UNIVERSITY of LIMERICK

OLLSCOIL LUIMNIGH

AUTUMN SEMESTER 2019
COURSE/MODULE BOOKLET

Introduction

The University of Limerick operates a modular system with continuous assessment. A module is a self-contained package of education taught during a single academic semester. Visiting students may choose from a wide range of modules and may cross register between the faculties and departments. Acceptance on these modules is subject to academic prerequisites, timetabling constraints and ceilings on enrolments. The module descripts that follow present an outline of the salient topics covered in each module.

Normal course load is 5 modules per semester.

Module Key

The module code is the key in most cases to find out when the class is running.

Example: **CU4051**

CU is the subject area.

4 is the type of study – only modules beginning in 4 are offered to study abroad students.

Modules beginning in 2 are certificate courses/access courses and modules beginning with 5 and 6 are postgraduate modules.

05 is just the departmental way to distinguish between classes.

The final digit is the only way to determine which semester the module will run in.

Odd numbers (**1, 3, 5, 7**) are fall semester classes.

Even numbers (**2, 4, 6, 8**) are spring semester classes.

1 and 2 are first year classes.

3 and 4 are second year classes.

5 and 6 are third year classes.

7 and 8 are fourth year classes.

This is the usual key for classes but there are always exceptions!

Modules Featured in this Booklet

All modules are in alphabetical order by module code.

Module	Faculty	Department
AC	BUS	ACF
AR	SEN	ARC
BC	SEN	CES
BY	SEN	LSC
CE	SEN	CEM
CG	SEN	CES
CH	SEN	CES
CM	BUS	MMA
CS	SEN	CSI
CU	AHS	MLA
DM	SEN	DMT
EC	BUS	ECO
ED	SEN	ECE
EE	SEN	ECE
EH	AHS	CCO
EN	EHS	EPS
EP	BUS	MMA
EQ	SEN	LSC
ER	SEN	LSC
ET	SEN	ECE
EV	SEN	LSC
FI	BUS	ACF
FR	AHS	MLA
FT	SEN	LSC
GA	AHS	CCO
GE	AHS	MLA
HI	AHS	HIS
HS	SEN	CES
IN	BUS	ACF
JA	AHS	MLA
JM*	AHS	CCO
LA	AHS	LAW
LI	AHS	MLA
LP	AHS	LAW
LS	SEN	LSC
MA	SEN	MAS
MB	SEN	MAS
MD	HUM	HUM
ME	SEN	MAB
MF	SEN	DMT
MG	BUS	MMA
MN	BUS	MMA
MS	SEN	MAS
MT	SEN	CEM
MU	HUM	HUM
NS	EHS	NMI
Module	**Faculty**	**Department**
PA	AHS	PPA
PD	SEN	DMT
PH	SEN	PHE
PM	BUS	PER
PO	AHS	PPA
PS	EHS	DMT
PT	SEN	DMT
PY	EHS	PHE
RM	AHS	CCO
SN	EHS	NMI
SO	AHS	SOC
SP	AHS	MLA
SS	EHS	PES
TE	AHS	MLA
TW	AHS	CCO
TX	BUS	ACF
WT	SEN	CEM

*Only open to Journalism Majors

Faculty Key

BUS	Kemmy Business School
SEN	Science & Engineering
AHS	Arts, Humanities & Social Sciences
EHS	Education & Health Sciences
HUM	Irish World Academy of Music & Dance

Disclaimer

The content of this booklet is for information purposes only and should not be viewed as the basis of a contract between the student and the University of Limerick. No guarantee is given that modules may not be altered, cancelled or otherwise amended at any time.

Module code	Academic area	Department
AC	Accounting	Accounting and Finance
AR	Architecture	School of Design
BC	Biochemistry	Chemical Sciences
BR	Broadening modules	N/A
BY	Biology	Biological Sciences
CE	Computer Engineering	School of Engineering
CG	Chemical Sciences	Chemical Sciences
CH	Chemistry	Chemical Sciences
CS	Computer Software	Computer Science and Information Systems
CU	Cultural Studies	School of Modern Languages and Applied Linguistics
DM	Design & Manufacturing	School of Engineering
EC	Economics	Economics
ED	Electrical Distribution	Electronic and Computer Engineering
EE	Electronic Engineering	Electronic and Computer Engineering
EH	English studies	School of Culture and Communications
EN	Education	School of Education
EP	Entrepreneurship	Management and Marketing
EQ	Equine Science	Biological Sciences
ER	Environmental Science	Chemical Sciences
ET	Electronic Technology	Electronic and Computer Engineering
EV	Equine Science	Biological Sciences
FI	Finance	Accounting and Finance
FR	French	School of Modern Languages and Applied Linguistics
FT	Food Technology	Biological Sciences
GA	Gaeilge	School of Culture and Communication
GE	German	School of Modern Languages and Applied Linguistics
HI	History	History
IN	Insurance	Accounting and Finance

Module code	Academic area	Department
JA	Japanese	School of Modern Languages and Applied Linguistics
JM	Journalism	School of Culture and Communication
LA	Law	Law
LI	Linguistics	School of Modern Languages and Applied Linguistics
MA	Mathematics	Mathematics and Statistics
MB	Mathematics	School of Education
MD	Music and Dance	Humanities
ME	Mechanical Engineering	School of Engineering
MF	Manufacturing	School of Engineering
MG	Management	Management and Marketing
MI	Management of Information	Management and Marketing
MK	Marketing	Management and Marketing
MS	Mathematics & Statistics	Mathematics and Statistics
MT	Materials	School of Engineering
MU	Music	Humanities
NS	Nursing	Nursing and Midwifery
PA	Public Administration	Politics and Public Admin
PD	Product Design	School of Design
PH	Physics	Physics
PM	Personnel Management	Personnel and Employment Relations
PO	Politics	Politics and Public Admin
PS	Psychology	Psychology
PT	Production Tools	School of Engineering
PY	Physical Education	Physical Education and Sports Sciences
RE	Robotics Engineering	School of Engineering
RM	Research Methods	School of Culture and Communications
SN	Sociology / Nursing	Nursing and Midwifery
SO	Sociology	Sociology

Module code	Academic area	Department
SP	Spanish	School of Modern Languages and Applied Linguistics
SS	Sport Sciences	Physical Education and Sports Sciences
TE	English as a Foreign Language	School of Modern Languages and Applied Linguistics
TW	Technical Writing	School of Culture and Communications
TX	Taxation	Accounting and Finance
WT	Wood Technology	School of Engineering

AC4001 - PRINCIPLES OF ACCOUNTING
ECTS Credits: 6

Accounting & Finance

Rationale and Purpose of the Module: *This module is designed to introduce the student to the fundamental concepts and practices of financial accounting.It treats accounting as the manifestation of various social and political pressures and thus considers it in its social context. By learning how to measure financial performance and financial position, the student will appreciate accounting as forming the basis for financial decision-making.*

Syllabus: This module introduces the student to the fundamental concepts and practices of financial accounting. Accounting is presented as a manifestation of various social and political pressures, which required that techniques be developed to account for trading and wealth. The topics covered include accounting in its political, regulatory, historical, social, economic, corporate governance and international contexts; introduction to the theoretical, conceptual and regulatory frameworks of accounting; traditional accounting model; capital, income and profit and measurement; principles of double entry bookkeeping; books of prime entry, ledgers, trial balance, internal controls, use of computers in recording and control of data, construction of final accounts for sole traders, partnerships and limited companies; accruals, prepayments and adjustments; depreciation and stocks; distribution of profits; profit and loss accounts and balance sheets, cashflow statements; nature, purpose, scope and framework of auditing. The ability of accounting to provide public accountability forms the basis for intergrating ethics into the subject matter.

Prerequisites: none

AC4007 - ADVANCED FINANCIAL REPORTING
ECTS Credits: 6

Accounting & Finance

Rationale and Purpose of the Module: *The aim of this module is to develop a student's understanding of the theory and practice of selected international accounting standards. It encourages the student to critically evaluate selected accounting standards in light of their historical development and regulatory context.*

Syllabus: The module will consider the theory and practice of selected international accounting standards and issues. Focus will be on the preparation and reporting of information to external users of financial information, especially, but not exclusively, equity investors. The international accounting standards and issues are examined in light of their historical development and discussions will not be solely around the actual content but what the regulations ought to be or might be. The module will cover the International Financial Reporting Standards.

AC4305 - FINANCIAL INFORMATION ANALYSIS
ECTS Credits: 6

Accounting & Finance

Rationale and Purpose of the Module: *The purpose of the module is to increase students' awareness of the information content of financial data and financial reports. The module considers the role and impact of accounting information in modern society within a variety of contexts. The module will enable students to critically analyse and interpret financial information in order to improve their decision-making capabilities.*

Syllabus: The nature of accounting information and its role in financial and other markets
The regulatory framework of accounting information and the needs of users
The conceptual framework of accounting information: recognition and measurement issues, fair value
Theories of financial analysis including efficient market hypothesis
Corporate governance: shareholder value and stakeholder theory perspectives including the Anglo-American and European models
Preparation of financial statements: income statement and balance sheet
Analysis of financial statements: ratio analysis, uses and limitations, accounting information as an aid to decision-making
Creative accounting: off-balance sheet financing, revenue recognition, fraud, the role of ethics and whistleblowing
Corporate social responsibility: environmental accounting, sustainability, narrative reporting and the green agenda
International accounting issues and developments: harmonisation and convergence, global reporting needs

Prerequisites: AC4001

AC4417 - MANAGEMENT ACCOUNTING 1
ECTS Credits: 6

Accounting & Finance

Rationale and Purpose of the Module: *This modules provides students with an in-depth understanding of the role and purposes of management accounting in the management process. It deals with the applications and systems of management accounting that serve the information needs of contemporary organisations. It aims to give students an appreciation of the frontiers of management accounting and the associated theoretical and empirical research activity.*

Syllabus: Objectives, scope and framework of management accounting; role and purpose of management accounting; management accounting and the business environment; ethical guidelines and challenges; cost terminology, concepts and classification; cost accumulation for inventory valuation and profit measurement; cost behaviour and analysis; cost-volume-profit relationships; cost-estimation methods; learning curve and non-linear cost functions; cost systems and design choices; job costing; activity-based costing and management; inventory costing and capacity analysis; variable versus absorption costing debate; information for planning and control; management control systems; organisational and social aspects of management accounting; responsibility accounting and the master budget; kaizen budgeting; activity-based budgeting; flexible budgets; standard costing and variance analysis.

AR2001 - FAB LEARNING PORTFOLIO
ECTS Credits: 12

School of Design

Rationale and Purpose of the Module: *The central objective of this module is to promote both the understanding and development of a range of skills on digital fabrication in different design areas, adding value to the corporate environment and to their careers.*

The module aims to inform and facilitate the

development of specific skills, which will be utilised in the workplace, through the application of theory encountered throughout the programme.

This module also aims to provide an opportunity for students to reflect on the development these key skills in an open and supportive learning environment.

The module supports the work of students in translating their study of their own practice into a portfolio of work reflecting their development and achievements in the programme

Syllabus: Personal Portfolio Development, Constructing a portfolio of experiences in projects using a combination of different digital fabrication technologies.

Use a combination of general and specialist knowledge and understanding the use of existing and emerging digital fabrication technologies.

Apply appropriate theoretical and practical methods to the analysis, design and fabrication of solutions based on digital fabrication technologies.

Use effective communication and interpersonal skills.

AR4001 - DESIGN STUDIO 1A
ECTS Credits: 15

School of Design

Rationale and Purpose of the Module: *The aim of First year Design Studio is to enable the student to become an active participant in the architectural design process. The field of architecture is broad and the methodologies used to work within it varied. In addition, architecture interacts closely with a number of related disciplines.*

First year Design Studio exposes the student to the types of thinking and acting inherent in this process with the objective of helping the student become conversant with the process and capable of developing initial architectural projects.

Syllabus: Design Studio is the backbone of study in Architecture. Study is organised around design æproblemsÆ or projects, a number of which are given each term.

By working through the project, the student will become exposed to the architectural design process, a new and complex process for most first year students. Each project introduces a different aspect of the architectural design process in order to help the student develop a range of methods of working.

Each project also introduces a new programmatic theme so that students understand and become conversant with the many fields of operation of an architect. Themes include space and light explorations through model making, understanding the process of abstraction and transformation through model making/two dimensional work, building full scale structures in timber to explore architectural concepts such as scale, framing, section and thresholds, developing observational skills through sketching on site, learning how to make a site plan by developing a pattern of occupation on an open site, learning how to develop a building design grounded in this context.

Studio work is organised so that close contact is maintained with the student. Work is analysed and discussed with the student on an individual basis and within the group. The student is taught to recognise the design process and to value and catalogue their own work. As the year progresses the student is encouraged to become increasingly responsible for organising and developing their own work process.

The studio is co-ordinated with the content of parallel course modules and integration between studio work and course module work is a vital and innovative component of the studio structure.

AR4005 - DESIGN STUDIO 3A
ECTS Credits: 15

School of Design

Rationale and Purpose of the Module: *The principal aim of Third-Year Design Studio is to enable the student to demonstrate a first synthesis of the disparate influences that go to make up an architectural project using the range of skills and tools an architect is required to use. The emphasis in the first term is on developing a thoroughly researched design proposal and to produce a set of competent design documents.*

Syllabus: An agenda will be set in Design Studio. The basis for all propositions will have stated intent relative to societal ideas of place, collectivity and socio economic (or political) meaning. The architectural project brief will have inherent complexity, embodying personal space together with public space.
Through the detailed study of architectural references, a concept of `now relative to the past history of societal and architectural ideas will inform each students proposition since both will be researched and presented in parallel. The material realisation of these social and cultural concepts is capable of conveying meaning in a contribution that the strictly functional provision of buildings does not make.
The architectural proposition will move through a series of studies where the student is taught to use different scales, modes of operation and reference points. The emphasis will be on the mastery of investigative skills through a range of media on an ongoing basis.

Prerequisites: AR4004

AR4007 - DESIGN STUDIO 4A
ECTS Credits: 18

School of Design

Rationale and Purpose of the Module: *In order to facilitate more extensive and, at the same time, more focused design projects and adequately comprehensive thesis projects, credits awarded to Design Studio 4a and 4b increase to 18 credits while the number of parallel modules is reduced*

Syllabus: In Y4 students start a personal pursuit; they must - through their design projects and their research work - relate to the world of architecture in their own personal way. Students are expected and asked to voice their position in architecture, to find their direction through architectural design. Students develop a method of research and allocate significant time to the research part of the curriculum. The architectural project is tightly allied to construction and the physicality of building; construction technology is an important part of the years work.
A research led project in the autumn semester opens the expanse of architectural intelligence into circumscribed cultural and environmental fields. Students develop a fluency in the means of making of and thinking through

things in terms of structure, technology, and environment to the point where they can rise above the practicalities and conceptualise as well.

AR4011 - GRAVITY AND REACTION 1
ECTS Credits: 3

School of Design

Rationale and Purpose of the Module: *Give students the understanding of a number of useful structural concepts using experiment, intuition and formal learning. Give students a strong conceptual and formal grasp of these concepts, that are applicable to actual conditions.*

Syllabus: Lectures, Experiments in the following concepts:

One Equation: Gravity + Reaction = Equilibrium (stable, unstable, neutral).
Co-Ordinate Systems
What does 3D space mean?
What is gravity? EinsteinÆs view: NewtonÆs view:
Effects of gravity have been described yet what is it?
How does it act over distance? Gravity waves never detected.
Friction
If force causes a change in velocity why is it so hard to push start a heavy timber crate? Why cannot a small child push start the crate?
Components of a Vector
A force can act on a body without changing its speed of motion; only its direction of motion; planetary motion.
Tension & Compression , Buckling of Compression Members, Moments
Equilibrium: How does an even see-saw balance?
Neutral / unstable equilibrium. How does an uneven see-saw balance. The gravity forces are different.
Components of a force, Internal Forces, Beams:
Members that Bend, Stiffness, Materials, Connections

AR4013 - GRAVITY AND REACTION 3
ECTS Credits: 3

School of Design

Rationale and Purpose of the Module: *Give students an understanding of structural models using experiment, project work and formal learning. Give students a strong conceptual and formal grasp of materials used in structural design, which are applicable to actual conditions.*

Syllabus: Continued Introduction to structural concepts. Topics covered will be portal frames, crane structure; RC beam design; timber truss design in qualitative process; shells, membranes. Introduction to materials used in structural design; concrete, reinforced concrete; timber; laminated timber; glulam; steel; models to describe failure modes in structures.
Students will research:
(a)* Materials in the studio and in a site context.
(b)* Materials used in structural design and their relevant components
(c) Failure modes in slab, trusses, beams, shells and membranes.

Prerequisites: AR4012

AR4015 - GRAVITY AND REACTION 5
ECTS Credits: 3

School of Design

Rationale and Purpose of the Module: *In depth study of Load Path, in depth study of structural form, particularly as it relates to specific material properties. Learning through the analysis of structural models using experiment, project work and formal learning. Give students a strong conceptual and formal grasp of materials used in structural design, which are applicable to actual conditions.*

Syllabus: Continued Introduction to structural concepts. Topics covered will be portal frames, crane structure; RC beam design; timber truss design in qualitative process; shells, membranes. Introduction to materials used in structural design; concrete, reinforced concrete; timber; laminated timber; glulaminated timber; steel; models to describe failure modes in structures.
Students will research:
(a) Materials in the studio and in a site context.
(b) Materials used in structural design and their relevant components
(c) Design and build in model form a simple bridge with calculated design loads and span.

Prerequisites: AR4014

AR4021 - REPRESENTATION / DRAWING 1
ECTS Credits: 3

School of Design

To establish drawing as a tool of observation, a tool of thinking and a tool of representation, this course is composed of two different types of drawing exercises:

Studio based exercises with weekly changing subjects introducing key aspects of architectural vocabulary (light and space, site, human scale, skin and comfort, flows and organisation, vision and architecture). Short introducing lectures are followed by a drawing or sketching exercise, and, in the next step by a model making exercise, where the drawings from the exercise have to be interpreted and transformed into the 3rd dimension. Contents of both exercises as well as the chosen format, materials and techniques are directly related to the particular subject. As subject matter, each session will be organized around a specific theme from art, photography, film, dance, architecture

Exercises in architectural drawing in a conventional sense, line drawings of floor plans, sections and details in pencil, are introduced within an extensive lecture, then elaborated by the students as far as possible self-dependently and later on reviewed.

In both parts of the course curriculum hand drawing with pencil is emphasized in order to develop within the students a sensitivity to the medium. Exercises are on opaque white paper so as to prevent tracing and use of construction aids.

AR4023 - REPRESENTATION / DRAWING 3
ECTS Credits: 3

School of Design

Rationale and Purpose of the Module: *In this module students hone skills in drawing through practising, and form an understanding through application.*

Syllabus: To establish drawing as a tool of observation, a tool of thinking and a tool of representation, this course consists of three different types of drawing exercises:

Surveying using the sketchbook, pencil and the body to observe and record buildings, proportions, scale, and distances of objects.
Surveying using careful notation of dimensions through careful observation, and detailed measuring using a tape measure and triangulation.
Drawing, with pencil, the results of the survey carefully bringing all information to the same level of detail and consistency on a well organised composed drawn document.

Prerequisites: AR4022

AR4025 - REPRESENTATION / DRAWING 5
ECTS Credits: 3

School of Design

Rationale and Purpose of the Module: *In this module students are introduced to the computer and related modes of representation, in conjunction with continuing studies in hand drawing. Switching between virtual and analogue modes of representation, e.g. models, drawings, digital photography, photoshop, illustrator, and other graphics programmes will be explored as tools of transformation and spatial, logical, and structural exploration.*

Syllabus: Widening the pallet of modes of representation that the student must master, drawing is taught as a tool of observation, a tool of thinking and a tool of representation, this course consists of three different types of drawing exercises:
Moving actively between analogue and digital modes of representation, students will develop their ideas between media, exploiting the most powerful aspects of each in terms of their design. Students will develop in parallel their hand drawings skills.

Prerequisites: AR4024

AR4031 - HISTORY AND THEORY OF ARCHITECTURE 1
ECTS Credits: 3

School of Design

Rationale and Purpose of the Module: *The first year program in History-Theory aims to expand studentsÆ horizons of knowledge about architecture while teaching foundational skills in reading and writing in the discipline. Even though students at the School of Architecture are expected to be highly literate and articulate, entering into a new fieldùsuch as architectureùis a difficult intellectual transition to make. Students will need to develop specific cognitive skills to address the new territories they will have to map. The first year program sets out to help students attain a basic literacy in the discipline while introducing a selection of the monuments of modern architecture together with contemporary ways of thinking about the field.*

Syllabus: The theme for the fall workshop is Site. Objectifying and describing a site is typically difficult for beginning, or even advanced students, and yet is a skill all architects must master. Site is the precondition for construction and the link between architecture and the world. With forms of human habitation rapidly changing due to urbanization, site becomes a more important consideration every day.
Seminars will address Fields, Territories, Surveys, Flows, and Contexts, surveying both historical and contemporary material to challenge students. As an introduction to architecture as an expanded field, students will encounter disciplines such as politics, geology, philosophy, infrastructural engineering, land art, archaeology, and landscape architecture. Buildings will illustrate responses to the topics and students will encounter a selection of the most significant works in modern and contemporary architecture. Projects discussed include HaussmannÆs Boulevards, the Paris Opera, MiesÆs Friedrichstrasse Skyscraper, the Villa Savoye, the Barcelona Pavilion, the Bauhaus, ArchigramÆs Instant City , SuperstudioÆs Continuous Monument, Herzog and de MeuronÆs Signal Box Auf dem Wolf, and the Sendai Mediatheque. Readings by authors such as Rem Koolhaas, Colin Rowe, Michel Foucault, St. Brendan, Guy Debord, John McPhee, John Stilgoe, Robert Smithson, and Georg Simmel will challenge students with the diverse ways by which we can describe sites.
We will visit three nearby sites first-hand in order to learn how to discuss them. Afternoon writing workshops will focus on describing these sites.

AR4033 - HISTORY AND THEORY OF ARCHITECTURE 3
ECTS Credits: 3

School of Design

Rationale and Purpose of the Module: *The second year program in Architectural Research provides students with a comprehensive survey of the history of architecture and urbanism. Students will continue to hone the specific cognitive skills required to address the field, deepening their knowledge of the local and global built domain while reading, writing, and researching architecture. The goal is to provide students with a basic knowledge and understanding of architecture and urban design in the period between circa 1851 and 1980. In addition, the course is designed to teach students how to critically analyze and evaluate built projects from a variety of perspectives, and how to communicate these ideas in spoken and written form.*

Syllabus: The first part of the course deals with ways of looking at the history of land and society; people, time, place (methodological with material from the Mediterranean, Ireland and Limerick). It will include several Case Studies: Irish building land 1600-2000 (ownership, tenure, land reform, rural and urban populations), building the city; Limerick 1200-2000 (racial, social and religious segregation over time), and deal with the shape of the city: (Medieval, Renaissance, Baroque and Industrial ideals of the city, with emphasis on land use in relation to buildings and spaces between buildings, building land in Ireland today; not about the law but about trends, patterns, densities.

The second part of the course is a contemporary theoretical survey of key theoretical aspects of modern architecture that exposes students to the monuments of the modern movement. The course focuses on the body in modernism, e. g. the body in an emergent consumer environment and visual culture (Joseph PaxtonÆs Crystal Palace, the department stores, the arcades), as an agent of production and instrument of sensation (William Morris, Art Nouveau, the Secessionstil), in motion (Frank Lloyd Wright, the Werkbund, Futurism, de Stijl), in a culture of hygiene (Tony Garnier, Le CorbusierÆs urbanism, the Suburb), at home and in exhibition (the International Style, the Schindler House, the Eames House, the Farnsworth House, JohnsonÆs Glass House), and nomadic (Team X, Kurokawa, the SmithsonÆs House of the Future, Archigram).

Prerequisites: AR4032

AR4035 - HISTORY AND THEORY OF ARCHITECTURE 5
ECTS Credits: 3

School of Design

Rationale and Purpose of the Module: *The third year program in Architectural Research continues the comprehensive survey of the history of architecture and urbanism in the programme curriculum. This module exposes students to the relationship of architecture to technology and materials, both naturally occurring and those produced by man both in Ireland and globally.*

The goal for the course is to give students a broad introduction to architecture throughout the ages, from the classical Greek and Roman periods to the present day while introducing them to the role that materials and technologly have in architecture.

Syllabus: Through lectures, discussion seminars, and writing the course will survey the relationship between architecture, materials, and technology from prehistory to the present day.

Starting with the classical Greek and Roman periods, into the present day ôSilicon Age,ö both society and architecture have been profoundly influenced by materials and technology. This course will be composed of a research and readings on the period by experts in the history of science and technology, Irish history, structural engineering, materials science, structures, and the history of architecture. Students will complete their own directed research projects on a particular work of architcture, and encounter the work directly, making observations from experience with the physical object.

Prerequisites: AR4034

AR4041 - ASSEMBLY AND TECHNIQUES 1
ECTS Credits: 3

School of Design

Rationale and Purpose of the Module: *Introduction to Principles of Construction.*
Introduction to Construction Industry

Syllabus: This course will introduce basic constructional principals through the detailed study of elements of simpler constructional technology. This technology is considered from the point of view of design intent, logic of assembly and the quality of the resulting climate/environment.
The course will further challenge the students to analyse the built environment they are familiar with under these themes. The suitability of various forms of construction to different design ambitions will be considered with particular emphasis put on developing an understanding of the size and dimensions of various constructional systems. The course is intended as a foundation course in itself as well as anticipating the information required in the design studio. The course is seminar based with an individual student research component.

AR4043 - ASSEMBLY AND TECHNIQUES 3
ECTS Credits: 3

School of Design

Rationale and Purpose of the Module: *The aims of this class are:*
1. to explain clearly and simply the basic principles of construction.
2. to show how much architectural expression depends on its constructional composition. Special attention will be will be paid to constructional aspects which imbue meaning and in this aspect it differs from the albeit relevant but exclusively technology-focused literature.
3. to introduce students to the importance of representing clear, legible and organised ideas to others in the construction industry.

Syllabus: Principles of assembly of buildings will be studied beginning through a raw material and a particular building typology. The focus will be on concrete, timber and steel construction. Practical reflections will be presented next to theoretical ones. Sober detail drawings will be introduced alongside thoughtful reflections. Basic construction concepts will be presented next to specific descriptions of construction processes.
DRAWING EXERCISE: Each exercise will involve disseminating the required information the previous week. A short introduction will precede each exercise.
LECTURE COURSE: A weekly lecture as well as visiting guest tutors will introduce students to properties of materials, covering descriptions of manufacturing methods, assembly and product ranges of the most important modern building materials.
DIARY OF A BUILDING: Students will be asked to keep a diary of progress on each site that will involve sketches, notes and photographs. Each group will be asked to present their findings to the class at the end of the year.
CASE STUDY: A building precedent will be presented to each student under the headings of concept, process and system.

Prerequisites: AR4042

AR4045 - ASSEMBLY AND TECHNIQUES 4
ECTS Credits: 3

School of Design

Rationale and Purpose of the Module: *The aims of this class are:*
a. to introduce students to the initial studies required to later generate a comprehensive set of working drawings of a third year design studio project.
b. to develop further the studentÆs own intuitive skills in technique alongside knowledge of available construction technology today.
c. to develop the students capacity to interrogate and develop design decisions through construction principles

Syllabus: Developed principles of assembly and techniques will be further studied concurrently with the production of a full set of working drawings.

DRAWING EXERCISE: Each weekly exercise will concentrate on developing one technical aspect of a building. The culmination of the term will be that each student would have completed a comprehensive set of working drawings.

LECTURE COURSE: A weekly lecture will introduce students to developed construction principles, systems and methods. Students will be asked to choose a construction system/method at the start of the year.

Each student will complete a short dissertation on the chosen topic for the end of the module.

DIARY OF A BUILDING: Students will be assigned a building of appropriate complexity at the start of the year. Fortnightly supervised visits will be made to the building site.

Prerequisites: AR4043

AR4051 - ENVIRONMENTAL SYSTEMS AND FORCES 1
ECTS Credits: 3

School of Design

Rationale and Purpose of the Module: *Basic understanding of physical backgrounds and interconnections for a sustainable development*

Syllabus: Sustainable development is a base for the future of human society on our planet. Architects as the designer for the built environment have a key position in this approach. Therefore a basic understanding of the physical backgrounds and interconnections is necessary. This lecture content spans from global to local and micro climate, to energy and itÆs different forms and sources towards materials and their properties. Parallel and interconnected to the teaching of design basics like space, light, boundaries students will learn the physical backgrounds and properties by handling and personal experiences. ôBurning your finger at a hot stainless steel surface while missing the heat radiation û and understand why this happened - is a much deeper experience, than just calculating heat conductivity on a piece of paper.ö

AR4053 - ENVIRONMENTAL SYSTEMS AND FORCES 3
ECTS Credits: 3

School of Design

Rationale and Purpose of the Module: *Advanced understanding of physical backgrounds and interconnections for sustainable development, and the integration of environmental principles into architectural works. Emphasis will be placed on the study of material properties. Particular attention will be paid to integration of environmental principles into design studio work. Specific material properties will be studied, and modelled.*

Syllabus: Sustainable development is a base for the future of human society on our planet. Architects as the designer for the built environment have a key position in this approach. Lectures on details of Environmental system and forces such as
- integrated design of case studies
- process integration
- acoustical, visual and thermal comfort
- building physical basics
- heat losses and energy balance

Research project on the modern building in respect of environmental systems

Realisation of group project of Autumn Semester, Yr 2 as physical manifestations
- daylight model of studio space
- solar simulator
- weather station
- indoor comfort station
- waste sorting system

Prerequisites: AR4052

AR4056 - ENVIRONMENTAL SYSTEMS AND FORCES 5
ECTS Credits: 3

School of Design

Rationale and Purpose of the Module: *Sustainable development is a base for the future of human society on our planet. Therefore a basic understanding of the physical backgrounds and interconnections is necessary. This modules content spans from global to local and micro-climate, to energy and its different forms and sources towards materials and their properties.*

Syllabus: Understanding precisely how the performance of an integrated and unrelated set of elements will perform in a specific environment comes through simulation, modelling and analysis. Both analogue and digital means of simulation will be taught. Daylight modelling, building fabric U-value calculations, air-tightness, and CFD modelling of buildings are some examples of the types of essential simulation during the design process. The emphasis of the course is on the acquiring analytical techniques and skills required to evaluate the environmental performance of a set of elements under a specific condition.

Building on observation, analysis and design, students will develop skills for critical inquiry into the nature of architectural design and how it engages with the concepts of site, place and comfort. The idea of `boundary conditions will be developed in the context of an integrated understanding of structure + environment + materials.

The following subjects will be covered:
Day-lighting and artificial lighting design in relation to a large-scale physical model
Thermal energy losses and gains through envelope
Performance of a building in relation to air movement inside and outside (applied CFD modelling tools)
Material selection and embodied energy considerations
Energy/Water/Waste systems integration/design

Prerequisites: AR4054

AR4073 - DESIGN STUDIO 2A
ECTS Credits: 15

School of Design

Phase I Using mapping as a vehicle for speculative architectural analysis, students will map one defined aspect of a particular place as ground, infrastructure, climate and occupation of space. Through mapping, students will confront their first analysis with more specific information: climate, ground, geology, built structures, growing structures, water treatment and flows, infrastructural networks, historic traces, land use and occupation of space. It is about identification of specifics through drawing, registering, measuring, timing, investigating; observe on site at several occasions and document, explain conditions, situations, make drawings, diagrams and sketches to explain conditions

Phase II Explore settings for physical activity and for the interconnection that happens between spectator and sport and between land and the body. Cultural and technical characteristics of sport must be integrated into

the land in a way, which will change it consciously.
Students first make a first landscape urban proposition (MODEL) plus make a set of drawings showing dimensional sizes for activities include heights PLANS, SECTIONS,
Make a set of investigations of three different structures and how they work with the land.
Development Synthesis Two: Choreography, colour, light, material, crowd versus the individual delineation, studies
Development Draw Up and review MODEL

The design studio is co-ordinated with the content of parallel course modules and integration between studio work and course module work is a vital and innovative component of the studio structure.

Prerequisites: AR4002

AR4317 - Advanced Construction 1
ECTS Credits: 3

School of Design

Rationale and Purpose of the Module: *An extended and clearly structured curriculum in construction design to induce a more innovative and imaginary approach to materials and details. In order to ensure the expected high level of competency in advanced building construction (at an industrial scale and with respect to contemporary and innovative technologies) SAUL introduces a set of Advanced Construction modules throughout Y4 and Y5 in close relation to and in support of the Design Studio projects*

Syllabus: Architecture students learn best by imagining, developing and realising (fullscale) prototype structures through which ideas can be tested, documented and communicated. Through actual engagement in all the stages of making and building, students have a unique opportunity to develop a rich phenomenal understanding of architecture. Closely related to Design Studio, Advanced Construction informs and supports the students individual design studio projects; directed and independent research on advanced construction is applied to these projects.

After revisiting traditional and conventional (vernacular) forms of building taxonomy and production techniques in a range of materials (stone, concrete, metal, timber, fabric and polymers) staff and students engage more advanced means of fabrication (including milling, folding, laminating, sewing, stacking, interlocking, hanging, injection moulding, compositing, extrusion, weaving and bundling). Spatially and programmatically this will entail various degrees of articulation from the standardised, lowtech component to the highly articulated formal element, avoiding selfsimilar repetition in favour of the diversity of the composite.

AR4319 - Advanced Construction 3
ECTS Credits: 3

School of Design

Rationale and Purpose of the Module: *An extended and clearly structured curriculum in construction design to induce a more innovative and imaginary approach to materials and details. In order to ensure the expected high level of competency in advanced building construction (at an industrial scale and with respect to contemporary and innovative technologies) SAUL introduces a set of Advanced Construction modules throughout Y4 and Y5 in close relation to and in support of the Design Studio projects.*

Syllabus: The series of modules in Advanced Construction expands the scope of students competencies in building technologies and construction beyond traditional methods and their related familiar scale. In the final year, students engage in a tested dialogue with concerns of design, structure, environment, history and theory, representation, digital media, and other related areas and interests.
Staff and student undertake in-depth research into specialist areas of technology. Case studies focus is on an integration of structural and environmental systems in response to specific conditions that require complex skills in analysis and/or design. The students are expected to apply findings from directed and independent research on advanced construction technologies to develop each students thesis proposal individually.

AR4337 - Urban Design
ECTS Credits: 6

School of Design

Rationale and Purpose of the Module: *Students are offered the opportunity to tailor their education to a larger degree in fourth and fifth year, with the invitation to make choices of modules beside the core Design Studio and adjacent modules. The introduction of architecture electives is intended to provide a flexible framework to accommodate the diverse field of interests and (shortterm) research projects within architecture, and to allow students to pursue their own personal interests within architecture. Smaller classes allow for in-depth interrogation of the subject at an advanced level.*

The elective modules have been conceived and created to give venue to research, to permit the students particular (and varying) interests to diversify and develop - apart from the Design Studio. This is markedly different from the lower three years of the course, where integration is the focus of the course, coordination between modules and Design Studio is essential, and particular student interests are less relevant than developing competence as an architect. Therefore the content of the elective modules cannot be specifically related to the Design Studio - this is to allow the student the space to start making their own decisions and setting their own direction.

Syllabus: Architecture electives provide a flexible framework to accommodate (short-term) research projects on a wide spectrum of issues, and to allow students to pursue their own personal interests within architecture. Focusing on case studies, the elective module will be delivered through a programme of lectures, seminar discussions and case study presentations. - The subject matter can change depending on the interest and availability of academic staff.

The module addresses the recent history, current discourse and emerging processes of urban design and place-based planning governance, with an emphasis on the design of civic space. It explores directly the meaning and application of sustainable development policies in urban development. It investigates, particularly, contemporary examples of interdisciplinary practice in urban design and emerging, bottom-up approaches to place making as a design practice. The course will develop a context for understanding the role of design in shaping the urban environment, both physically and culturally.

AR4347 - Design Philosophy
ECTS Credits: 6

School of Design

Rationale and Purpose of the Module: *Students are offered the opportunity to tailor their education to a larger degree in fourth and fifth year, with the invitation to make choices of modules beside the core Design Studio and adjacent modules. The introduction of architecture electives is intended to provide a flexible framework to accommodate the diverse field of interests and (shortterm) research projects within architecture, and to allow students to pursue their own personal interests within architecture. Smaller classes allow for in-depth interrogation of the subject at an advanced level.*

The elective modules have been conceived and created to give venue to research, to permit the students particular (and varying) interests to diversify and develop apart from the Design Studio. This is markedly different from the lower three years of the course, where integration is the focus of the course, coordination between modules and Design Studio is essential, and particular student interests are less relevant than developing competence as an architect. Therefore the content of the elective modules cannot be specifically related to the Design Studio - this is to allow the student the space to start making their own decisions and setting their own direction.

Syllabus: Architecture electives provide a flexible framework to accommodate (short-term) research projects on a wide spectrum of issues, and to allow students to pursue their own personal interests within architecture. Focusing on case studies, the elective module will be delivered through a programme of lectures, seminar discussions and case study presentations. - The subject matter can change depending on the interest and availability of academic staff.

Considering a wide array of research processes from the scholarly to the wildly eccentric, this module will analyse the relationship between inquiries into archives, sites and objects and the structures used to organize the results. Taking research beyond a mundane or tedious task, this module will uncover the researchers power to make strange and unpredictable the world of neat certainties. Subsequently, it will relate the way we position ourselves in the world, the way we describe it, to the way we act within and upon it.

AR4367 - Digital Technology
ECTS Credits: 6

School of Design

Rationale and Purpose of the Module: *Students are offered the opportunity to tailor their education to a larger degree in fourth and fifth year, with the invitation to make choices of modules beside the core Design Studio and adjacent modules. The introduction of architecture electives is intended to provide a flexible framework to accommodate the diverse field of interests and (shortterm) research projects within architecture, and to allow students to pursue their own personal interests within architecture. Smaller classes allow for in-depth interrogation of the subject at an advanced level.*

The elective modules have been conceived and created to give venue to research, to permit the students particular (and varying) interests to diversify and develop - apart from the Design Studio. This is markedly different from the lower three years of the course, where integration is the focus of the course, coordination between modules and Design Studio is essential, and particular student interests are less relevant than developing competence as an architect. Therefore the content of the elective modules cannot be specifically related to the Design Studio this is to allow the student the space to start making their own decisions and setting their own direction.

Syllabus: Architecture electives provide a flexible framework to accommodate (short-term) research projects on a wide spectrum of issues, and to allow students to pursue their own personal interests within architecture. Focusing on case studies, the elective module will be delivered through a programme of lectures, workshops and applied technology laboratories. The subject matter can change depending on the interest and availability of academic staff.

This elective provides the theoretical framework, tool expertise and technical skills required to analyse, understand and represent three-dimensional complex forms (curves, surfaces and volumes) using digital tools. NURBS-based modelling tools and physically correct rendering tools are taught and applied in the process, specifically Rhino and Maxwell Render. The course will also present a number of techniques for sketching complex surfaces using pencil. The course also analyses prototyping and fabrication processes related to these complex forms, and students will study outstanding references of their application in contemporary design.

AR4397 - UTOPIAN STUDIES
ECTS Credits: 6

School of Design

Rationale and Purpose of the Module: *Students are offered the opportunity to tailor their education to a larger degree in fourth and fifth year, with the invitation to make choices of modules beside the core Design Studio and adjacent modules. The introduction of architecture electives is intended to provide a flexible framework to accommodate the diverse field of interests and (shortterm) research projects within architecture, and to allow students to pursue their own personal interests within architecture. Smaller classes allow for in-depth interrogation of the subject at an advanced level.*

The elective modules have been conceived and created to give venue to research, to permit the students particular (and varying) interests to diversify and develop - apart from the Design Studio. This is markedly different from the lower three years of the course, where integration is the focus of the course, coordination between modules and Design Studio is essential, and particular student interests are less relevant than developing competence as an architect. Therefore the content of the elective modules cannot be specifically related to the Design Studio this is to allow the student the space to start making their own decisions and setting their own direction.

Syllabus: Architecture electives provide a flexible framework to accommodate (short-term) research projects on a wide spectrum of issues, and to allow students to pursue their own personal interests within architecture. Focusing on case studies, the elective module will be delivered through a programme of lectures, seminar discussions and case study presentations. - The subject matter can change depending on the interest and availability of academic staff.

This module will examine the nature and history of utopianism, especially in relation to the processes of the imagination and social design. It will consider utopianism in all its manifestations, including books and buildings, intentional communities and political movements; and it

will especially pay attention to the role of the utopian method in producing the built environment. To do so, students will read and discuss work that describes and enacts utopia in description and theory and in fiction and film (especially science fiction). Classes will be comprised of a lecture, followed by close discussion of assigned texts.

AS2391 - MANUFACTURING TECHNOLOGY AND CAD
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: *Introduce students to engineering principles and techniques prior to them starting an undergraduate engineering programme.*

Syllabus: * Understanding the role of a measurement and calibration system in engineering.
* Understand the basic techniques used in joining components/materials.
* Understand the principles of machining.
* Acquire a basic understanding of a CAD package and principles of engineering drawing.

AW6001 - ACADEMIC LITERACIES FOR INTERNATIONAL POSTGRADUATE STUDENTS 1
ECTS Credits: 3

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *This module is intended to replace EF6001, which provides language support at Proficiency Level for students on the MA TESOL programme whose L1 is not English. This modification requires broadening EF6001 to offer support to all international students undertaking PG programmes with the aim of enabling students to adapt better to their new learning environment. The University's strategic goal is to increase the number of International students coming to UL and the number of UL students who have an overseas experience as part of their degree. With an increase in international students comes a new set of challenges such as different educational structures, teaching and learning styles, as well as social and cultural differences.*
This module is intended to assist international students undertaking PG Programmes with the aim of enabling students to adapt better to their new learning environment. In order to ensure that the transition from their home system to UL is as smooth as possible and the student's maximum academic and social potential is met, this module aims to:
• Equip International students with the practical skills necessary to succeed in UL
• Enable International students to become critical thinkers and researchers
• Equip International students with the written and oral communication skills necessary to participate effectively in the academic community
• Encourage students to become autonomous/independent learners
• Enhance the learning experience of students

Syllabus: There are many challenges facing International students (culture shock, language shock and academic shock), and this module offers strategies for managing this experience and for providing a rich and engaging learning environment for such students. This module will raise students' awareness of the academic support systems, cultures, and protocols within UL; provide students with information sourcing and management skills; and provide students with strategies for successful integration and learning in UL. This module will also offer practice in skills such as academic reading (reading methods; reading abstracts; fact versus opinion; critical thinking; assessing internet sources critically), writing (the planning process; analysing titles; brainstorming; outlining) and presenting (learning and practising how to write an outline of a project presentation; learning how to give an oral presentation of a research paper by using PowerPoint (or other software).
Proposed Content:
1 x 12 hour Pre-Sessional Block
- Session 1: Academic Support Systems and Cultures
- Session 2: Information Sourcing
- Session 3: Information Management
- Session 4: Academic Protocols (Plagiarism)
- Session 5: How to Become a Successful Learner
1 x 12 hour Training (Weeks 3-8)
- Weeks 3&4: Academic Reading Skills
- Weeks 5&6: Presenting Skills
- Weeks 7&8: Introduction to the Research Project

BC4011 - BIOPROCESS ENGINEERING FOR BIOCHEMISTS
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: *The purpose of this module is to introduce students to more advanced aspects of bioprocess engineering, building directly on the fundamentals covered in CG4003. The students will be informed on mass transfer, biochemical kinetics, heat transfer specific to bioprocessing, mass balance, stoichiometric analysis relevant to bioprocessing, downstream processing unit operations, and emerging technologies in bioprocessing. In addition, the students will complete practical experiments relevant to course content.*

Syllabus: Bulk mass transfer effects in fermentation systems. Factors affecting oxygen mass transfer in aerobic fermentations. Measurement of kLa using static and dynamic methods. Control of kLa using correlations with agitator power and other operational variables.
Heat transfer in biochemical systems. Heat exchanger design in bioprocessing units.
Bioreactor sizing and design for the following reactor types: fed batch, stirred fermenter, bubble column, airlift, packed bed, fluidised bed, trickle bed, and perfusion. Bioreactor scale-up. Operation and feeding regimes: chemostat with recycle, fed batch operation, and multistage reactors. Control methods: feedback, indirect metabolite control, programmed control, and emerging AI-based methods.
Bioreaction product separation processes including: cell disruption, solvent extraction, adsorption, filtration, and centrifugation.
Final product purification methods: gel filtration, process chromatography, protein crystallisation, spray drying, and lyophilisation.
Regulatory and licensing systems in the pharmaceutical, biopharmaceutical, and biotechnology industries.

Prerequisites: CG4003

BC4825 - MICROBIAL TECHNOLOGY 2
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: *To build on the fundamental concepts of microbiology. To develop skills in manipulating and identification of micro-organisms. To develop an understanding of metabolic pathways. Understanding basic concepts in microbiology for the*

development of diagnostic kits. To illustrate the role of microbiology in the clinical and food environment. Understand viruses and their life cycles.

Syllabus: Principles of metabolism: the major pathways, Glycolysis, Embden Mayerhoff and Pentose Phosphate Pathways, Electron transport and Chemosmosis. Traditional and novel fermentation processes. Systematic (taxonomy) microbiology. Clinical microbiology: use of chemotherapeutic agents and susceptibility testing. Developments in microbial diagnostic kits for clinical and industrial/food applications. Viruses: general characteristics.

Prerequisites: BC4803, BY4001

BC4903 - BIOMOLECULES
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: *To impart an understanding of the structure, properties and biochemical function of the major groups of biological molecules found in living organisms, along with selected biotechnological applications of such biological molecules. To impart some basic biochemical laboratory skills, principally how to detect & quantify selected biomolecule types.*

Syllabus: The range of biomolecules. Evolution of biomolecules. Structure, properties & functions of: amino acids, peptides & proteins; carbohydrates including monosaccharides, diasaccharides and polysaccharides; fatty acids, energy storage lipids, structural lipids and ecosanoids; nucleic acids including DNA, RNA and their building blocks; vitamins. Selected biotechnological applications; enzymes, antibodies, hormones and gene therapy. The production of high fructose corn syrup. Bioethanol production. The dynamics of life. Overview of metabolism; anabolism and catabolism. Glycolysis.

BC4905 - GENETIC ENGINEERING
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: *To introduce the techniques involved in genetic engineering and to familiarise the students with their theoretical basis and practical uses*

To demonstrate the diverse applications of the techniques of molecular biology in research and development and quality control in a wide variety of industries

To impart core laboratory skills relevant to molecular biology

To prepare the students for careers in the biotechnological/biopharmaceutical/etc industries

Syllabus: DNA structure, transcription, translation; Gene structure function and control. Molecular techniques to manipulate DNA, restriction enzymes and other DNA modifying enzymes; DNA transfer methods; polymerase chain reaction; cDNA and genomic cloning; cloning and expression vectors; selection and screening methods; phenotypic Vs genotypic screening; Northern, Southern and Western blotting; heterologous protein expression; cloning in plants and animals; introduction to bioinformatics - databases and genome analysis; gene therapy; transgenic animals; ethics of genetic engineering. Nucleic acid diagnostics: DNA profiling and DNA fingerprinting.

Prerequisites: BC4903, BC4904

BC4957 - BIOINFORMATICS IN GENETIC AND PROTEIN ANALYSIS
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: *To introduce students to the uses and applications of modern bioinformatics in elucidation of protein and genetic information using both theoretical and practical approaches*

Syllabus: Overview of bioinformatics. The generation of DNA sequence data, using sequence analysis, manual and automated DNA sequencing. Gene structure in eukaryotes, archaebacteria and prokaryote. The genome projects. Using the web for DNA and Protein analysis. Accessing bioinformatics databases, EMBL. GENBank and DDJ and the PDB. Searching databases using SRS or Query. Searching with a sequence û the Blast tools for homology searching. Predicting and confirming an ORF, control region identification, intron identification. Analysis of protein sequences derived from genetic information. InterProscan, patterns, sites and structure within proteins. The concept of motifs and domains. Alignment of sequences using CLUSTAL. Phylogenetic analysis for comparative sequence analysis. Functional prediction. Protein secondary and tertiary structure . Protein modelling. Swiss PDB viewer as a tools for molecular modelling. Genomics and proteomics tools. Microarrays and proteomics databases.

Prerequisites: BC4904, BC4905

BR4001 - BROADENING: SOCIAL AND CIVIC ENGAGEMENT
ECTS Credits: 6

Centre for Teaching and Learning

Rationale and Purpose of the Module: *This is a new, innovative and unique module in how it approaches student engagement at a local, regional and national level. It challenges students to critically engage with the graduate attributes in a non-traditional manner through the development of leadership skills and investment in championing real issues through personal and social responsibility. It focuses on the personal development of the student through 'reflection in action' prioritising their personal and academic development. The module will be an elective open to students from all programmes (year 1-3) and initially the aspiration would be to pilot it as an elective in the BBS with a maximum of 50 students.*

Syllabus: This module focusses on self development and the key graduate attributes through a process of self directed learning and collaborative projects in key issues of regional and national importance. Students will develop personal and academic curiosity through live projects both within UL and in the community with opportunities to demonstrate strong links with the Civic Engagement Offfice. Students will develop skills in leadership and critical analysis in relation to how they can impact on their community in a regional and national level.

The campaign element of the module would involve research in an area of social importance (with a focus on students) such as Road safety, mental health, sexual health, social responsibility, alcohol awareness, drug

abuse, equality and many more working with the Students Union on the many issues and campaigns they take on. The campaign will have to have an online element and a visible element on campus, a public speech and talk is encouraged and as much engagement with UL and or external bodies is also invisaged.

BR4012 - BROADENING: COMMUNICATION ACROSS CULTURES
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *In line with the UL strategy to broaden the curriculum, this module will offer students in a range of different disciplines an opportunity to engage in learning about language and intercultural communication. In our increasingly multicultural and multilingual society, communities and organizations are faced with a number of difficult challenges as they strive to provide a respectful, safe and harmonious environment for all. It is crucial that students have opportunities to understand and appreciate their own culture and make connections to appreciate the cultures and experiences of others. To this end, the module aims at developing students' intercultural communication competence and is aimed at non-traditional language students. The module will bring the concept of intercultural learning to life in a way that is engaging and allows students to critically evaluate the importance of culture and language in intercultural communication. The first part of the course explores views of identity, culture, and intercultural communication including the role of language. Students will look at representations of 'us' and 'them ', drawn from a range of genres including: the media, websites, embassy and business publications as well as representations in art and film. Students will reflect on their own cultural identities and how these might have informed their interpretations of the "other". In the second part of the course students will carry out a collaborative project of intercultural learning. They will be paired with native-speakers from other cultures and be required to carry out tasks aiming at raising intercultural learning.*

Syllabus: This module aims at developing students' intercultural communication competence. The module will bring the concept of intercultural learning to life in a way that is engaging and allows students to critically evaluate the importance of language in intercultural communication. Students will attend an individual advisory session with a language tutor where they will reflect on their current language level and intercultural awareness; this will allow sudents to identify learning goals and create a programme of learning including telecollaborative tasks in order to achieve these goals. Students will tkae responsibility for the organisation of their own learning, establish and maintain contact with their partners and seek and offer information and opinions to enable development of intercultural communicative competence. Students will demonstrate in-depth reflection on their learning process through the keeping of a learner diary, in which they will record progress made, plan their next steps and reflect on their development during the semester.

BR4022 - BROADENING MODULE: "THE EUROPEAN UNION: BROADENING THE PERSPECTIVE"
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *The module will offer students who would otherwise not engage in European Studies an opportunity to engage in European Union Studies. While imparting factual information to key aspects of the history, institutions and politics of the European Union will be most prominent in the first half of the module, the second half aims to actively engage students in discussions about topical issues, such as migration, climate change and Brexit, but also, and perhaps more importantly, in reflections about the future of the European Union, which the students themselves will help to shape in their later careers. The module is interdisciplinary in nature and include and integrate the areas of politics, cultural studies and language studies. It aims to counteract the perception of the European Union as a top-down political enterprise by encouraging students to see it as one dependent on the active engagement of citizens. The module will also address the role of ERASMUS, in which many students will participate, in shaping a sense of EU citizenship. By reserving one-quarter of the places on this module to ERASMUS students from as wide a range of member states as possible the module will bring the multilingual and multi-cultural European experience into the classroom and make the different national perspectives an integral part of the debate. It will consist of an academic part and - as part of the UL Engage initiative - an off-campus element in which students engage both Limerick schools and the general public in Limerick City in discussions about what it means to be an EU citizen today.*

A European element will increase the career prospects of graduates from any discipline in a future Europe, in which after Brexit, Ireland is likely to be even more closely interlinked with other member states.

Syllabus: Part I (weeks 1-6)
Week 1 Introduction; History of the European Idea; What Makes an EU citizen? (Fischer)
Week 2 History of the EU; Institutions and their Functions: Democracy in the EU (Costello)
Week 3 The Four Freedoms (Costello)
Week 4 Social Europe (Moxon-Browne)
Week 5 Ireland in the European Union (Moxon-Browne)
Week 6 EU Languages and Language Policy (Atkinson)

Part II (Weeks 7-9)
(topics may change depending on political developments)
Weeks 7/8 Year 1: Brexit, Migration;
Year 2: The Euro, "Austerity"/"Fiscal Discipline";
Year 3: External Relations, Climate Change (Scully)
Week 9 Student presentations: mixed groups of 6-7 students (Irish/ERASMUS) will present summaries of debates on the above issues in the media of selected member states in comparison to the representation of these debates in the Anglophone media of Britain and Ireland. (Scully)

Part III
Week 10 The ERASMUS Experience: Auberge Espagnol (Fischer)
Week 11 Preparation for Part IV Community Engagement (Schools: Mannix McNamara / City: Scully)
Week 12 The Future of the European Union (Fischer)

Part IV: One full day in week 12 (Friday/Saturday) will

be dedicated to Community Engagement: four groups will engage with pupils in one secondary and one primary school and two with passers-by in selected locations in Limerick city centre (Schools: Mannix McNamara / City: Scully).

BR4081 - BROADENING: ACTIVE BODY, ACTIVE MIND
ECTS Credits: 6

Physical Education & Sport Sciences

Rationale and Purpose of the Module: *This module is part of the Broadening the Curriculum Agenda here in UL for creating interdisciplinary modules as part of the UL Strategic plan and specifically is designed to enable students to evaluate the importance of health for optimal learning, educational achievement and personal development and appreciate the relationship between an active body and active mind. Through engaging in diverse learning strategies that include practical learning as well as the more traditional lecture and tutorial format, students will experience first-hand the interplay of physical, mental, social and emotional dimensions of learning for health. It will encourage students to integrate the important concepts of an active lifestyle for physical and mental health, well-being and academic achievement. In addition, the module aims to take students beyond traditional understandings of health and learning and to apply their new knowledge to create sustained cognitive, emotional and behavioural change for improved learning and health gains.*

Syllabus: Students will be provided with content and opportunities that allow them to engage in physical activity and learning in a fun, creative, challenging and social context. Through the introduction of different physical activities using the UL campus environment (e.g., team challenges, orienteering, walking, aquatics, sports, dance) students will become aware of the common currency of physical activity not only from a group perspective but also with respect to the level of autonomy individuals have in determining their own active lifestyles. The module provides students with an opportunity learn from an interdisciplinary and intradisciplinary perspectives how to make decisions from a collective group perspective as regards the determinants of being physically active and also accomodate space for students to identify their own motives/ motivational climate in considering and maintaining an active lifestyle. Behavioural change models (e.g., the transtheoretical model/ stages of change model) provide the framework for students to conceptualise and measure active lifestyles of the student population as well as their own. Additionally, this framework can facilitate promotion strategies for individuals and groups. Attention will also be given to the environment in which activity occurs focusing on aspects of contextual intelligence. In addition to enhancing their physical health, the module will also challenge students to become critically aware of their learning styles, their personal study habits and the link between physical activity and improved motivation and learning success.

BR4901 - BROADENING: BEGINNERS JAPANESE
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *In line with the UL strategy to broaden the curriculum, this module will offer students in a range of different disciplines an opportunity to engage in learning Japanese. In our increasingly multicultural and multilingual society, it is crucial that students have opportunities to learn about and appreciate other languages and cultures. To this end, the module aims at developing students' competence in Japanese and is targeted at those who have not studied Japanese previously. The emphasis is on achieving a basic level of communication in all four skills (listening, speaking, reading and writing) while developing confidence and a degree of accuracy when using the language in a limited range of situations. The module also aims to stimulate students' interest in Japan and deepen their knowledge and understanding of Japanese society and culture.*

Syllabus: This module aims to introduce students to Japanese and gradually develop their ability to function at beginners' level. Students should develop a basic understanding of everyday vocabulary, understand the rules of pronunciation and have a basic grasp of the relevant grammar for that level. The module will allow students gain sufficient proficiency in Japanese to:
• recognize numbers, times, days, dates, where things are, greetings and questions;
• speak using greetings, expressions of time, price, number, place, talk about themselves, their likes, dislikes, pastimes and schedules, and ask basic questions;
• read words written in the hiragana, katakana and kanji writing systems, grasp information from signs, posters, notices, self-introductions, and descriptions;
• write, using the writing systems studied, short passages about themselves, their lives and their pastimes; in particular, passages introducing themselves and their schedules;
• be able to read and write using hiragana, katakana and about 50 kanji;
• discuss and analyse aspects of Japanese history, culture and society in English.

BR4911 - BROADENING: BEGINNERS FRENCH
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *In line with the UL strategy to broaden the curriculum, this module will offer students in a range of different disciplines an opportunity to engage in learning French. In our increasingly multicultural and multilingual society, it is crucial that students have opportunities to learn about and appreciate other languages and cultures. To this end, the module aims at developing students' competence in French and is targeted at those who have not studied French previously. The module is mapped on to the A1 level of the Common European Framework for Languages where the emphasis is on achieving a basic level of communication in all four skills (listening, speaking, reading and writing). It will also aim at developing confidence and a degree of accuracy when using the language in a limited range of situations. The module also aims to stimulate students' interest in the French-speaking world and deepen their knowledge and understanding of French society and culture.*

Syllabus: This module aims to introduce students to French and gradually develop their ability to the level of A1 as outlined by the Common European Framework for Languages. Students should develop a basic understanding of everyday vocabulary, understand the rules of pronunciation and have a basic grasp of the relevant grammar for that level. The module will allow students gain sufficient proficiency in French to:
• manage to pronounce very short, isolated mainly ready-made expressions;
• show a limited control of a few simple grammatical structures;
• use a very basic repertoire of words related to personal details;

• use a limited range of vocabulary to talk about particular concrete situations;
• use a small range of ready-made expressions and phrases related to everyday topics (introductions, leave-taking, apologies);
• write simple isolated phrases and sentences on everyday topics.

BR4921 - BROADENING: BEGINNERS GERMAN
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *In line with the UL strategy to broaden the curriculum, this module will offer students in a range of different disciplines an opportunity to engage in learning German. In our increasingly multicultural and multilingual society, it is crucial that students have opportunities to learn about and appreciate other languages and cultures. To this end, the module aims at developing students' competence in German and is targeted at those who have not studied German previously. The module is mapped on to the A1 level of the Common European Framework for Languages where the emphasis is on achieving a basic level of communication in all four skills (listening, speaking, reading and writing), It will also aim at developing confidence and a degree of accuracy when using the language in a limited range of situations. The module also aims to stimulate students' interest in the German-speaking world and deepen their knowledge and understanding of German society and culture.*

Syllabus: This module aims to introduce students to German and gradually develop their ability to the level of A1 as outlined by the Common European Framework for Languages. Students should develop a basic understanding of everyday vocabulary, understand the rules of pronunciation and have a basic grasp of the relevant grammar for that level. The module will allow students gain sufficient proficiency in German to:
• manage to pronounce very short, isolated mainly ready-made expressions;
• show a limited control of a few simple grammatical structures;
• use a very basic repertoire of words related to personal details;
• use a limited range of vocabulary to talk about particular concrete situations;
• use a small range of ready-made expressions and phrases related to everyday topics (introductions, leave-taking, apologies);
• write simple isolated phrases and sentences on everyday topics.

BR4931 - BROADENING: BEGINNERS SPANISH
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *In line with the UL strategy to broaden the curriculum, this module will offer students in a range of different disciplines an opportunity to engage in learning Spanish. In our increasingly multicultural and multilingual society, it is crucial that students have opportunities to learn about and appreciate other languages and cultures. To this end, the module aims at developing students' competence in Spanish and is targeted at those who have not studied Spanish previously. The module is mapped on to the A1 level of the Common European Framework for Languages where the emphasis is on achieving a basic level of communication in all four skills (listening, speaking, reading and writing). The module also aims to develop confidence and a degree of accuracy when using the language in a limited range of situations. The module will stimulate students' interest in Spain and Latin America and deepen their knowledge and understanding of Spanish and Latin American society and culture*

Syllabus: This module aims to introduce students to Spanish and gradually develop their ability to the level of A1 as outlined by the Common European Framework for Languages. Students should develop a basic understanding of everyday vocabulary, understand the rules of pronunciation and have a basic grasp of the relevant grammar for that level. The module will allow students gain sufficient proficency in Spanish to:
• manage to pronounce very short, isolated mainly ready-made expressions;
• show a limited control of a few simple grammatical structures;
• use a very basic repertoire of words related to personal details;
• use a limited range of vocabulary to talk about particular concrete situations;
• use a small range of ready-made expressions and phrases related to everyday topics (introductions, leave-taking, apologies);
• write simple isolated phrases and sentences on everyday topics.

BR4941 - BROADENING: ADVANCED FRENCH
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *The aim of this module is to consolidate knowledge of the French language at advanced level and develop skills and competence up to the level of B1/B2 as outlined by the Common European Framework for Languages. On successful completion of the module, students will be able to exchange ideas and information on familiar and unfamiliar topics both orally and in writing, as well as understand longer concrete and abstract reading and listening material. Students should be able to demonstrate knowledge of key aspects of the culture and current issues of the countries where the language is spoken.*

Syllabus: This module is for students who have studied French previously and wish to expand their knowledge of the language. The emphasis is on developing students competence to the level of B1/B2 outlined by the Common European Framework for Languages. The module includes a portfolio of independent work and a mini-research project which provides the opportunity to research an area related to a French-speaking country and/or the student's area of study through the medium of French. Communication skills which will be developed include discussion, interview techniques and presentation skills, reporting skills and writing a report.

BR4951 - BROADENING: ADVANCED GERMAN
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *The aim of this module is to consolidate knowledge of the German language at advanced level and develop skills and competence up to the level of B1/B2 as outlined by the Common European Framework for Languages. On successful completion of the module, students will be able to exchange ideas and information on familiar and*

unfamiliar topics both orally and in writing, as well as understand longer concrete and abstract reading and listening material. Students should be able to demonstrate knowledge of key aspects of the culture and current issues of the countries where the language is spoken.

Syllabus: This module is for students who have studied German previously and wish to expand their knowledge of the language. The emphasis is on developing students competence to the level of B1/B2 outlined by the Common European Framework for Languages. The module includes a portfolio of independent work and a mini-research project which provides the opportunity to research an area related to a German-speaking country and/or the student's area of study through the medium of German. Communication skills which will be developed include discussion, interview techniques and presentation skills, reporting skills and writing a report.

BS4001 - PRINCIPLES OF INTERNATIONAL BUSINESS
ECTS Credits: 6

Management and Marketing

Rationale and Purpose of the Module: *This module aims to provide students with an understanding of the international dimensions of business. It provides students with a foundation in the theory and practice of businesses operating within a globalised context. The module introduces students to the extensive remit of international business activity and to key concepts concerning companies operating internationally.*

Syllabus: The course will introduce topics concerning international business while illustrating its scope and importance. Topics will include the impact of geography, culture and politics on business dealings. Students will study formal institutions (economic and political) and informal factors such as culture, religion, language and ethics. Other topics may include: globalisation; international trade; corporate social responsibility; global branding; international management strategy.

BY4001 - BIOLOGY 1
ECTS Credits: 6

Biological Sciences

Rationale and Purpose of the Module: *To introduce fundamental concepts of biological structure and function.*
To provide an introductory course in cellular energetics and respiration, photosynthesis, animal physiology, and microbiology.

Syllabus: Introduction to biology, characteristics of life, scientific methodology, biomolecules, chemistry of the cell and organism, cell structure and function, membrane structure and function. Cellular energy and metabolism, enzymes and enzyme reactions, cellular respiration; photosynthesis. Introduction to micro-organisms, microbiology, prokaryotic and eukaryotic organisms. Plant structure and function; transport in plants, reproduction, seed structure, germination, growth and development, plant adaptations. Principles and scope of ecology; ecosystems; cycles in nature; energy flows; population and community dynamics; limiting factors; food chains: succession, environmental concerns.

BY4015 - PLANT PHYSIOLOGY
ECTS Credits: 6

Biological Sciences

Rationale and Purpose of the Module: *To introduce the students to the principles and applications of plant physiology.*

Syllabus: Plant mineral nutrition, nutrient deficiencies and fertiliser use. Nitrogen and secondary plant metabolism. Types and structures of mycorrhizas and their roles in plant nutrition. Saprotrophy, parasitism and carnivory in plants. Water relations in plants. Plant hormones, roles and their applications: plants responses, root and shoot growth, tissue differentiation, photoperiodic responses in plants, photomorphogenesis, flowering. Seed dispersal, dormancy and germination. Tropisms and plant movement. Applications in horticulture and agriculture. Plant reproduction and pollination ecology; interactions with animals. Phytopathology; fungal pathogens of plants and plant defence mechanisms, phytoalexins, allelopathy. Photosynthesis, C3, C4 and crassullacean. Acid metabolism; photorespiration and plant metabolism. Plant growth measurement. Biological/ecological relationships between plants and other organisms. Plants and medicines, ethnobotany. Pedagogical approaches to teaching plant physiology at second-level

Prerequisites: BY4002

BY4023 - ANIMAL DIVERSITY
ECTS Credits: 6

Biological Sciences

Evolution of animal diversity; Animal architecture; Environmental considerations; Invertebrate classification and relationships - the Protozoans, the Poriferans and Placozoans, Introduction to the hydrostatic skeleton, the Cnidarians, the Platyhelminthes, the Nemertines, the Molluscs, the Annelids and Sipunculans, the Arthropods, the Nematodes, the Echinoderms; An overview of invertebrate reproduction and development.

Comparative vertebrate morphology; Historical predecessors-evolution; Definition of the phylum Chordata; Chordate characteristics; Protochordates; Vertebrate classification Agnathans, Gnathostomes, Teleostomi, Tetrapods, Amniotes; Biological design size and shape, structural analysis, functional analysis, ecological analysis; Introduction to animal behaviour and the influences of environment on such behaviour; Comparison of the processes of homeostasis and control in vertebrate and invertebrate body systems; Assessment of the importance of animal diversity to biological sciences and the environment.

BY4025 - CROP AND GRASSLAND SCIENCE
ECTS Credits: 6

Biological Sciences

Climate in Ireland, climate and plant growth, agricultural policy
Fruits crops, protected crops, horticultural pests, weeds and diseases, integrated crop production.
Landscape management.
Fertilisers and manures; tillage machinery; cultivation, management and harvesting of arable crops and root crops; farm forestry; energy crops; grassland establishment and management; agriculture and the environment.

BY4045 - CELL BIOLOGY AND BIOCHEMISTRY
ECTS Credits: 6

Biological Sciences

Rationale and Purpose of the Module: *To provide a solid understanding and knowledge of fundamental biochemical processes which will underpin an understanding of nutrition, metabolism and exercise physiology.*

Syllabus: The course is delivered as a series of lectures covering the following topics: Carbohydrates; Lipids; Amino acids; Protein; Nucleic acids; Enzymes; Membranes; Muscles; Nerves; Hormones; Metabolism This is supported by a series of laboratory based practical investigations covering the following areas: Analysis of carbohydrates; Exploring Lipids; Behaviour of Amino acids and Proteins; Enzymes; Nutrition. The course is examined through a series of term tests, practical laboratory write ups, and an end of term exam based on multiple choice questions and essay style questions.

BY4055 - ANIMAL FEEDING AND DIGESTION
ECTS Credits: 6

Biological Sciences

Rationale and Purpose of the Module: *The purpose of the module is to provided students of the B.Sc (Education) in Biological Science , Agricultural Science elective with an introduction to the principles of feeding and nutrition in farm animals.*

Syllabus: Carbohydrates, protein and fats classification and sources; ruminant and non-ruminant digestion and fermentation; VFA production; feedstuffs and their classification, feed processing and benefits; forages for farm animals; assessment of forage and feed quality; minerals and vitamins in the animal's diet; energy, protein and amino acid requirements and sources; diet formulation; algebraic calculations and Pearson Square methods; feeding management; feeding for maintenance; feeding during pregnancy and lactation. Feeding the growing animal and average daily gain; condition scoring, forage to concentrate ratios.

BY4204 - PRINCIPLES OF HUMAN PHYSIOLOGY
ECTS Credits: 6

Biological Sciences

Rationale and Purpose of the Module: *To introduce students to the basic concepts and principles of human physiology*
On completion of the module students will be able to: demonstrate a knowledge of the structure and function of major human physiological systems. Additionally, the influence and relationship between various human physiological conditions and metabolism of nutrients will be considered.

Syllabus: This module will examine the structure and function of the major human physiological systems. Physiology of the blood, circulation and lymphatic systems. The nervous system: central, peripheral and autonomic. Physiology of skeletal, muscle and integumentary systems. The respiratory system: mechanical properties of breathing, pulmonary and bronchial circulation, the transport of oxygen and carbon dioxide. The digestive system: the gastro-intestinal tract, intake and absorption of nutrients. The renal system: kidney structure and function, osmoregulation and homeostasis, regulation of acid balance. The endocrine system: regulation of calcium and phosphate metabolism. Reproductive system. Sensory system: perception of taste and aroma. The influence of physiological conditions on nutrient absorption will be considered e.g. inborn errors of metabolism on iron metabolism. The impact of food constituents on physiology will be examined e.g. ingestion of toxins.

Prerequisites: BY4002, BY4001

BY4215 - SOIL SCIENCE
ECTS Credits: 6

Biological Sciences

Rationale and Purpose of the Module: *The purpose of the module is to educate students about the nature, properties and functions of soils with particular reference to soils in Ireland.*

Syllabus: 1. Introduction:
2. Physical properties of soil:
Mineral matter, organic matter, water and air in soil, structure, structural stability and measurement of these, soil water and water movement, soil air, soil temperature.
3. Soil chemistry:
Soil colloids, cation exchange, soil pH
4. Soils and plant nutrition:
Nutrient elements, soil testing, availability of elements, soil pH and liming, calcium, magnesium , sulphur and trace elements
5. Soil biology:
Soil organisms, soil organic matter, C:N ratio
6. Soil genesis and classification (these 5 lectures not taken by Equine Science, who transfer to crop and grassland instead for grassland):
Factors in soil formation, soil formation in Ireland, soil profiles and horizons, classification and mapping of Irish soils, Great soil groups, series and types, Great soil groups found in Ireland, County soil maps, soils and land use.
Functions of compost, compost materials and growth substrates, making an organic compost.
Nutrient requirements and deficiencies in horticultural plants & use of artificial and organic fertilisers.
Laboratory:
Preparing a compost for seeds and a blocking compost
Preparing a compost for actively growing plants
Preparing cuttings composts

CE4005 - STRUCTURAL THEORY
ECTS Credits: 6

School of Engineering

Plastic analysis, Elastic buckling theory for columns, effect of end conditions and imperfections. Beams on an elastic foundation. Static and kinematic indeterminacy, internal and external stability. Virtual work theorems, moment area method, stiffness and flexibility methods, influence coefficients and reciprocal theorems. Application of virtual work methods in structural analysis. Approximate iterative solutions including moment distribution, Introduction to structural dynamics.

CE4007 - WATER MANAGEMENT SYSTEMS
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: *This module is proposed to enhance the existing water and environmental engineering content and to supplement existing modules in the development of the B.E. in Civil Engineering. The module seeks to train students in the design and modeling of water distribution and water collection systems including hydraulic design of treatment plants and will synthesise the principles learned in the prerequisite modules.*

Syllabus: Context and principles of water management from catchment to consumer; structural and hydraulic components of water distribution systems (reservoirs, pump stations, surge tanks) and water / wastewater collection systems (manholes, combined sewer overflows, siphons, pumping stations, attenuation tanks); pipeline construction techniques and their application for specific site and ground conditions; development and use of simple numerical analysis tools for the design and sensitivity analysis of hydraulic systems; analysis and design of water storage and distribution systems, including flow demand, storage requirements, flow pressure and control; analysis and design of surface / wastewater collection systems, including assessment of hydraulic loads, network capacity, flow velocity, sediment transport, design & application of hydraulic structures; hydraulic design of treatment plants; hydraulic profiles; long term economic and sustainability design and operation of hydraulic systems.

CE4014 - HYDRAULICS AND WATER ENGINEERING
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: *This module introduces the theory and practice of modern water engineering looking at water in the natural Hydrological cycle and the fundamental concepts in water treatment technologies and water supply.*

Syllabus: Hydrology: The hydrological cycle; Water balance equation; Hydrologic Budgets; Precipitation: intensity, duration & return periods; Surface run-off and drainage systems; Sustainable urban drainage systems, flow attenuation,
Aquifers; Groundwater flow; Measurement and monitoring of stream flow and groundwater; Hydrograph generation run-off, unit, synthetic; Channel Storage; Mass diagrams; Routing flood, reservoir & channel.
Water Treatment: Characteristics of water; Water demand rates and peak flows; Distribution systems and service reservoirs; Physical treatment - screening, sedimentation; Clarification and settlement; Filtration with granular media and mechanical; Biological oxidation; Aerobic oxidation plants; Chemical treatment - coagulation, flocculation; Disinfection chlorine, ozone & other; Fluoridation; Sludge dewatering and disposal; Treatment plant design.
Applied Hydraulics: Design of water distribution pipe networks, pump types and characteristics, surface profiles and backwater curves, design of hydraulic structures.

Prerequisites: CE4003

CE4015 - SOIL MECHANICS
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: *This module builds on the material covered in WT4014 by further exploring soil mechanics using critical state theory. The course is designed to challenge the student to master the key concepts in soil mechanics and apply these concepts in projects and self-directed learning to achieve the following key objectives:*

Key objectives
** To master the concepts of critical state theory.*
** Introduce a simple constitutive soil model û Cam clay.*
** To generate enthusiasm for the subject through field trips, practical experimentation and case histories.*

Syllabus: * Basic mechanics
Stresses, strains; plane, axial symmetry, 2-D and 3-D conditions; stress ratio and dilation; slip surfaces; analysis of stress and strain û MohrÆs circle; essentials of material behaviour; Stress-strain behaviour, stiffness and strength; Choice of parameters for stress and strain; Constitutive equations; Time & rate effects

* Laboratory testing of soils
Standard tests, purposes and specification; Shear box, triaxial and oedometer tests; Interpretation û OCR.

* Consolidation
Basic mechanisms of consolidation and 1-D consolidation theory; Solutions and applications for 1-D consolidation; Determination of cv, cc and cs from oedometer tests; Calculation of foundation settlement
* Critical state strength of soil
Soil behaviour in shear; Peak, ultimate and residual strengths; Critical states; Undrained strength; Estimation of critical state strength parameters from classification tests
* Cam clay model
Basic features of the cam clay model and its application in computer predictions of soil behaviour; State boundary surface; Yielding and hardening

Prerequisites: WT4014

CE4025 - TRANSPORT PLANNING AND DESIGN
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: *This module places transport in its wider historical and contemporary context as a major determinant of sustainable human settlement. It addresses current thinking and trends and introduces the main methods of data collection and analysis, transport system planning, appraisal, design and management.*

Syllabus: History and Contemporary Picture and Trends: Physical, social, political and economic contexts, sustainable transport and settlement, current policies and trends.
Data Collection and Analysis: Use of demographic data, survey design and implementation.
Appraisal and Forecasting: Demand drivers, mode choice and behaviour, an overview of multi-modal macro and micro modelling, modelling uses and limitations, demand and capacity forecasting, impact assessment.
Road Design: Road construction details and geometric guidelines, road junction analysis.

CE4043 - STRUCTURAL ENGINEERING DESIGN 2
ECTS Credits: 6

School of Engineering

ACADEMIC CONTENT IS NOT CURRENTLY AVAILABLE FOR THIS MODULE – UPDATES ARE IN PROGRESS

CE4045 - PROFESSIONAL PRACTICE 1
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: *The objective of this module is to engage the student in professional practice skills through the medium of problem-based learning. The module involves an overview of Health and Safety in the construction industry and project work integrates core skills in CAD and land surveying in advance of cooperative education in semester 6.*

The module is 100% continually assessed and non-repeatable.

Syllabus: The Planning System: Making a simple planning application.

Health & Safety: Overview of health & safety in the construction industry. Statutory framework for the construction industry. Roles and responsibilities of the civil engineer. Processes and procedures, risk assessments.

Computer Aided Drafting: Overview of current industry practice and trends in drawing and integration of CAD with the design process. Operate a proprietary 2-D CAD system to produce survey and planning drawings. Operate a proprietary 3-D CAD system to produce a rudimentary 3D model and associated plan and sections.

Land Surveying: Overview of land surveying methods and principles. Overview of GIS. Surveying and setting out using total station and levelling equipment operation, data recording and production of a topographical survey drawing. Setting out of a simple building.

CE4047 - WIND, OCEAN AND HYDRO ENERGY
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: *The purpose of this module is to introduce civil engineering and energy students to national and EU policy, resource assessment, conversion principles and electricity generation potential associated with renewable energy generated from wind, ocean & hydro resources. This will equip students with the knowledge and analytical skills necessary to advise on their appropriate use at specific sites.*

Syllabus: Wind Energy Onshore & Offshore: Market status and current trends; Site and Resource Assessment; Supporting Structures; Aerodynamic and Power Conversion Principles; Power Predictions with Statistical Analysis; Economic Assessment with review of National and EU policy; Storage Mechanisms

Hydro-Energy: Market Status and Current Trends; Catchment Areas; Dams; Weirs; Hydrodynamic and Power Conversion Principles; Environmental Impact; Layout of Hydro Power Systems; Power Output; Economic Assessment; Peak Load Management

Ocean Energy: Potential Market and Case for Irish Ocean Energy; Review of Emerging Technologies for Wave & Tidal Energy conversion; Power Conversion Principles

---

CE4055 - REINFORCED CONCRETE DESIGN 1
ECTS Credits: 6

School of Engineering

ACADEMIC CONTENT IS NOT CURRENTLY AVAILABLE FOR THIS MODULE – UPDATES ARE IN PROGRESS

CE4205 - MICROCOMPUTER SYSTEMS
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: *This module is designed for 'transferee students'. Students must be capable of writing programs at assembly language level for some modern computer or microprocessor.*

The main purpose is to:

1. Teach 8086 assembly language programming.

2. To introduce operating system design and implementation concepts based on a complete single-user, disk based operating system. MS-DOS and Microsoft Windows will be the example operating systems.

Syllabus: 8086 assembly language programming. 8086 architecture, standard PC components, instruction set, linking, debugging. Operating system introduction. MS-DOS memory organisation. Interrupt handlers. Process execution, device drivers, disk storage organisation. Introduction to Microsoft Windows OS .

CE4607 - COMPUTER NETWORKS 1
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: *This module provides a unified view of the field of computer communications and networks. The module seeks to integrate a number of topics introduced in earlier parts of the course and addresses the analysis, design and performance evaluation of data communication systems. The module covers communications within and between computer systems, and communications protocols and standards.*

Syllabus: * [Introduction to Data and Computer Communications] Communications tasks; Protocol elements, characteristics, and functions; Protocol architectures; Reference communications models overview: OSI vs. TCP/IP (layersÆ description and functions, PDU encapsulation).
* [Physical Transmission] Transmission modes (simplex, half duplex, full duplex) and transmission types (baseband, broadband); Analogue and digital signals; Transmission impairments (attenuation, delay distortion, noise); Channel capacity; Data encoding and modulation; Physical interfacing; Asynchronous & synchronous transmission; Transmission media; Multiplexing techniques (FDM, TDM, WDM).
* [Link-by-Link Communication] Line disciplines (ENQ/ACK, poll/select); Framing; Frame synchronization & data transparency, Flow control; Error control; Addressing; Link management; Protocol examples (character-oriented, byte-count, bit-oriented).
* [Network Services] Switching (circuit-, message-, packet switching); Addressing (classful vs. classless IP addressing); NAT operation (static and dynamic); IP

subnetting and supernetting; Routing (concepts and principles; routing algorithms û flooding, static, dynamic; central and distributed control; distance vector vs. link state routing; hierarchical routing; routing protocols examples: interior vs. exterior); Congestion control; QoS provision; IP protocol: main functions and operation (IPv4 vs. IPv6); Mobile IP; Address resolution with ARP and RARP; Internet multicasting (MBone operation) and group management (IGMP protocol); Control and assistance mechanisms (ICMP protocol: v4 vs. v6). Modular design of protocols.
* [Transport Services] Overview (connection-oriented vs. connectionless; segmentation and re-assembly; end-to-end delivery, flow control & buffering; crash recovery); Unreliable datagram transport with UDP; Real-time transport with RTP and RTCP; Reliable connection-oriented transport with TCP and SCTP; Wireless TCP; Modular design of protocols.
* [End-to-End Communication] Session management (SIP and SDP protocols); Data presentation (ASN.1 and NVT); Client-server communication model; Domain Name System (DNS); TCP/IP configuration: static (BOOTP protocol) vs. dynamic (DHCP protocol); Terminal networking with Telnet; File transfer with FTP and TFTP; E-mail service (SMTP, POP, IMAP protocols); Browsing with HTTP; Network management with SNMP.
* [Practical Implementation] Building and testing different types of patch cables; Serial interface configuration; Device configuration: IOS software, managing configuration files, updating software; Router configuration: initialisation, commands and modes of operation; Routing protocolsÆ configuration, operation and evaluation: RIP, IGRP etc.; Network configuration: testing established connectivity and routes. Analysing and interpreting IP addresses and subnets; Scaling the IP address space: CIDR, private addressing, secondary IP addressing, MTU and fragmentation; NAT configuration; TCP/IP protocols configuration and operation.

Prerequisites: EE4616

CE4701 - COMPUTER SOFTWARE 1
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: *Introduce students to a high level object-oriented programming language and its software development environment*

Syllabus: The focus of this module is to introduce a modern high level object-oriented programming language to enable the student to develop the programming skills necessary to write simple but useful applications. The following topics will be covered:

Introduction to software development.
Short comparative study of different programming languages.
Simple program design techniques e.g. flowcharts.
Basic data types, control statements, methods, scope.
Relationship between the program, the run time environment and the operating system.
Introduction to programming language documentation.
Introduction to Class Libraries.
Interactive Development Environments.
Introduction and demonstration of a low level graphics toolkit.
Basic test practices and test case definition.

CE4703 - COMPUTER SOFTWARE 3
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: *To introduce the student to algorithms and dynamic data structures (e.g. queue, trees, and dynamic arrays).*
Introduce software engineering practices, Flow diagrams and class diagrams.
Use good software practice to develop a significant application

Syllabus: The following will be covered:
* Algorithms
* Growth of functions
* Data structures - Linked lists, Stacks, Queues and Red-Black Trees.
* Greedy Algorithms
* Hash functions and search minimisation techniques
* Class/Object unit testing
* Analysis of algorithms
* Case study/Project

Prerequisites: CE4702

CE4706 - SOFTWARE ENGINEERING 1
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: *- To introduce the domain of software engineering from a programmers perspective focusing on object oriented analysis, design and programming.*
- To revisit and develop existing computer software skills and competence.
- To emphasise good Software Engineering Practices
- To enhance individual and team working skills

Syllabus: Introduction to Software Engineering. Software Development Paradigms.Software Evolution and Reliability. Human Factors in Software Engineering.Software Specification, System Modelling. Requirements Definition/Specification.Software Design: Modularity, Cohesion, Coupling.Function Oriented Design. Diagramming Techniques. Structured Design.Software Reviewing and Testing. Software Quality Assurance and metrics.More ADTs and algorithms. Introduction to Object Oriented Analysis/Design and Programming Programming Languages Programming Practice: Coding, Style, DocumentationThe C++ Programming Language (continued):C++ versus C, Objects and Classes, Function and Operator Overloading, Inheritance and Polymorphism, Input and Output, Memory Management, Templates. Development Environments: Debuggers, Profilers, Browsers.Individual and Team Project/Case Study.

Prerequisites: CE4704

CE4708 - ARTIFICIAL INTELLIGENCE
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: *To provide the student with a solid grounding in the theoretical and practical foundations of artificial intelligence and expert systems.*

Syllabus: Section (i) - Introduction to Prolog and "Logic Programming"
Rule-based systems and logic programming. The resolution principle, unification & backtracking. Recursion & iteration. Prolog representation of algorithms. Extra-logical features of Prolog.
Section (ii) - State-Space Search
Use of state-space search in A.I. programming.

Representation of problems in state-space form. Prolog representation of state-spaces. Heuristics. Search strategies: depth-first, breadth-first, hill-climbing, best-first, branch & bound, Algorithm A, Algorithm A*. Admissibility, Monotonicity, Informedness.
Section (iii) - Expert Systems
The structure of an expert system. Knowledge representation. The inference engine. Inference strategies. Reasoning under uncertainty.
Section (iv) - Neural Networks
Neural models: McCulloch & Pitts, Rosenblatt. Hebbian learning. The Adaline. Multi-layer Perceptrons & Backpropagation. Associative networks. Competitive networks.

Prerequisites: CE4703

CE4817 - DIGITAL SIGNAL PROCESSING 1
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: *This module provides practical coverage of the fundamentals of digital signal processing, with emphasis on the following key topics: the discrete Fourier transform, the z-transform and digital filter design.*

Syllabus: TRANSFORMS: Review of the Fourier transform, its properties and the more general Laplace transform. Sampling and Railings leading to the z-transform for discrete signals. The DFT and its relationship to these transforms.
SYSTEMS: Difference equations and the z-transform. Recursive and non-recursive systems and their z-plane descriptions. Examples: averaging filter, integrator, differentiator. Important properties; linear phase systems, all pass systems.
SIGNAL WINDOWING: Choice of windows for reduced spectral leakage. The DFT as a signal analyser. Windowing in the DFT context. Padding with zeros to reduce picket-fence effect.
NON-RECURSIVE FILTERS: Design by windowing methods. Sample design.
RECURSIVE FILTERS: Design based on analogue prototypes. Bi-linear mapping approach and Impulse-invariant approach, their areas of suitability. Case studies.
FILTER TRANSFORMATION: Transformations for BP and HP filters. Analogue and digital approaches.
NOISE: Overview of noise issues and the correlation method.
RATE CONVERSION: Introduction to up-sampling and down-sampling.SIGMA-DELTA methods in A/D and D/A conversion.

Prerequisites: EE4816

CG4003 - BIOPROCESS ENGINEERING 1
ECTS Credits: 6

Chemical Sciences

Overview of biochemical processes currently used on an industrial scale. Introduction to biochemical process design strategies for high value/low volume and low value/high volume products.
Material and energy balances for bioprocessing operations.
Aspects of mass transfer of importance in aerobic fermentations. Biochemical reaction kinetics for cell free enzyme, single cell, cellular agglomerate, and immobilised enzyme systems.
Bioreactor design for ideal batch and ideal chemostat operations. Practical aspects of bioreactor operation and monitoring: sterilisation, asepsis, inoculation, rheology, aeration, agitation, instrumentation and sampling.
Introduction to commercial-scale bioproduct separation and purification methods.
Industrial biosafety.

CG4005 - CHEMICAL ENGINEERING THERMODYNAMICS
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: *To give students knowledge and understanding of (i) methods for estimation of pure component properties, (ii) methods for correlation and prediction of phase equilibria, and (iii) the thermodynamics of energy conversion cycles.*

Syllabus: Application of the first and the second law of thermodynamics in chemical engineering: identify and describe open and closed systems; conditions and limitations for conversion between different kinds of energy; describe the theoretical energy conversion processes of Carnot-, Rankine- and Brayton, and understand the differences with their corresponding technical applications: steam turbines, gas turbines, cooling machines and heat pumps.

Fundamental thermodynamics of phase equilibria and methods of correlation and prediction: understand standard states and the use of activity and fugacity coefficients, understand the use and limitations of models for correlation and prediction of excess free energy and activity coefficients

Application of chemical thermodynamics to reaction engineering: spontaneity of chemical reactions, chemical reaction equilibrium, equilibrium conversion calculations

Methods of correlation and prediction of physical properties for chemical engineering calculations. Availability and application of electronic data bases for physical properties, and software for prediction of physical properties

---

CG4007 - SUSTAINABLE ENERGY PROCESSES
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: *Provision of a process engineering module to give a deeper and wider knowledge in energy processes, with emphasis on sustainability and renewability.*

Syllabus: Overview of energy conversion/generation process fundamentals starting with combustion, elements of energy balance including heats of combustion, component balances, calorific values, excess air, efficiency and Carnot efficiency, and engineering solutions to maximize efficiency.
This will lead to existing ideas for efficient energy generation (advanced generation) represented by Combined heat and power and Combined gas generation extended further to chemical energy generation represented by Fuel cells, Hydrogen production and Fuel re-synthesis. The novel energy conversion/generation ideas will be extended further to advanced nuclear power generation, represented by pebble-bed nuclear reactor.
The knowledge of energy generation fundamentals will be enriched with the engineering principles of renewable energy generation, based on Solar, Geothermal, Biogas, Biomass, Wind and Ocean sources.

CG4017 - BIOPROCESS ENGINEERING 2
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: *The purpose of this module is to introduce students to more advanced aspects of bioprocess engineering, building directly on the fundamentals covered in CG4003. The students will be informed on mass transfer, advanced biochemical kinetics, heat transfer specific to bioprocessing, mass balance, stoichiometric analysis relevant to bioprocessing, downstream processing unit operations, and emerging technologies in bioprocessing. In addition, the students will complete practical experiments relevant to course content, use Polymath to solve biological rate expressions and construct a process flow sheet for a biological process using SuperPro software.*

Syllabus: Bulk mass transfer effects in fermentation systems. Factors affecting oxygen mass transfer in aerobic fermentations. Measurement of kLa using static and dynamic methods. Control of kLa using correlations with agitator power and other operational variables. Heat transfer in biochemical systems. Heat exchanger design in bioprocessing units.

Bioreactor sizing and design for the following reactor types: fed batch, stirred fermenter, bubble column, airlift, packed bed, fluidised bed, trickle bed, and perfusion. Bioreactor scale-up. Operation and feeding regimes: chemostat with recycle, fed batch operation, and multistage reactors. Control methods: feedback, indirect metabolite control, programmed control, and emerging AI-based methods. Modelling and simulation of bioreactors.

Bioreaction product separation processes including: cell disruption, solvent extraction, adsorption, filtration, and centrifugation.

Final product purification methods: gel filtration, process chromatography, protein crystallisation, spray drying, and lyophilisation.

Regulatory and licensing systems in the pharmaceutical, biopharmaceutical, and biotechnology industries.

CG5011 - PRINCIPLES OF CHEMICAL ENGINEERING
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: *To allow students with varying backgrounds to become familiar with those core aspects of chemical engineering that might be lacking in their prior experiences. Tutorials are tailored to the previous academic background of the individual student.*

Syllabus: Fundamentals of material and energy balances. Introduction to chemical process design and analysis. Introduction to Process Control and Instrumentation. Solid Materials Handling (size reduction, settling, elutriation, filtration, etc.)
Among typical tutorial topics are the following:
Review of Introductory Inorganic and Organic Chemistry
Review of Chemical or Engineering Thermodynamics
Review of Chemical Kinetics

CH4003 - PHYSICAL CHEMISTRY 2
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: *i. To facilitate the student in understanding of the reaction thermodynamics and the role of thermodynamics in chemical reaction processes.*
ii. To familiarise the student with the various reaction kinetics, including some complex kinetic schemes, their interpretation and applications in the appraisal of industrial problems.
iii. To develop the students ability to design basic kinetic experiments and to extract kinetic information from the measurements of concentration-time based data. iv. To provide the student with the basic knowledge of commonly used spectroscopes

Syllabus: - Reaction Process, role of thermodynamics
- FickÆs law, diffusion
- Rate laws, integrated and differential forms
- Zero, first and second order rate laws
- Arrhenius equation, collision theory, activated complex theory
- Mechanism of reaction, steady state approximation
- Lindemann hypothesis, role of equilibria
- Photochemistry, fast reactions, polymerisation reactions
- Michaelis-Menten kinetics
- Catalysis
- Langmuir adsorption isotherm
- Applications to selected examples of industrially important reactions

Prerequisites: CH4002

CH4005 - PHYSICAL CHEMISTRY 4
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: *To familarise the student with the concepts of electrochemical systems under current flow situations.*

To familiarise the student with electrochemical methods of chemical analysis.

To introduce applications of electrochemical methods in energy conversion and storage, sensors and production of chemicals

Syllabus: Mass Transport in Solution. Ficks Laws of Diffusion.
Electron transfer reactions.Overpotential/Polarization Effects.
Electrode reactions, oxidation/reduction.
Electrode kinetics, Butler-Volmer equation, limiting forms. I/E curves, interplay of
mass transport and electron transport.
Electrical double layer.
Ideally polarizable electrode, capacitance, interfacial effects, models of the double
layer.
Theoretical basis of electron transfer.
Polarography, steady-state, sweep, convective/diffusion techniques.
Electroanalytical techniques, cyclic voltammetry, chronoamperometry, chronocoulometry, potentiometric stripping analysis, differential pulse techniques.
Ion selective electrodes. Biosensors.
Electrodeposition: Electrocrystallisation, bath design, additives (brighteners, throwing
and levelling power).
Surface Treatment: Anodizing, electroforming, electrochemical (E.C.) machining, E.C.
etching, electropolishing.
Electrocatalysis, electrosynthesis.
Fuel cells, solar cells.
Surface analysis techniques, atomic force microscopy,

scanning tunneling microscopy, scanning electrochemical microscopy.

CH4007 - ORGANIC PHARMACEUTICAL CHEMISTRY 1
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: *To build on the functional group chemistry covered in CH4102, CH4103 and CH4104. To impart to the student a detailed understanding and working knowledge of the applied use of organic compounds as pesticides and as medicinal drugs with an emphasis on mode of action at the molecular level and on the synthesis of selected structures.*

Syllabus: Insecticides: The role of acetylcholine and acetylcholinesterase (AChE) in nerve impulse transmission; organophosphates and carbamates: Malathion, parathion and carbaryl, synthesis, mode of action as inhibitors of AchE.
Herbicides: 2,4,5-T and 2,4-D, synthesis, nucleophilic aromatic substitution reactions, dioxin formation; mode of action as auxin analogs.
Antibiotics: sulfonamides, synthesis, mode of action; penicillins: role of transpeptidase enzymes in bacterial cell wall synthesis, mode of action of penicillins as inhibitors of transpeptidase enzymes, synthesis of semi-synthetic penicillin stuctures.
Analgesic and antiarthritic compounds: aspirin, ibuprofen and naproxen, synthesis of naproxen, resolution and racemisation aspects.
Review of functional group chemistry.

Prerequisites: CH4007

CH4013 - ORGANIC CHEMISTRY
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: *To introduce the student to fundamental aspects of organic chemistry eg the different families of compounds- their nomenclature, structure (2D and 3D) and isomerisation (if any).*

To highlight the functional group of each family and relate structure to reactivity; to examine associated reactions/reaction mechanisms of the different functional groups; to introduce aromatic chemistry and study the chemical behaviour of aromatic compounds; to highlight current trends and applications in the areas of organic chemistry.
To carry out practical work to support and reinforce some of the theoretical aspects encountered; to encourage self-directed learning through the use of software and web sources.

Syllabus: Aliphatic Hydrocarbons: Alkanes/Cycloalkanes/Alkyl Groups/Alkenes/Cycloalkenes/Alkynes: Nomenclature; Structural formulae (2D&3D); Isomerisation; Reactions: Combustion and Free Radical Rxns (Alkane/Cycloalkanes); Electrophilic Addition Rxns., Carbocations; Polymerisation;(Alkenes/Cycloalkenes/Alkynes). Occurrence/Uses. Environmental factors/current trends.

Haloalkanes: Structural formulae; Nomenclature; Substitution/Elimination Reaction Mechanisms- SN1, SN2; E1, E2.

Alcohols/Ethers: Structural formulae; Nomenclature; Classification; Physical properties; Occurrence and Uses. Alcohols only:- Acidity; Preparation; Reactions: Oxidation, Esterification.

Aldehydes/ Ketones: Structure & Basicity of the Carbonyl Group; Nomenclature; Properties; Preparation; Typical Carbonyl Group Reactions (Nucleophilic Addition Reactions); Imine formation; Reaction with Grignard Reagents; Synthesis; Occurrence/Applications.

Carboxylic Acids and Carboxylic Acid Derivatives: - Esters, Acyl Halides, Acid Anhydrides and Amides. Functional Group; Nomenclature; Physical Properties; Acidity of the Carboxyl group; Preparation; Nucleophilic Acyl Substitution Reactions (Simple Carboxylic Acids and Esters only).

Amines: Classification; Aliphatic and Aromatic Amines; Reactions; Occurrence.

Aromatic Hydrocarbons: Benzene and Benzenoid Compounds.
Aromaticity- Huckel Rule; Structural Formulae; Nomenclature, Electrophilic Aromatic Substitution Rxns Mechanism; Few examples. Occurrence/Uses.

CH4015 - ORGANIC CHEMISTRY 4
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: *To describe the main methods of polymer production relating synthesis detail to chain architecture. To explain the molecular basis of structure-property relationships in polymers. To develop an understanding of the structure and function of proteinaceous biopolymers.*

Syllabus: Polymer chemistry, addition and condensation, chain growth and step growth mechanisms, polymerisation kinetics.
Branching, cross linking, and networks.
Copolymerisation, types of structure and synthetic methods. Polymerisation techniques.
Chain structure and property relationships, thermal transitions. Crystallinity and morphology.
Polymer solutions and methods of characterisation.
Biopolymers: properties, composition and function of proteins and nucleic acids.

CH4021 - LABORATORY CALCULATIONS
ECTS Credits: 3

Chemical Sciences

Rationale and Purpose of the Module: *Many students entering the University of Limerick to study science courses do not have chemistry as a leaving certificate subject. Given that by its nature chemistry is a very conceptual subject, the rationale for this module is to introduce all students to some of the more basic concepts in fundamental chemistry and appropriate calculations associated with common laboratory practice.*

Syllabus: Valency- the periodic table, valency as applied to the periodic table grouping,

combining atoms to form molecules.
Common Ions & Molecules- sulphates, chlorides, nitrates, phosphates,
hydrochloric acid, sulphuric acid, nitric acid, phosphoric acid, acetic acid,
sodium hydroxide, sodium carbonate, sodium chloride.
Moles-The Moles triangle, grams, moles, gas volume, molecules,
interchangeability of grams, volume and number of molecules through moles.
Concentrations- moles, molarity, percentage solutions, volume over volume,
weight over volume, parts per million, parts per billion, conversion of
one form of unit to another.
Serial Dilutions- moving between concentrations, dilutions.
Acids/Bases- balancing equations-titrations and titration calculations.
Redox Reactions- balancing equations-titrations and titration calculations.
pH -strong acids, strong bases, weak acids and weak bases,
dissociation of acids and bases, solution pH, pOH.

Prerequisites: CH4701, CH4711, CH4721

CH4025 - PHOTOCHEMISTRY
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: *To provide students with an understanding of some key elements of the theory of photochemistry and their application to analytical techniques and solar energy conversion.*

Syllabus: • The terminology of photochemistry.
• The process of light absorption.
• Polyatomic light absorption.
• Absorption to emission 1: fluorescence, internal conversion and the singlet state.
• Absorption to emission 2: phosphorescence, inter-system crossing and the triplet state.
• Photochemistry-based analytical techniques (UV/vis and fluorescence
• Photocatalysis

Prerequisites: CH4003, CH4041

CH4051 - INTRODUCTION TO APPLIED CHEMISTRY AND BIOCHEMISTRY
ECTS Credits: 3

Chemical Sciences

Rationale and Purpose of the Module: *To introduce the student to the disciplines of Applied Chemistry and Industrial biochemistry. To provide the student with a reference framework for future core course modules. To generate student interest and enthusiasm for the subject areas by focusing upon relevant, topical issues of broad public interest*

Syllabus: Importance of chemical and biopharmaceutical industry globally and use of fundamentals relating to chemistry and biochemistry underpinning consumer chemicals (such as detergents, shampoos, cosmetics etc), pharmaceuticals (eg aspirin, paracetamol, penicillin), oil industry (diesel, petrol, tars) and semiconductor industry (materials and processes involved in silicon processing and etching for microchip devices) as well as biopharmaceuticals, such as antibodies, insulin and other proteins.

Chemistry: Case studies where chemistry has solved major problems e.g developments in glass manufacture that makes iphones possible, the advances in synthetic chemistry that allowed antibiotics to be produced at a global scale; the fundamentals of chemistry in polymers and polymeric processes; the chemistry of how aluminium is produced from bauxite and chemistry that makes lithium ion batteries possible. Analytical chemistry and its role in forensics; The role of an industrial chemist in a work environment.

Industrial Biochemistry includes production of genetic engineered protein; overview of approaches and applications. The human genome project and its impact on society.The biochemistry of HIV, including viral structure and biology. Biotechnological approached to developing a antibodies, vaccine. Molecular biology of cancer. Oncogenes and cellular transformation. Approaches to drug discovery and drug delivery. Products of pharmaceutical biotechnology and their medical uses. The unique biology of extreme/hyperthermophiles. Hyperthermophiles as a source in industrially relevant substances. Practical applications of industrial biochemistry. Review of biochemical processes currently used at an industrial scale. Some fundamental concepts in bioprocess engineering. The role of an industrial biochemist in a process work environment. Foundamentals of cellular respiration.
The approach to research; case studies; identification of a problem, planning and pursuing a research strategy.

CH4103 - ORGANIC CHEMISTRY 2A(1)
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: *To build on the functional group chemistry covered in CH4102. To extend the students comprehension and working knowledge of functional group chemistry; to expand the range of reagents, reactions and associated mechanisms. To establish a foundation in stereochemistry and to develop the students understanding of its relevance to organic reactions.*

Syllabus: Aldehydes and ketones (Part 2): Carbon-based nucleophiles continued û Wittig reaction and enolate anions; Aldol and Claisen condensation reactions; alkylation at the a-position.
Carboxylic acids: methods of preparation; using pKa as a measure of acid strength; formation of derivatives such as acid chlorides and esters.
Carboxylic acid derivatives û acid halides, anhydrides, esters and amides; nucleophilic displacement reactions;
Aromatic structure and reactivity (Part 1): defining aromaticity and understanding aromatic stabilization; HuckelÆs rule; electrophilic aromatic substitution reactions;
Stereochemistry: defining and naming chiral centres, enantiomers, diastereomers and meso forms; Fisher projections; understanding the stereochemical course of SN1 and SN2 reactions; applying use of stereochemistry and kinetic measurements to deduce the nature of a chemical reaction pathway.

Prerequisites: CH4103

CH4203 - INORGANIC CHEMISTRY 2
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: *- To describe and explain the main features of the chemistry of the main group elements (s and p block) in relation to position in the Periodic Table*
-to understand the principles underlying the chemistry of metallic elements in the s-, p-, d- and f- block elements and to describe and explain the main features of this chemistry in relation to position in the Periodic Table.
- To introduce students to the chemistry of transition metal complexes

Syllabus: The Periodic Table and important trends: s-block, p-block, d-block and f-block metallic elements. Electrode potential diagrams. Comparison of main group and transition metals. Hard and soft acid and base theory. Complexes: structure, isomerism, magnetic and spectroscopic properties. Reaction mechanisms. Properties of first row transition metals. Comparison of first row and second and third row transition metals. Chemistry of the lanthanides.

Bonding in transition metal complexes, crystal field theory,

Organometallic compounds

Cluster compounds, multiple metal to metal bonds.

Chemistry of metallic s and p block elements group by group.

Prerequisites: CH4122

CH4253 - INORGANIC CHEMISTRY 2B
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: *- To describe and explain the main features of the chemistry of the main group elements (s and p block) in relation to position in the Periodic Table and*
-to understand the principles underlying the chemistry of metallic elements in the s-, p-, d- and f- block elements and to describe and explain the main features of this chemistry in relation to position in the Periodic Table.
- To introduce students to the chemistry of transition metal complexes

Syllabus: The structure of the Periodic Table and important trends: s-block, p-block, d-block elements. Polarising power. Chemistry of hydrogen and s and p block elements group by group. Electrode potential diagrams. Comparison of main group and transition metals. Properties of first row transition metals. Organometallic compounds. Survey of biological importance of the elements.

Prerequisites: CH4701, CH4252

CH4303 - ANALYTICAL CHEMISTRY 1A
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: *To give the students an understanding of and an appreciation for the qualitative and quantitive aspects of analytical chemistry through a working knowledge of the theory and applications of spectrophotometry and spectroscopy.*

Syllabus: The analytical process, measurements and experimetal error, fundamentals of spectrometry, Beer-Lambert law, applications of spectrometry, spectrometers, atomic spectroscopy, calibration and analytical methods, infrared spectroscopy, modes of stretching and bending, fourier transform ir, correlation charts for ir, functional group survey, nmr basic concepts, chemical shift & shielding, Pulsed FT nmr, integration, spin-spin splitting in 1H spectracoupling constants, combined ir/1Hnmr spectra interpretation.

Prerequisites: CH4303

CH4305 - ANALYTICAL CHEMISTRY 3
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: *TO DEVELOP ANALYTICAL METHODS FOR THE QUALITATIVE AND QUANTITATIVE DETERMINATION OF SOLIDS AND SOLID SURFACES. TO INTRODUCE THE CLASSIFICATION AND CHEMISTRY OF SOLIDS*

Syllabus: APPLICATION OF X-RAY METHODS INCLUDING DIFFRACTION, FLUORESCENCE AND ELECTRON MICROPROBE ANALYSIS. STRUCTURE DETERMINATION BY X-RAY METHODS. SOLID STATE REACTIONS INCLUDING CORROSION AND CEMENT CHEMISTRY; RELATIONSHIP BETWEEN CHEMICAL AND MECHANICAL PROPERTIES. APPLICATION OF GROUP THEORY, INCLUDING POINT AND SHAPE GROUPS.

REVIEW OF ALL MAJOR CLASSES OF SOLIDS
* CRYSTALLIZATION-NUCLEATION AND GROWTH OF CRYSTALLINE SOLIDS
* POLYMORPHISM IN PHARMACEUTICAL SOLIDS
* ELUCIDATION OF THE STRUCTURE OF DNA
* LACTOSE CRYSTALLIZATION
* POLYMERS
* SOLID STATE TRANSFORMATIONS
* NON-STOICHIOMETRY AND SOLID SOLUTIONS
* IONIC CONDUCTIVITY IN SOLIDS-SOLID STATE SENSORS
* TOPOTACTIC REACTIONS AND EPITAXY

CH4405 - PROCESS TECHNOLOGY 2
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: *The Process Technology 2 semester course is a continuation of Process Technology*

To provide the student with a broad understanding of the principles of fluid flow and momentum transfer.
To acquaint the student with the significance of particle-fluid interaction in processing operations.
To enable the student to develop expertise in the analysis and design of heat transfer processes

Syllabus: Fluid mechanics, revision of fluid statics, fluid flow, laminar and turbulant. Momentum transfer, energy relationships and the Bernoilli Equation. Newtonian and non-Newtonian fluids. Flow in pipes and vessels, pressure drop and velocity distribution. Pumps and fans, efficiencies. Flow measurement. Dimensional analysis as applied to fluid flow. Size reduction of solids, particle size distribution. Particle - fluid interaction, free and hindered settling, elutriation, centrifugation, fluidisation and fluidised beds. Flow of fluids through packed beds. Filtration. Heat transfer: conduction, convection and

radiation. Heat transfer coefficients. Heat exchangers. Dimensionless numbers in solving heat transfer problems

Prerequisites: CH4404

CH4407 - PROCESS TECHNOLOGY 4
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: *- To provide the student with a broad understanding of the principles of mass transfer and its applications*
- To enable the student to develop expertise in the analysis and design of separation processes.
To give the student practical experience in the operation of separation processes.

Syllabus: Mass Transfer, diffusion in gases and liquids, laws of diffusive flux, mass transfer in solids, unsteady state mass transfer. Mass transfer across phase boundaries, mass transfer coefficients.

Separation operations, vapour-liquid systems, plate and packed columns, McCabe - Thiele plots, equilibrium stages, stage efficiencies, HETP and HTU.NTU approaches to packed column design. Distillation continuous and batch. Gas absorption and stripping. Use of triangular composition diagrams, leaching and liquid - liquid extraction, mixer-settlers. Evaporation, forward and back-feed operation, efficiency.

CH4415 - PROCESS TECHNOLOGY 3
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: *To provide the student with a comprehensive knowledge of chemical reaction engineering and reactor design.*

Syllabus: Chemical reaction thermodynamics; review of chemical kinetics; ideal reactor types and design equations;
design for single and multiple reactions; multiple reactor systems; temperature effects in reactor design and operation; assessment of and models for non-ideal reactor behaviour; reactor design for heterogeneous reactions.

CH4417 - PHARMACEUTICAL FORMULATION
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: *To draw on a knowledge of basic physical chemistry and chemical unit operations in order to understand the efficient design and formulation of medicines as well as the manufacture of these medicines on both a small (compounding) and a large (pharmaceutical technology) scale.*

Syllabus: Physical Chemical principles of dosage from design
Particle science & powder technology
Biopharmaceutics
Dosage form design & manufacture

Prerequisites: CH4003, CH4004, CH4005, CH4405, CH4415

CH4701 - GENERAL CHEMISTRY 1
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: *Many students that enter the University of Limerick to study science and engineering courses do not have chemistry as a leaving certificate subject. The rational of this module is to introduce all students to some basic concepts in Chemistry. More specifically:*
To give students an understanding of the fundamental concepts of modern chemistry.
To familiarise students wit the various applications of chemistry in everyday life.
To develop the basic laboratory skills associated with practical chemistry.

Syllabus: Simple characterisation of atoms and molecules: basic atomic structure, ions and isotopes, atomic and molecular weights, the mole concept.
Early chemical concepts and their present day uses: e.g. Dalton Atomic Theory, Avogadro's Law, Oxidation and reduction.
Chemical nomenclature. Modern theories of atomic and molecular structure. Quantum mechanical description of the atom: Schroedinger Wave Equation, atomic orbitals and quantum numbers.
Introduction to chemical bonding. Bond representation by Lewis dot, valence bond and molecular orbital structures. Hybridisation.
Periodic classification of the elements.
The Gas Laws, Stoichiometry.
Classification of chemical reactions. The Electrochemical Series.
Chemical equilibrium. Liquid solution chemistry. Acids and bases.
Selected applications of chemistry in domestic, medical and industrial environments.

CM4203 - COMMUNICATIONS
ECTS Credits: 6

Management and Marketing

Rationale and Purpose of the Module: *This module facilitates students in thinking strategically about communication. It aids them in improving their written, presentation and interpersonal communication skills. The module examines a set of 'best practices' or guidelines that have been derived from both research and experience. It gives students the opportunity to put those guidelines into practice and encourages them to reflect on the role of communication in personal, academic and business contexts.*

Syllabus: This module introduces Communications in personal, academic and professional contexts. Students are introduced to communication theory and develop their practical communication skills. Topics covered include the following: the communication process; culture and intercultural communication; interpersonal communication including listening and feedback skills; understanding conflict and its impact on communication; referencing and library skills; non-verbal communication; presentation skills; communication channels, contexts, strategies and audiences.

CS4004 - SOFTWARE TESTING AND INSPECTION
ECTS Credits: 6

Computer Science & Information Systems

Rationale and Purpose of the Module: *To introduce students to software testing and inspection such that when given a specification and an implementation of a program, the student would be able to write the tests, run them, and report on the errors found.*

Syllabus: - Key Terminology: testing, debugging, error, bug, defect, quality, risk, mean-time between failures, regression testing, limitations of testing;
- Test types and their place in the software development process;
- Black-box and white-box testing;
- Program reading and comprehension;
- Refactoring code;
- Inspections, walkthroughs and desk-checking;
- Programming with assertions;
- Using a debugger for white-box testing;
- Reporting and analysing bugs: content of the problem report, analysis of a reproducible bug, making a bug reproducible;
- Test case design: characteristics of a good test, equivalence classes and boundary values;
- Expected outcomes, test case execution and regression testing;
- Requirements for white-box and black-box testing tools;

Prerequisites: CS4013

CS4013 - OBJECT ORIENTED DEVELOPMENT
ECTS Credits: 6

Computer Science & Information Systems

Rationale and Purpose of the Module: *On successful completion of this module students will be able to identify, design, code and construct systems using inheritance hierarchies, encapsulation and polymorphism to solve specified programming problems.*

Syllabus: Key terminology: objects, attributes, behaviours, states, classes, instances, associations; abstraction, inheritance, generalisation/specialisation, parent (base/superclass/ancestor) and child/children (subclass/descendant) classes, encapsulation/information hiding, polymorphism, message passing, dynamic binding;
Problem solving using a procedural approach versus an object oriented approach;
Representing classes, objects, attributes: build generalisation relationships; define is-a relationships; divide into superclasses/subclasses; build associations between classes; draw an analysis-level diagram;
Methods: method definitions; static keyword; location of methods; arguments/parameters; method invocation; return types; method modifiers;
Classes and objects: defining classes, member variables and member methods; access modifiers; creating and destroying objects/instances; class and instance variables, static variables; object values including predefined object values (null, this, super);
Constructors: constructor method; overriding defaults; sending arguments; overloading methods including constructor methods; overriding a method; blocks and scope;
Exceptions: how to handle exceptions/errors; the throw clause; try, catch and finally blocks; rethrowing an exception;
Extending classes: abstract classes; nested classes and interfaces; interfaces and polymorphism; constructors in extended classes, constructor phases; single inheritance versus multiple inheritance; single inheritance of implementation; accessing and initialising superclasses; named and anonymous inner classes; member and local inner classes; iteration, exception-safety and delegation idioms based on inner classes;

Prerequisites: CS4222

CS4019 - DIGITAL ARTS 1
ECTS Credits: 6

Computer Science & Information Systems

Rationale and Purpose of the Module: *This module is an introduction to the wide range of art types and practices which make up the digital arts. It contextualizes the aesthetics and modes of approach of the digital arts by presenting the historical development of post 19th Century art practices and technologically mediated art forms. It evaluates these forms from a range of theoretical and practical vantage points thereby providing a perspective from which students can critically relate to the digital arts in general as well as to their own practice.*

Syllabus: 1. Video Art
2. Film Theory
3. Installation and Interactive Art
4. Electronic and Experimental Music
5. Digitally Enabled Sculpture
6. Sound Art

CS4020 - INFORMATION SOCIETY
ECTS Credits: 6

Computer Science & Information Systems

Rationale and Purpose of the Module: *This module offers a socio-economic, political and cultural exploration of the "internet society". The course will provide a series of perspectives on the network society, examining its conceptual foundations, critiquing its more polemical exponents, and subjecting the claims of the electronic sublime to critical scrutiny. This module will help students understand some of the current debates in the media about the effects of information and communications technology on society. The module will help the student to develop critical thinking around key issues of the Information Society.*

Syllabus: In this module, the students will cover a series of available approaches to the study and understanding of technological innovation and social change in the Information Society. In particular, the module covers three main approaches to investigate issues related to the Information Society: technological determinism, social constructivism, and alternative theoretical approaches such as Actor Network Theory. The module will then cover a series of specific case studies regarding recent technological innovation and social change. Key issues of the Information Society (security vs. privacy; copy-right vs. copy-left) will be discussed through practical examination of selected case studies in different areas (proprietary systems and IP, user generated content platform and online communities, open source movements).

CS4023 - OPERATING SYSTEMS
ECTS Credits: 6

Computer Science & Information Systems

Rationale and Purpose of the Module: *On successful completion of this module a student should have a clear understanding of the*
(1) Logical structure of, and facilities provided by, a modern OS
(2) Concepts of processes, threads and multithreading and how they are implemented in a modern OS
(3) Problems that arise when processes collaborate and compete and well as being able to demonstrate practical experience of mechanisms for handling these situation
(4) Different ways of implementing virtual memory
(5) Use of system calls

Syllabus: (1) Positioning the operating system (OS) between the user and the hardware; the need for the OS; different types of OSs; interfaces to an OS and the interface with the hardware;
(2) The concept of a process and a thread; representation of processes and threads; process and thread state; process creation and termination; thread creation, scheduling and termination; multithreading;
(3) Scheduling; context switching; concurrency, including interaction between threads;
(4) Inter process communication (IPC); synchronization and mutual exclusion problems; software algorithms for IPC; 2 processes, n processes;
(5) Low and high level mechanisms for IPC and synchronization: signals; spinlocks; semaphores, message passing and monitors; deadlock; use of semaphores for synchronization, mutual exclusion, resource allocation; implementation of semaphores; use of eventcounts and sequencers for classical IPC problems; conditional critical regions; monitors and condition variables;
(6) Physical and virtual memory; address translation; base and length registers; segmentation and paging; cache memory; system services for memory management;
(7) I/O subsystem, directory name space; inodes; synchronous and asynchronous I/O; locking; buffering;
(8) File systems and file management; file system types; disk organization; mounting a file system; device drivers; file system based IPC; pipes; the socket mechanism; IPC using sockets;
(9) Fault tolerance and security;

Prerequisites: CS4211

CS4025 - DIGITAL AUDIO FUNDAMENTALS
ECTS Credits: 6

Computer Science & Information Systems

Rationale and Purpose of the Module: *An introduction to digital audio aimed toward preparation for studio applications.*

Syllabus: Nature of analog and digital sound;
Principles of digital signal processing for audio including sampling theory and spectral representation, digital sound synthesis techniques;
Digital audio recording techniques including selection and use of microphones;
Multitrack recording;
Manipulation of digital audio files;
Digital audio and compression;
Digital audio distribution including storage, internet and digital audio broadcasting.

CS4031 - INTRODUCTION TO DIGITAL MEDIA
ECTS Credits: 6

Computer Science & Information Systems

Rationale and Purpose of the Module: *To introduce students to some of the seminal developments in technology and to provide them with a historical perspective on how these developments have impacted on human development.*

Syllabus: The influence of technology on cognition and activity;
An overview of conceptual development of computer media.
The relationship of Technology to Practice, Form, Content and Remediation.
Case studies will consider the influences, consequences and interrelationship of media and thought, including examples from the world of work, education, video games, social media, ubiquitous computing, personal fabrication and so forth.

CS4053 - DIGITAL VIDEO FUNDAMENTALS
ECTS Credits: 6

Computer Science & Information Systems

Rationale and Purpose of the Module: *To introduce students to the principles and technologies applied to digital video representation and recording.*

Syllabus: Introduction to principles of digital video representation and recording.
Principles of Digital Signal Processing for video including sampling theory and hue, saturation and intensity representation.
Selection and use of digital video cameras.
Digital video formats, compression techniques, connectivity and standards.
Principles of digital video colour representation.
Introduction to digital video display and projection.
Digital video image capture.
Introduction to digital video editing.
High-definition digital video.
Introduction to CGI.
Digital video distribution.
Audio technology for video.

CS4055 - DATA MINING AND DATA WAREHOUSING
ECTS Credits: 6

Computer Science & Information Systems

Rationale and Purpose of the Module: *To introduce students to the concepts and strategies for the design, development and implementation of data warehouses and repositories in order to enable their exploitation by knowledge discovery and data mining technologies.*

Syllabus: What is data mining; why data mining; cross-industry standard process (CRISP-DM); CRISP-DM in action; data warehousing and enterprise intelligence; basic elements of data warehousing; what tasks can data mining approach; Data pre-processing: data cleaning, handling missing data, identifying misclassifications, graphical methods for identifying outliers, data transformation, numerical methods for identifying outliers;

Hypothesis testing versus exploratory data analysis: dealing with correlated variables, categorical variables, using exploratory to uncover anomalous fields, numerical variables, multivariate relationships, selecting intersecting subsets of the data for further investigation;

Data warehousing with intelligent agents: integration of

database and knowledge-based systems, the role of artificial intelligence in warehousing;

Data warehouse performance: measuring data warehouse performance, performance and warehousing activities; data warehousing and OLAP, relationship between data warehousing and OLAP;

Aspects of building data warehouses: physical design, using functional independence, loading the warehouse, metadata management, operation phase, coherent management of warehouses for security;

Data mining task in discovering knowledge in data: statistical approaches to estimation and prediction, univariate methods: measures of centre and spread, statistical inference, confidence interval estimation, bivariate methods: simple linear regression, confidence interval for the mean value of y given x, prediction intervals for a randomly chosen value of y given x, multiple regression, verifying model assumptions;

Nearest neighbour algorithm, supervised versus unsupervised methods, classification task, k-nearest neighbour algorithm, distance function, combination function, quantifying attribute relevance, k-nearest neighbour algorithm for estimation and prediction;

Classification and regression trees, C4.5 algorithm, decision rules, comparison of the C5.0 and CART algorithms applied to real data;

Neural networks: neural networks for estimation and prediction, sigmoid activation function, back-propagation, gradient descent method, back-propagation rules, termination criteria, momentum term, sensitivity analysis;

Clustering task: hierarchical clustering methods, k-means clustering;

Self-organising maps, Kohonen networks, cluster validity, using cluster membership as input to downstream data mining models;

CS4057 - MACHINE LEARNING AND AI FOR GAMES
ECTS Credits: 6

Computer Science & Information Systems

Rationale and Purpose of the Module: *The purpose of the module is to provide the students with an overview of the applications of Artificial Intelligence and Machine Learning methods to Games and Game Development.*

Syllabus: A series of case studies on the application of Artificial Intelligence and Machine Learning methods to all aspects of Games and Games Development will be presented. Example applications could include, Game Playing Programs, Path Finding, Control and Goal Oriented Action Planning, Multi-Agent Systems, Semi-automated Action Planning, and Sound Generation. The AI and Machine Learning methods discussed may include Symbolic AI, Expert Systems, Evolutionary Algorithms, Genetic Programming and Grammatical Evolution, Reinforcement Learning, Artificial Neural Networks, Swarm Intelligence, and Behaviour-Based Robotics and Control.

Prerequisites: CS4006

CS4059 - CREATIVE CODING
ECTS Credits: 6

Computer Science & Information Systems

Rationale and Purpose of the Module: *To introduce students to the design and development of interactive audio-visual artworks using low level coding.*

Syllabus: This module will focus on the development of interactive audiovisual (a/v) artworks.
Student will focus first on the analysis of existing a/v artworks. They will then create a concept, design and develop an interactive artwork using low level coding.

Key topics include:
1. Low level programming (C++ and openFrameworks)
2. Use of Integrated Development Environment (IDE) - XCode
3. Real-time manipulation of audio elements by means of code (C++)
4. Real-time manipulation of video elements by means of code (C++)
5. Communication protocols for interconnection with third-party software (MIDI, OSC)
6. User responsive art installations.

CS4067 - WRITING GAMES ANALYSIS
ECTS Credits: 6

Computer Science & Information Systems

Rationale and Purpose of the Module: *The primary objective of this module is to define the art and practice of writing computer games. Students discover how to analyse Games Discourse and are introduced to Wittgensteinian definitions of language-games as a tool for understanding and critiquing formal descriptions of language, thought and the process of story creation and revelation. Students are given a heuristic for investigation that results in their discovery of a complicated network of similarities, overlapping and criss-crossings within the structure of an essentially hypertextualised story. The final objective is that students learn how a game may resemble a simulation that tries to model a phenomenon by isolating the essential features of that phenomenon and plays them out in a way that does not affect the phenomenon and ultimately the students are required to produce their own written phenomenon.*

Syllabus: - history and development of games' story development;
- character development;
- discourse analysis;
- hypertextual narratology;
- gaming as hermeneutical play;
- game-states and rule definitions;
- iteration, repetition and rapture;
- Derrida's "Structure, Sign and Play";
- game criticism, speculation and theory;
- rules and metarules; winning conditions;
- interactive fiction.

CS4083 - SOUND SYNTHESIS
ECTS Credits: 6

Computer Science & Information Systems

Rationale and Purpose of the Module: *To develop knowledge and competence of digital media systems. (Existing module CS4063 "Digital Media Software & Systems 2" is part of a suite of modules core to both LM113 (Digital Media Design) and LM114 (Music, Media & Performance Technology). The course board has decided that the titles of this suite of DMSS modules do not adequately describe the course content and therefore wish to change the titles to better communicate the content. The content itself of these modules remains the same - only the title itself is changed.)*

Syllabus: To develop knowledge and competence of digital media systems:
1. A survey of sound synthesis techniques from early electronic music to contemporary signal processing
2. Creation of synthesis techniques in industry-standard software
3. Examination of additive synthesis, modulation synthesis and contemporary techniques
4. Basics of frequency-domain processing
5. Real-time computer methods for sound design and processing
6. Aesthetics and development of sound design and processing

CS4084 - MOBILE APPLICATION DEVELOPMENT
ECTS Credits: 6

Computer Science & Information Systems

Rationale and Purpose of the Module: *The module will focus on the tools and environments that exist to help developers create real world applications that run on wireless and mobile devices. A strong emphasis will be placed on providing students with hands on experience in the programming and testing of applications for mobile devices. Throughout this module students will use an object oriented programming language, basic APIs and specialised APIs to develop applications for mobile devices.*

Syllabus: Challenges to be faced when developing applications for mobile devices.
Platform specific mobile applications and/or mobile web applications; mobile application lifecycles.
Mobile applications and their architectures.
Overview of operating systems (OSs) and Application Programming Interfaces (APIs) to choose from when developing applications for mobile devices.
Comparison of native development environment options; software development kits (SDKs) and emulators.
Installing and configuring the development environment.
Managing application resources; designing user interfaces; data storage and retrieval options; synchronization and replication of mobile data.
Communications via network and the web; networking and web services; wireless connectivity and mobile applications.
Performance consideration: performance and memory management; performance and threading; graphics and user interface performance; use various facilities for concurrency.
Security considerations: encryptions, authentication, protection against rogue applications.
Location based application; location API.
Packaging and deploying applications for mobile devices.

CS4085 - COMPUTER GRAPHICS II - TOOLS AND TECHNIQUES
ECTS Credits: 6

Computer Science & Information Systems

Rationale and Purpose of the Module: *Increase competence of student in the area of modern real-time computer graphics. This includes usage of Content Creation Suites, 3D Engines and combining available tools into a working tool chain. This is a follow on module to CS4815 which introduces more advanced graphics techniques and special effects.*

Syllabus: - Basic Modelling Techniques
- Basic Animation Techniques
- Usage of Content Creation Suites
- Graphical File Formats (importing / exporting)
- Introduction to Real-Time 3D Engines
- Scene Management Techniques
- Special FX
- Particle Systems
- Pixel/Vertex Shaders

Prerequisites: CS4815

CS4093 - GAMES FOR GLOBAL MARKETS
ECTS Credits: 6

Computer Science & Information Systems

Rationale and Purpose of the Module: *To examine the processes by which games are developed with a view of global markets, and the considerations needed for successful implementation of the principles.*

Syllabus: General overview of localisation, internationalisation, global markets, phases
Culturalisation of game content: why it matters, geopolitical and cultural forces, strategies
Software ratings and rating bodies
Localisation-friendly development and internationalisation
Organising assets, integrating assets
Localisation tools and processes
Localisation kits, localisation testing

CS4096 - ARTIFICIAL INTELLIGENCE FOR GAMES
ECTS Credits: 6

Computer Science & Information Systems

Rationale and Purpose of the Module: *The purpose of the module is to provide the students with a foundation in the principles and applications of Artificial Intelligence methods as applied to Games and Game Development.*

Syllabus: Review of basic AI technologies and principles, and how they can be employed in computer, board, and embodied games. Comparison between mainstream AI and game AI. Specific topics addressed include pathfinding in games, heuristic search in game playing, map representational mechanisms, and character decision making. Areas of agent learning including reinforcement learning as applied to games will be introduced. Other topics of interest include procedural content generation and general game AI. The related areas of artificial life and robotics will be touched upon.

Prerequisites: CS4006

CS4106 - MACHINE LEARNING: METHODS AND APPLICATIONS
ECTS Credits: 6

Computer Science & Information Systems

Rationale and Purpose of the Module: *The purpose of this module is to familiarise students with a targeted subset of the principles and methods involved in machine learning, focusing mainly on the field of evolutionary computation and associated paradigms.*

Syllabus: Following an overview of general machine learning methods and applications, the goal is to provide students with an understanding of the basic principles, methods and application domains for evolutionary computation.
Students will be introduced to a broad range of evolutionary computation techniques including genetic algorithms, genetic programming, and grammatical evolution. Different representational mechanisms

including binary, Gray, real-valued and e-code will be discussed. Different approaches to the mutation and recombination operators will be presented. Fitness function types and interactive evolutionary computation will be introduced.
Depending on the particular expertise of the lecture involved in delivery of the module particular emphasis may be placed on application to areas such as neuroevolution, evolutionary robotics (including evolutionary humanoid robotics), automatic program synthesis, the parallelisation of sequential programs, and financial modelling and prediction. Potential societal, ethical and philosophical implications of advanced AI/ML technologies will be outlined.

Prerequisites: CS4006

CS4125 - SYSTEMS ANALYSIS AND DESIGN
ECTS Credits: 6

Computer Science & Information Systems

Rationale and Purpose of the Module: *The development of large-scale complex software-based systems proceeds from analysis through design and implementation to system verification and validation. This module covers the analysis and design phases of the software development cycle with particular emphasis on the use of Object-oriented approaches to specification.*

Syllabus: - Software lifecycles: review of the waterfall model, prototyping, spiral, and object-oriented (OO) development models.
- Focus on the Unified Software Development Process (USDP).
- Characteristics of good software design - modules, cohesion, coupling or dependency, encapsulation, abstraction, etc.
- Requirements investigation.
- Requirements classification: functional and non-functional requirements.
- Requirements modelling: use case diagrams and use case descriptions.
- Computer aided software engineering (CASE).
- Review of OO concepts: classes and objects, abstract classes, class interfaces, inheritance, polymorphism, etc.
- Analysis using OO method and UML: identification of classes using key domain abstraction, CRC cards, collaboration and sequence diagrams, state transition diagrams, and activity diagrams.
- Overview of object-oriented software architectures: layering and partitioning, open versus closed, MVC, broker, etc.
- Design using OO method and UML: concurrency, object design, collection classes, GUI design, and data management design.
- Additional diagramming notation: packages, subsystems, and implementation.
- Analysis and design patterns.
- Frameworks.
- Other methodologies - DSDM, Agile approaches, Extreme Programming.

CS4158 - PROGRAMMING LANGUAGE TECHNOLOGY
ECTS Credits: 6

Computer Science & Information Systems

Rationale and Purpose of the Module: *To provide students with an understanding of production systems, phrase structure generative grammars, the languages generated by these grammars, and the abstract state machines that elucidate the parsing process. To provide students with an understanding of how recognition/parsing programs can be systematically derived from grammars, especially by means of parser generators. To provide an understanding of the notion of syntax directed translation, and how it can be implemented in parser-based tools, especially applied to code-generation, and documentation of programs.*

Syllabus: - Notion of Phrase Structure;
- Notion of Post's Production Systems;
- Chomsky's definition of Phrase structure Generative Grammars, and Hierarchy of Grammars. Sentential Forms and Languages generated by Context Free Grammars;
- Regular expressions, Regular sets, and Regular Grammars;
- Classification of Abstract State Machines, Configurations, Transitions;
- Construction of Recognising Finite State machines from Regular Grammars and Coversely Program Design based on Regular Expressions;
- Construction of Lexical Analysers including use of Generators such as LEX/FLEX;
- Leftmost and Rightmost derivation of sentences from Context Free Grammars, Parse trees, and ambiguity of Grammars;
- Top Down Parsing (Recursive Descent) Techniques;
- Bottom Up (LR) Parsing Techniques;
- Notion of an Item, Closure of a set of Items, Transitions between sets of items, and canonical collections of valid items;
- Parser Generators such as YACC/BISON and their use in syntax directed translation.

Prerequisites: CS4111, CS4112, CS4411, CS4512, CS4013

CS4178 - SOFTWARE REQUIREMENTS AND MODELLING
ECTS Credits: 6

Computer Science & Information Systems

Rationale and Purpose of the Module: *Introduce students to the requirement and modelling phases of a system's (and software) development cycle. Requirements and models as knowledge capture and materialization in analyzable IT artefacts. Requirments and models that support the needs to change and evolution. Exposure to relevant methods, techniques and tools, exposure to case studies.*

Syllabus: 1. Requirements in the traditional and in the agile/evolutive system and software development process.
2. Techniques for elicitation and discovery of requirements.
3. Relation between requirements and knowledge capture: formal and informal materialisations.
4. Abstract models and constraints as co-design tools with diverse stakeholders.
5. Relation between requirements, models, and testing.
6. Functional and non-functional requirements.
7. Models for system behaviour: formal models, verifiable models, executable models.
8. Requirements and model validation
9. Requirement and model review, refinement and evolution
10. Negotiation and agreement: organisational and social issues; co-design.

CS4187 - PROFESSIONAL ISSUES IN COMPUTING
ECTS Credits: 6

Computer Science & Information Systems

Rationale and Purpose of the Module: *Information and Communication Technology (ICT) industries employ large numbers of people who create technologies affecting a wide range of different types of communities within society as a whole. It is very important that students who will be entering these industries do so with an understanding of ethical professional and cultural issues that they will need to engage with as professionals. To this end Professional Issues in Computing focuses on the ethical, legal and social consequences of the design, implementation and use of computer and information systems.*

Syllabus: What is a computer professional?
Ethical theories including: consequentialism and non-consequentialism; utilitariasm; deontological theory.
Ethical decision making frameworks.
Applying ethical theories to moral problems in ICT.
Codes of conduct of professional bodies in ICT.
Legal implications of being a professional including: Intellectual property law; privacy and data protection; computer crime; Irish, European and American laws and potential for conflict.
Conflict between the legal and the ethical approaches.
Social impacts of ICT including: Digital divide - exclusion based on: race, gender, age, language; North/South divide, power and democracy, unstoppable progress, physical and social disability.

CS4227 - SOFTWARE DESIGN AND ARCHITECTURE
ECTS Credits: 6

Computer Science & Information Systems

Rationale and Purpose of the Module: *The objectives of this module are to equip students with the fundamental knowledge and techniques necessary to design quality software at the object and component level. The emphasis is on the support of architectural use cases through patterns at the architectural and design level, refactoring and Component Based Development (CBD) at both theoretical and applied level.*

Syllabus: Topics presented include:
Challenges facing the Object Oriented (OO) and Component Based Development (CBD) paradigms.
Characteristics of good software focusing on modular decomposition, coupling, cohesion, interfaces, encapsulation and architecture centric component based development.
Modelling of architectural use cases.
Object Oriented Design (OOD) with a focus on extensibility and performance using a generic OO method in conjunction with the Unified Modelling Language (UML).
Design of software architecture focusing on architectural patterns such as those presented in the volumes on Pattern Oriented Software Architecture series.
Detailed design focusing on creational, structural and behavioural design patterns.
Introduction to refactoring, code smells and refactoring to patterns.
Component Based Development in theory and practice.
Overview of topics such as Service Oriented Architecture, Domain Specific Languages etc.
Comparison of OO versus CBD.

CS4416 - DATABASE SYSTEMS
ECTS Credits: 6

Computer Science & Information Systems

Rationale and Purpose of the Module: *Databases, particularly relational databases and database management systems (DBMSs) are central in the design and development of modern information systems. Understanding of their structure and skills in their application are fundamental aspects of a proper foundation in any domain of software development.*

Syllabus: The concept of a DBMS and DB Architectures are introduced. This module will build upon the notion of a database as introduced in Information Modelling and Specification including revision of those concepts previously introduced, i.e. the relational data model, including issues, such as Integrity Constraints, SQL, and Views.
- Concepts of databases and DBMSs;
- Database Architectures;
- Revision of the Relational Model; SQL Tables, Views and the DDL; Referential and Existential Integrity Constraints;
- Normalisation: Functional Dependencies; 1st, 2nd 3rd, 4th Boyce Codd and Fifth Normal Forms;
- Technologies: Transaction Management; ACID properties; Security; Data Storage & Indexing; Triggers & Active DBs; Query Optimisation; Distributed Architectures;
- Use of embedded SQL, cursors, triggers;
- Object DBs and Object Relational DBs;
- Data Warehousing, Decision Support & Data Mining;
- Emerging Technologies;

Prerequisites: CS4513

CS4457 - PROJECT MANAGEMENT AND PRACTICE
ECTS Credits: 6

Computer Science & Information Systems

Rationale and Purpose of the Module: *To examine the processes by which the development of computer-based information systems are managed, and the considerations needed for successful implementation of such systems.*

Syllabus: Why management of IS projects can be the deciding factor for success or failure; responsibilities for managing medium to large-scale information systems development projects; from project initiation to systems implementation; the tools and techniques applicable to planning, monitoring and controlling a project.

CU4027 - VISUAL CULTURAL STUDIES
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *The aim of this module is to provide students with a comprehensive overview of the transdisciplinary formations of visual culture and visual cultural studies. Students will develop an understanding of;*
** the ways in which visual texts have emerged as a dominant mode of cultural communication*
** how visuality has emerged as a primary concern within a range of disciplinary formations such as cultural studies, film studies, media studies, sociology and technology.*

Syllabus: The course will survey the field of visual cultural studies from the transition between the painting and the mechanical reproduction of images. It will deal with the problem of photography as a reflection of reality, as gaze and as surveillance The gendering of the

image in painting ,advertising and cinema will be covered The module will deal with the notion of virtuality and the critiquing of the internet. Race and globalisation as they are theorised and represented will form the basis of the last part of the module.
Readings will form the basis or lectures and tutorials as well as the screening of films and television productions. Analytic tools of image analysis will be presented and applied and will form a significant part of student assessment.

CU4037 - EUROPEAN CINEMA FROM ITS BEGINNINGS TO THE 1950s
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *The module intends to give students an overview over the major developments in the various European national cinema traditions up to the end of the 1950s. It aims to introduce students to basic concepts of film historiography as well as key issues of the periods studied such as the role of film within popular culture, aesthetical debates and theories before and after the introduction of sound films, the mutual influences of American and European cinema. The main focus of this module will be on the development of Soviet, French, German, Spanish, Italian and Scandinavian Cinema.*

Syllabus: Principles of film history; Europe vs. America; the concept of National Cinema; aesthetics of silent vs. sound films; literature vs. moving images; visions of modernity; images of technology and science fiction. Aspects covered will include: Beginnings (Lumiþre brothers, Georges Meliþs); Nordisk Film Companie; Film and World War I; Soviet Cinema (Montage, Eisenstein, Dziga Vertov); Weimar Cinema (Expressionism, Fritz Lang, Murnau, mountain films, proletarian cinema, Marlene Dietrich); French cinema (Gance, Renoir); Nazi Cinema (cinema as propaganda; Riefenstahl); Italian Neo-Realism (Rossellini, de Sica), Spanish Cinema (Berlanga, Bunuel).

CU4121 - INTRODUCTION TO NEW MEDIA AND CULTURAL STUDIES
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: * *To introduce students to the fields of cultural studies and new media and to the basic concepts underlying their study of these disciplines over the course of their programme.*
* *To give students the theoretical tools to analyse cultural processes and to investigate new media as cultural institutions, particularly in comparative contexts.*
* *To raise studentsÆ intercultural awareness as part of a process of preparing for the Erasmus/study abroad semester.*
* *To introduce students to the concept of career planning, particularly with the objective of preparing them for cooperative education as an integral part of their course.*

Syllabus: * The notion of culture: defining and describing the notion of culture and cultures; comparing different definitions and traditions of culture in a range of contexts; cultural anthropology; linguistic dimensions of culture; cultural policy and cultural imperialism; language and cultural awareness.
* Media and culture: identifying and describing cultural dimensions of media processes; the cultural specificity of media in different linguistic and cultural contexts; cultural dimensions of new media processes.
* Analysing cultural processes: theories and methodologies of cultural analysis.
* Career planning for students: skills awareness; career awareness; preparation for the off-campus year.

CU4127 - CULTURAL STUDIES 5: COMPARATIVE LITERATURE
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *The aim of this interdisciplinary module is to examine literatures from different linguistic and cultural contexts comparatively, both from the point of view of theory, and in practice. The students will be introduced to theoretical approaches to comparative literature and apply these to literary texts concerned with specific themes and genres in a variety of cultural contexts. In particular, the module will explore the ways in which such literary texts enable critical inquiry into common experiences past and present across cultures. The module will also provide the setting for further developing the studentsÆ critical and analytical skills in the study of literature.*

Syllabus: The course is structured as follows:
The students will be introduced to the concept of comparative literature, the development of specific genres and themes and, following on from this, to a range of examples from different cultural and language backgrounds.
The students will also focus on the analysis of the prime texts from a comparative approach, looking at various textual strategies of representation.

CU4128 - NEW MEDIA, LANGUAGE AND GLOBALISATION
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *To deepen studentsÆ understanding of the interaction between language and technology, economics and politics in New Media; To explore the linguistic and sociolinguistic characteristics and consequences of New Media practices, To analyse these practices and their consequences at both micro and macro levels; To develop studentsÆ critical skills.*

Syllabus: This module focuses on the interaction between language, technology, economics and politics in the New Media. New media are understood here as media that are designed beyond the context of the nation state. The focus will be on satellite and digital broadcasting as well as on the Internet, although reference will be made to other media, both traditional and new. The module will cover the following areas using a number of case studies against a theoretical background: The language and cultural politics of New Media (in terms of power relationships, ownership, representation, cultural bias etc.); multilingualism and New Media (how global media organizations respond to linguistic diversity; technical possibilities versus political/economic realities;); the role of English as the globalizing language of New Media and the social, cultural and linguistic consequences of this; minority languages and New Media (the focus here will be on the Irish language and New Media).

DM4003 - OPERATIONS MODELLING (ENG)
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: *Understand the role of operations in both production and service enterprises.*
Introduce Lean thinking and structured operations improvement tools.
Introduce a range of quantitative methods and highlight their application in the decision making process for solving real world problems.
Provide an understanding of optimal decisions under constraints.
Provide an understanding of design and analysis of operations under uncertainty.
To provide students with modeling and software capabilities that can be applied to operations design and analysis.

Syllabus: Lean Thinking and Operations
Introduce students to lean thinking and operations improvement tools used within DMAIC (Define-Measure-Analyze-Improve-Control) projects. Related lean thinking to operations modeling methods.

Operations Modeling - Software:
Introduce and provide students with base skills to use software to solve operations optimization models. The focus is primary on introducing the student to spread sheet modeling, but brief introductions to other modeling and optimization software will be given. Students will apply software modeling skills obtained here to subsequent topics.

Operations Modeling Under Constraints
Basic definition of Linear programming, demonstrate method via graphical method, model formulation applications in operations.
Simplex method, Artificial starting solution method, interpretation of simplex tableau, sensitivity analysis.
Transport model, Assignment model, Shortest Route model, Network Minimisation model, Maximum Flow Model,
Transshipment model
Introduce binary and integer applications in operations analysis, integer solution methods such as branch-and-bound and meta heuristics solution methods.
Decision Making Under Uncertainty
Introduce decision making under uncertainty
Introduce basics of simulation using spreadsheets.
Introduce basic queuing and inventory models.

DM4017 - SIMULATION MODELLING AND ANALYSIS
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: *To provide students with knowledge on discrete event simulation modeling and its application to manufacturing, logistic and services systems.*
To provide students with modelling and software capabilities to apply simulation to manufacturing, logistic and services systems.

Syllabus: Introduction to simulation
Overview of simulation modelling, introduction to the basic concepts of discrete event simulation. The simulation process steps involved in carrying out a simulation project. Comparison of discrete event simulation with continuous simulation and system dynamics.

Computer simulation packages

verview of available computer packages, description of representative packages, computer implementation issues. Development of programming skills to apply simulation to manufacturing, logistic and services systems using a generic simulation package. Provide an overview of available simulation software.

Statistical aspects of simulation

Input analysis, random number generation, output analysis, experimental design.

Queuing Models
Provide comparison of simulation with stochastic mathematical models through the introduction of basic queuing models.

Systems Design
Using simulation students will carry out systems (manufacturing, logistic and services systems) design assignments.

DM4027 - MEASUREMENT AND QUALITY SYSTEMS (ENG)
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: *Appreciate the importance of measurement standards and systems.*
Apply sound principles to a variety of measurement requirements.
Understand and apply scientific principles to the analysis of manufacturing data.
Use the results of the analysis to identify areas that need improvement.

Syllabus: ISO9000 and its variants, requirements for a quality system, calibration needs and systems.
Basis of measurement and interchangeability, limits and fits, BS4500.
Line and length standards, optical flats, interferometry, errors in measurement.
Measuring instruments and techniques: Length, angle, flatness, straightness, displacement.
Measurement of: straightness, machine tool alignment, flatness, surface texture.
Process Variability: capability tests, indices, R & R studies, Central Limit Theorem.
Charting techniques: X/R and X/S, average run length, Cusum, np, c, p and u charts.
Acceptance sampling: OC curves, design of single, double and sequential sampling plans, variables sampling, continuous sampling.
International standards e.g. MIL-STD 105D, MIL-STD-414.
Statistical Process Control, Statistical Process Control for Variable Data, Statistical Process Control for Attribute Data, Short Run SPC, Minor Project.

EC4004 - ECONOMICS FOR BUSINESS
ECTS Credits: 6

Economics

Rationale and Purpose of the Module: *The purpose of this module is to provide the student with an understanding of intermediate level micro- and macro-economic theory and practice. The first half of the module is concerned with issues affecting the*

macroeconomy and Irelands membership of European Monetary Union. In the second six weeks of the module students will be exposed to current thinking in economics for business from a micro-economic perspective. In this section of the module students will not only engage with theoretical ideas and constructs but they will also be required to apply the material covered to concrete real-life micro economic situations. The intention of the module is to develop the students understanding of the nature, scope and functioning of the economy so as to have an appreciation of the changing set of problems business decision-makers face and the economic context in which firms operate.

Syllabus: Section one of the module is concerned with the macroeconomy. The topics covered include: the expectations-augmented Phillips curve, purchasing power parity, interest rate parity and the Fisher effect. These theories are combined to obtain what is known as the "open economy monetary model". This model is then used to evaluate particular issues including the long-run performance of the Irish economy and the factors underlying the 'Celtic Tiger' period. The module continues by extending the analysis of production and cost theory developed in first year microeconomics. Imperfect market structures of the firm are explored including analysis of game theory. Labour market decisions are analysed with respect to the supply and demand for labour and wage determination, the latter forms the key link between the micro and macro sections of the module. An overview of the theoretical and practical exposition of business objectives along with key issues facing the firm in the business environment in addition to the role of government are then explored.

EC4027 - THE EUROPEAN ECONOMY
ECTS Credits: 6

Economics

Rationale and Purpose of the Module: *The years since 1945 have been the longest period since 113 B.C. in which no army has crossed the Rhine with war-like intentions. The very idea of war between the European Union's member States seems as remote as to be nonsensical. The creation of the European Union (EU); a legal, political, economic, cultural, and soon to be military entity, is one of the greatest economic experiments in the history of Mankind. The shape and scope of the EU has the capacity to affect the lives of hundreds of millions of people in different ways, some positive, some negative. Thus a careful study of this experiment is in order.*

This module uses economics to understand the history of the EU, its significance in terms of the post 1945 World Economy, the EU's international interactions with the rest of the world, its development up to today, and the prospects for change most likely in the future. This module builds on introductory micro and macro economic principles and using economic theory as a lens we will use real world examples, data, and current topics to inform our discussions on the evolution of the European Union.

Syllabus: The module is divided into eight sections set our below. Worksheets corresponding to each topic will aid students revise the module content. Core texts will support lecture material along with references and recommended readings for each topic, where relevant.
Topic 1 Introduction to the Course
• History of European Integration since the beginning of the 20th century.

Topic 2 Economic Growth in Europe
• Growth in Europe: Facts and Figures
• Growth effects and factor market integration
• Solow's Medium Term Growth Model

Topic 3 Trade Theory and the EU
• Absolute Advantage
• Comparative Advantage
• Production Possibility Frontier
• Standard Trade Model
• EU Trade Policy
• Trade Effects
• Tariffs
• Quotas
• Welfare analysis of trade
• Measuring consumers' and producers' surplus in an open economy

Topic 4 History and Future of the Common Agricultural Policy

Topic 5 History of the General Agreement on Trade and Tariffs and World Trade Organisation
• EU and International Trade Agreements
• EU Development Policy
• EU Trade Disputes

Topic 6 Environmental Economics
• Environmental Policy in the EU
• Energy Policy in the EU

Topic 7 EU Competition Policy
• Theory of Monopoly and Perfect Competition

Topic 8 The History of Monetary Integration
• The Theory of Economic and Monetary Union
• Optimum Currency Area Theory
• The European System of Central Banks
• The Stability and Growth Pact
• Euro and the Great Crisis
• Banking System and the Future of Euro Area

EC4045 - ECONOMICS OF NATURAL RESOURCES
ECTS Credits: 6

Economics

Rationale and Purpose of the Module: *The nature, scope and key concepts of natural resource economics is followed by a discussion on the connection between markets, efficiency and sustainability including the concepts of willingness to pay and demand as well as cost and supply. The next topic examines the optimal level of pollution which is then followed by an analysis of public policy instruments in the face of market failure. A practical application here is that of EU carbon emissions trading as well as carbon taxes levies by some countries. This is followed by an investigation of the main theoretical and practical issues relating to exhaustible resources (e.g. energy). Issues relating to the extraction of coal, oil and gas are assessed. In addition, theories on the harvesting of renewable resources with specific application to forestry and fisheries are developed. The latter part of the module focuses on regional and global air pollutants. Finally, we discuss the connection between natural resources and economic growth with specific reference to both developing and developed countries.*

Syllabus: The module is divided into two broad sections. The first section of the module deals with the theoretical underpinnings of environmental and natural resource economics. The second part of the module focuses on applying economic theory to the extraction of natural resources while also considers the connection between natural resources and economic growth in developed and developing countries.
Section 1: Economic Theory and Public Policy Instruments
Topic 1 Environment Issues and Concepts
Topic 2 Applying Techniques of Economics to Environmental Issues

Topic 3 A General Model of Pollution Control
Topic 4 Public Policy Instruments: Decentralised Policies
Topic 5 Public Policy Instruments: Command and Control strategies
Topic 6 Public Policy Instruments: Emission Taxes
Topic 7 Public policy Instrument: Transferable Discharge Permits

Section 2: Extraction of Natural Resources and Development
Topic 8 Depletable Resources: Peak Oil
Topic 9 Common Pool Resources: Fisheries
Topic 10 Renewable Resources: Forestry
Topic 11 Global Air Pollutants: Climate Change
Topic 12 Natural Resources and Economic Development

Prerequisites: EC4111, EC4102, EC4101, EC4112

EC4101 - MICROECONOMICS
ECTS Credits: 6

Economics

Rationale and Purpose of the Module: *The primary aim of this module is to introduce students to the fundamentals of modern market-oriented microeconomic analysis. The economic way of thinking introduced in this module involves the use of key concepts and models to help students to begin to understand how a complex real world micro-economy operates. The module should educate students to think in terms of alternatives, help them to understand the cost of individual and firms choices and provide them with general frameworks to understand key microeconomic concepts and issues. This module aspires to develop the critical thinking abilities of students, not merely through the mastery of microeconomic concepts and techniques but also through a questioning approach to the body of knowledge which is facilitated primarily in the interactive smaller group weekly tutorial sessions and through the use of e-learning platforms.*

Syllabus: What is economics is explored. Concepts such as scarcity, individual decision-making, trade-offs and opportunity cost along with distinctions between microeconomics vs macroeconomics and normative vs positive economics are emphasised. Markets are examined. The model of supply and demand is used to understand how market equilibrium prices and quantities are determined. Intervention in the market via price ceilings and price floors are also examined. The sensitivity of demand and supply to changes in key variables such as price and income is analysed through elasticity. Consumer choice using indifference curve analysis is presented. The latter part of the module focuses its attention on supply and costs of production. The different types of costs and how costs affect revenue and profits are examined. A perfectly competitive firms supply decision along with that of Monopoly (single priced vs price discrimination monopolists) are also studied.

EC4111 - MICROECONOMICS (NON BUSINESS)
ECTS Credits: 6

Economics

Rationale and Purpose of the Module: *The primary aim of this module is to introduce students to the fundamentals of modern market-oriented microeconomic analysis. The economic way of thinking introduced in this module involves the use of key concepts and models to help students to begin to understand how a complex real world micro-economy operates. The module aims to train students to think in terms of alternatives, to understand the cost of individual and firms choices and provide general frameworks to understand key microeconomic concepts and issues.*

Syllabus: The question of what is economics is explored. In answering this question emphasis is placed on the importance of key concepts such as scarcity, individual decision-making, trade-offs and opportunity cost. Students are also introduced to the distinctions between microeconomics vs macroeconomics and normative vs positive economics.
Markets as a means of organising economic activity are examined. The model of supply and demand is used to understand how market equilibrium prices and quantities are determined. You not only learn how equilibrium is determined, but how relative prices are used by consumers and suppliers to make decisions about the use of societys scarce resources. Supply and demand curves are used to explain the movements of prices and the allocation of resources in a market economy such as ours. Government intervention in the market via the introduction of price ceilings (maximum price) and price floors (minimum price) are also examined.
The sensitivity of demand and supply to changes in key variables such as price and income is analysed through measures of elasticity.
Individual decisions are looked at in detail to show how they come together to form the demand curve. Consumer choice using indifference curve analysis is introduced.
Shifting the focus back to the market process the latter part of the module focuses its attention on supply and costs of production. Students examine the different types of costs and how costs affect revenue and profits. Cost concepts and how they relate to a perfectly competitive firms supply decision are examined. At the other end of the competitive spectrum is the complete absence of market competition. This situation of monopoly (single priced vs price discrimination monopolists) is also studied in detail.

EC4213 - INTERMEDIATE ECONOMICS (FOR NON-BUSINESS)
ECTS Credits: 6

Economics

Rationale and Purpose of the Module: *The subject content of this module develops some of the analysis presented in the introductory microeconomics and macroeconomics modules. The concept of market structures and producer and cost theory analysis is extended in the microeconomics section. Pricing of factor inputs is introduced. In terms of the supply-side of the firm, basic optimisation techniques are applied to production theory in dealing with the issue of input mix while cost theory is applied to problems like determining break-even output levels and ômake or breakö decisions. Other sections of the module provide the necessary microeconomic foundation for the analysis of labour markets, basic business problems and pricing of factor inputs.*
The macroeconomics section incorporates the labour market material into the general Keynesian, Classical model. As outlined below, a variety of topics and policy issues are then examined. The course also discusses issues in international monetary economics including the cost and

Syllabus: The syllabus is divided into a micoreconomics and a macroeconomics element. The microeconomics section includes the following topics 1) The theory of production and costs including isoquant and isocost analysis and traditional versus modern theories of costs 2) Models of imperfect competitive market structures and game theory and an analysis of Monopolistic

Competition, Oligopoly and Duopolistic market structures 3) Labour demand and supply and 4) Pricing and allocating of the factors of production. The macroeconomics section includes the following topics 5) Irish economics performance before and after 1987 including the reasons for the improvement in economic performance. 6) The labour market including a discussion on how price expectations are formulated and the impact on inflation and unemployment 7) The Keynesian, Classical and Monetarist model. This includes a discussion on the Keynesian model, adaptive expectations and the concept of money illusion. Monetarism. The neo-classical model and rational expectations. The effectiveness of macroeconomic policy under each of he models is addressed here 8)The inflation-unemployment trade-off. Includes an analysis of the Phillips curve and the adjusted Phillips curve as well as deflation, expectations and credibility. 9) EMU and the European Central Bank including a discussion on the costs and benefits of EMU to Ireland. The design of the European Central Bank (ECB). Accountability and transparency .The ECBÆs monetary policy in EMU.

Prerequisites: EC4112, EC4111

EC4307 - ECONOMETRICS
ECTS Credits: 6

Economics

Rationale and Purpose of the Module: *This course provides an introduction to the theory and practice of econometrics, and presents a treatment of econometric principles for cross-sectional and time series data sets. The course concentrates on linear models and focuses on how the techniques can be applied in practice rather than on how their statistical properties can be rigorously derived. The essential purpose of the module is to meet the main empirical research needs of students who typically do not intend to specialise in econometric theory. However, the module also serves as a preparation for students who do wish to proceed to more advanced econometrics courses. Students are expected to have gained experience and show competence in the following transferable skills: data generation, IT (using statistical and econometric software), results interpretation and technical write-up, team-working, directed Web based searches, and use of library resources.*

Syllabus: Introduction; regression analysis; method of Ordinary Least Squares (OLS); the Classical Linear Regression Model; properties of OLS estimators - Gauss-Markov theorem; interval estimation and hypothesis testing; multiple regression analysis; heteroscedasticity; autocorrelation; multicollinearity; dynamic econometric models - autoregressive and distributed-lag models; time series econometrics (including stationarity, unit roots and cointegration).

The course makes use of Excel, Microfit 4.1 and Stata data analysis and statistical software.

EC4333 - ECONOMICS OF EUROPEAN INTEGRATION
ECTS Credits: 6

Economics

Rationale and Purpose of the Module: *The years since 1945 have been the longest period since 113 B.C. in which no army has crossed the Rhine with war-like intentions. The very idea of war between the European Union's member States seems as remote as to be nonsensical. The creation of the European Union (EU); a legal, political, economic, cultural, and soon to be military entity, is one of the greatest economic experiments in the history of Mankind. The shape and scope of the EU has the capacity to affect the lives of hundreds of millions of people in different ways, some positive, some negative. Thus a careful study of this experiment is in order.*

This module uses economics to understand the history of the EU, its significance in terms of the post 1945 World Economy, the EU's international interactions with the rest of the world, its development up to today, and the prospects for change most likely in the future. Using economic theory as a lens we will use real world examples, data, and current topics to inform our discussions on the evolution of the European Union.

Syllabus: The module is divided into eight sections set our below. Worksheets corresponding to each topic will aid students revise the module content. Core texts will support lecture material along with references and recommended readings for each topic, where relevant.
Topic 1
Introduction to the Course
History of European Integration since the beginning of the 20th century.
Topic 2
Economic Growth in Europe
•Growth in Europe: Facts and Figures
Growth effects and factor market integration
•Solow's Medium Term Growth Model
Topic 3
Trade Theory and the EU
•Absolute Advantage
•Comparative Advantage
•Production Possibility Frontier
•Standard Trade Model
EU Trade Tolicy
Trade Effects
•Tariffs
•Quotas
Welfare analysis of trade
•Measuring consumers' and producers' surplus in an open economy
Topic 4
History and Future of the Common Agricultural Policy
Topic 5
History of the General Agreement on Trade and Tariffs and World Trade Organisation
EU and International Trade Agreements
EU Development Policy
EU Trade Disputes
Topic 6
Environmental Economics
Environmental Policy in the EU
Energy Policy in the EU
Topic 7
EU Competition Policy
Theory of Monopoly and Perfect Competition
Topic 8
The History of Monetary Integration
The Theory of Economic and Monetary Union
Optimum Currency Area Theory
The European System of Central Banks
The Stability and Growth Pact
Euro and the Great Crisis
Banking System and the Future of Euro Area

Prerequisites: EC4101, EC4102

EC4417 - INDUSTRIAL ECONOMICS
ECTS Credits: 6

Economics

Rationale and Purpose of the Module: *To study the organisation of markets, firms and industries from both a theoretical and applied perspective. Pricing strategies, concentration, market performance, strategies of firms*

and of multinational enterprises (MNEs), and Public Policies will all be appraised at the level of the European Union evolving in a globalised context.

Syllabus: 1.Introduction (Scope and Method of Industrial Economics, S-C-P paradigm...).
2.Theories of the firm: Neoclassical and others
3.Market Structure
4.Structure and Strategy (Oligopoly Theory - Cournot and Bertrand duopoly models)
5.Non price strategies
6.Technological Innovation
7.Barriers to entry in the case of the EU
8.Performance of firms (performance indicators and performance of EU firms)
9.A Case Study: the EU Banking Industry
10.Multinational enterprises, globalisation and regionalism
11. The emerging global 'Asian' firm (keiretsu, Chaebol and Chinese SOE)
12.EU Policy with regard to industry

Prerequisites: EC4102, EC4101, EC4004

EC4427 - MANAGERIAL ECONOMICS
ECTS Credits: 6

Economics

Rationale and Purpose of the Module: *This module aims to provide students with insights into how economics can aid managerial decision making within firms that operate in an increasingly global environment. Reflecting the highly globalized nature of tastes, production, labor markets, and financial markets in today's world it provides tools for understanding managerial decision making under conditions of certainty and uncertainty (including risk analysis). It examines the nature of the firm in the global economy and different models of corporate governance. It covers economic approaches to decsion making on production and cost. It also explores decision making on the demand side of the firm by covering demand estimation and differnet models of pricing.*

Syllabus: The module begins with economic perspectives on the firm including neo-classical, managerial discretion and behavioural models. It also covers property rights and transaction cost perspectives of the firm. It explores how economic theory contirbutes a perspective on corporate governance and examines international models of corporate governance. It examines decision making in relation to production using cost and production theory. It proceeds to cover demand side issues such as demand estimation, demand analysis and pricing. It extends pricing analysis by covering prices under different market structures such as different models of oligopoly. It examines the make or buy decision in the context of the boundaries of the firm and the growing prevalence of outsouring in a global context. It also examines decision making under conditions of risk and uncertainty.

Prerequisites: EC4101, EC4102, EC4004

EC4437 - INTERNATIONAL POLITICAL ECONOMY
ECTS Credits: 6

Economics

Rationale and Purpose of the Module: *This is an exploration of the relationships between politics and economics in the global political economy (GPE). An understanding of the main issues confronting the global political economy is a pre-requisite to finding solutions to global problems A fundamental assumption is that economic issues significantly influence political decisions and vice versa; it is no longer possible to separate arbitrarily one area of study from the other. The focus of the course falls upon the growth processes in world markets; patterns of global production, international money flows, global and financial investment practices and intensifying regionalism (as evident in the European Union, the North America Free Trade Association and the Asia Pacific Economic Community).This module seeks to provide the student with a balanced and objective analysis of the main issues confronting the world economy and through the use of economic theory, empirical evidence and objective analysis seeks to distinguish between fact and fiction.*

Syllabus: The module will have as its main objective an exploration of the main issues that confront the world economy.

Topic 1: Forces Shaping the World Economy
Topic 2: North South Issues: Trade Policy and Economic Development
Topic 3: International Monetary System 1948- present: International Currency Flows and the Role of International Institutions
Topic 4: International Trade and Growth
Topic 5: Globalisation and Foreign Direct Investment
Topic 6: Multinational Corporations and the Changing Nature of International Production
Topic 7: Environment, Sustainability and the Global Economy: Climate Change and effectiveness of global policy responses
Topic 8: Economic Development, Poverty and the Environment
Topic 9: The Global Financial and fiscal crises in the world economy and in Ireland.
Topic 10: Current and Future Economic Challenges for the World Economy

Prerequisites: EC4101, EC4111, EC4102, EC4112

ED5011 - DIGITAL ELECTRONICS 1
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: *The aim of the module is to give students an introduction to many of the important hardware elements and topics in digital circuits.*

Syllabus: The difference between digital and analogue signals
Binary numbers (unsigned) and how they can represent an analogue signal
Number systems and codes, Hexadecimal, ASCII code
Simple ADC and DAC concepts
Logic Gates: AND, OR and INVERTER gates and their truth tables
Representing data in parallel and in serial form, RS232
Buses and addressing: the concept of selecting a device by decoding a number on an address bus
Memory devices: basic types (NO internal workings) of semiconductor memory and how they are used
LED displays: including single LEDs and 7-segment displays and how to drive them
Modem Basics
Sequential circuits: D-type flip-flops and registers; Counters and their applications; Shift registers û serial û to û parallel conversion (and vice-versa); Simple state diagrams
Mass Storage: Discs, Magnetic storage, sectors, data rates, Optical storage; Flash memory

---

ED5021 - C++ PROGRAMMING
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: *To introduce the C++ language and develop C++ programming skills.*

Syllabus: Basic C++; syntax and semantics of the C++ procedural subset.
Objects and Classes; what a C++ object is and how it is de?ned by the use of a C++ Class. The use of C++ classes to represent abstract data types.
Function and Operator Overloading: function polymorphism.
Inheritance and Polymorphism: software re-use via composition, inheritance and object polymorphism.
Input and Output: introduction to the iostream library.
Memory Management: the new and delete operators: memory leaks and the use of programs such as ôpurifyö to detect them.
Templates: class and function templates as a way of writing reusable software. The Standard Template Library: introduction to the components and their use.
Exception handling: throw, try and catch.
The ANSI/ISO Standard. Development Environments; Debuggers, Prolers, Browsers.

ED5031 - SOFTWARE ENGINEERING
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: *To understand and apply the object-oriented approach to software development. To emphasise Good Software Engineering Practices. To enhance individual and team working skills via individual investigative project and presentation, individual exercises and a team project.*

Syllabus: Object Oriented Analysis/Design: Object Oriented Paradigms (one in detail e.g. OMT/UML) focusing on architecture and behavioural design and representation.
Use Cases.
Design Patterns.
Software Reuse.
Overview of Object Oriented Programming Languages (e.g. Java/Smalltalk).
Individual Project/Case Study.
Team Project in the area of Software Design for Advanced Communication Systems (e.g. Call Handling and Mobility Management Systems for the 3rd generation mobile system, UMTS).

ED5041 - COMPUTER NETWORKS 1
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: *To provide students with a uni?ed view of the ?eld of multimedia communications and networking infras-tructures and an understanding of how data is represented and reliably transmitted over different media. To provide students with an understanding of the structure of the Internet and world-wide web. To outline the major topics associated with multimedia communications (inter alia/ applications, networks, protocols and standards). To equip students to quantify the communications requirements of various multimedia applications, and the computational overhead of their underlying network protocols.*

Syllabus: Introduction to data communications and multimedia. Information representation. Standards for multi-media communications. Digital communication basics: data transmission, media, encoding, multiplexing, interfacing, and data-link controls. Local and wide-area networks. Routing and Internetworking. Internet and Internetworking protocols. Transport-level protocols. Client-server model. Application layer. ISDN and B-ISDN. The world-wide web.

EE4001 - ELECTRICAL ENGINEERING 1
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: *To give students an understanding of the fundamental concepts of electricity and magnetism.*

Syllabus: CONDUCTION: Electric charge and flow. Resistivity, resistance, Ohms Law. Resistors in series and in parallel. Power dissipated in a resistor. Thevenins and Nortons theorem, superposition principle, simple DC circuits. Star-delta transformation.
ELECTROSTATICS: Concepts of electrical charge, electrical fields. Field strength, flux and flux density, Coulombs and Gauss laws. Potential difference, voltage. Capacitance, dielectrics, permittivity. I = Cdv/dt. Parallel plate and coaxial capacitors. Energy stored. Capacitors in series and in parallel.
MAGNETICS: Concept of magnetic field. Magnetic effect of a current, force on a conductor, torque on a current loop. The moving coil meter. Amperes law. Magnetic materials, B, H, and hysteresis. The magnetic circuit.
ELECTROMAGNETIC INDUCTION: Induced emf, Faradays Law of Induction: Lenzs Law. EMF induced in a moving conductor. Electric Generators. Counter EMF, Inductance, v = Ldi/dt. Energy stored in an magnetic field. The LR circuit.
AC CIRCUIT ANALYSIS : How the ESB charges for the Energy that it supplies. Efficiency, Simple AC circuit analysis, Basic Filtering, Power Factor, Safety Issues.

EE4003 - THE ENGINEER AS A PROFESSIONAL
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: *The engineering profession demands more than just technical know-how and an engineering education must reflect this. To have a successful and rewarding career to and to properly reflect the importance of the engineering professional in society it is necessary to have technical knowledge aswell as the ability to express ideas, to assume leadership, to operate within teams (sometimes interdisciplinary) and organisations and to make ethically considered decisions.*

Syllabus: 1. Communication. Presenting, Writing.

2. Adapting to the Workplace. Effective Meetings, Time Management, Creativity, Stress & Fun, Feedback, Planning, Teamwork, Leadership.

3. The Engineer as a Professional. Professions & The Engineering Profession, Professional Bodies, Life Long Learning & Continuous Professional Development

4. Engineering Ethics, Engineers in Society, Responsibility in Engineering, Common Morality & Codes of Ethics, Analysing the Problem, Utilitarian & Respect for Persons Philosophies, Creative Middle Ways

---

EE4005 - ELECTRICAL POWER SYSTEMS
ECTS Credits: 6

Electronic & Computer Engineering

ACADEMIC CONTENT IS NOT CURRENTLY AVAILABLE FOR THIS MODULE – UPDATES ARE IN PROGRESS

EE4011 - ENGINEERING COMPUTING
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: *Engineering computing is the use of computers, software and numerical methods to solve scientific and engineering problems. The module has two distinct aspects. Firstly, the module aims to introduce students to a number of basic numerical methods commonly used in solving engineering problems and the concepts necessary to implement them in a relevant engineering software package. The second aim is to introduce students to a high level object-oriented programming language and a software development environment.*

Syllabus: Brief introduction to computers. Overview of scalars, vectors & arrays. Overview of logic operands for algorithm development. Introduction to basic numerical methods for solving engineering problems, e.g. search based techniques for finding roots, determining the maxima/minima of mathematical functions and methods for solving sets of simultaneous equations. Algorithm development and implementation of numerical methods in math based software package.
Comparative study of different programming languages and software development methods.
Introduction to object oriented development. Basic data types, control statements, methods, scope. Introduction to programming language documentation. Introduction to libraries. Interactive Development Environments. Basic test practices and test case definition.

EE4115 - SYSTEMS ANALYSIS
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: *To revise and develop student skills in the mathematical analysis of electronic problems.*

Syllabus: BODE PLOTS: Use of logarithmic plots for frequency response. Poles and zeros in the frequency domain. Bode approximations for amplitude and phase responses.

LAPLACE TRANSFORM: Application of Laplace transform to circuit analysis, initial conditions, partial fraction decomposition, use of tables for inverse transformation, s and t shifting. Impulse and step response related to location of poles in s-plane, stability concept illustrated via feedback systems. Barkhausen criteria for oscillation. Geometric derivation of frequency domain response from pole-zero locations in s-plane.

COMPUTER SIMULATION: Use of appropriate package to model responses.

SECOND ORDER SYSTEMS: Standard form of second order low pass response. Frequency and step response, damping factor, natural frequency, under, critical and overdamped responses. Overshoot and settling time. Risetime estimation for cascaded systems.

FOURIER SERIES: Development of Fourier series as a means for decomposing non-sinusoidal signals into sums of sinusoidal signals. Trigonometric and complex forms of series. Amplitude and phase spectra. Application to circuit responses. Spectrum of amplitude modulated signal. Distortion due to non-linear circuits exemplified by numerical calculation of distortion generated by common emitter amplifier for finite amplitude input sinusoidal signals.

FILTERS: Filter classification - low, high, bandpass and band stop. Filter specification. Distinction between group and phase delay, minimum phase concept. Low pass filter types; Butterworth, Bessel and Chebyshev. Derivation of Butterworth response to exemplify design methodology. Meaning of term "maximally flat". Use of tables to design passive low pass filters. Low pass to high and bandpass transformation.

DISTRIBUTED PARAMETER CIRCUITS: Lossless transmission lines, derivation of wave velocity and characteristic impedance. Step propagation, reflection coefficient, multiple reflections, matched termination. Properties of selected lines, e.g., coaxial cable, PCB tracks, ribbon cable. (Sinusoidal response and SWR are covered elsewhere).

EE4313 - ACTIVE CIRCUIT DESIGN 1
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: *Introduction to Active Circuit Design and Analysis.*

Syllabus: REVIEW OF BASIC CIRCUIT ANALYSIS- Basic Circuit Elements, Phasors and Complex Impedance, Circuit Analysis TheoremsAC
CIRCUIT ANALYSIS û Combining impedances, frequency response, source conversions, Thevenin and Norton Equivalent Circuits, Mesh and Nodal Analysis, Bridge Networks, D-Y and Y-D conversions.
RESONANCE û Series and Parallel Resonance CircuitsAMPLIFIERS: Properties of an ``ideal'' amplifier. Input and Output impedance. Introduce the Operational Amplifier as an approximation of an ideal amplifier. Simple inverting and non-inverting amplifier circuits.
SMALL-SIGNAL MODELS: Modelling of simple MOS and BJT amplifiers.
AMPLIFIER TYPES: Characteristics of common-emitter (common source), common-base (common gate) and common-collector (common-drain) topologies. Gain characteristics, input, output impedances and key application strengths of each type.

Prerequisites: EE4102

EE4407 - ASICS 1
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: *This module concentrates on the design of digital ASIC (application specific integrated circuits).*

Syllabus: Introduction to Design Methodologies. Custom IC designs. Standard cells. HDL based Digital Design flow. EDA Tools.

Description of combinational and sequential digital systems in the Verilog or VHDL Hardware description language (HDL):

Test benches and verification using HDLs. Synthesizeable HDL constructs and inference of common digital

structures.

CMOS digital circuit design.

The MOS transistor and long channel model. Parasitic capacitances. Introduction to the short channel model.The static CMOS inverter and its static and dynamic performance.

Static CMOS logic gates, composite CMOS gates and switch based logic.

CMOS latches and flip-flops for ASIC design.

Example common ASIC blocks: adders and multipliers.

Design for test. Fault models. The stuck-at fault model and test. Vector generation. Testing sequential circuits.

EE4523 - DIGITAL SYSTEMS 2
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: *The module covers digital system topics including: Fully synchronous systems; Finite State Machines(FSM); Mealy and Moore type FSMs; Hardware Description Languages and RTL modelling. Modern digital design requires designers to use HDLs for design and verification. (Digital Systems 1 on the programme is a prerequisite for this module.)*

Syllabus: Fully synchronous systems: A review of the benefits of a fully synchronous system.

Finite State Machines(FSM): State diagram, state table and assignments. Mealy and Moore type FSMs. Using memory in a general Mealy-Moore state machine. Other approaches: 'One-shot' encoding and shift register-based machines.

Hardware Description Languages: The nature and use of HDLs. Hierarchical modelling concepts and structural specification of logic circuits. Gate-level modelling. Behavioural modelling. Description of basic digital circuits using a HDL.

Simulation: Event-driven simulation. Simulation using test benches.

Register-Transfer-Level (RTL) description.

Design flow and CAD tools. HDL code for FSMs (E.g. serial multiplier).

EE6011 - CRYPTOGRAPHY AND SECURITY FUNDAMENTALS
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: *Intorduce cryptography & security fundamentals, including security threats and vulnerabilities as well as security services for modern e-commerce and mobile applications.*

Syllabus: [Introduction to information and network security] Why security is an important issue.
[Threats and vulnerabilities] Threats from passive and active attackers, such as: identity interception, masquerade, replay, data interception, manipulation, repudiation, denial-of-service, traffic-analysis, mis-routing and digital pests such as: trojan horse, virus, worms.
[Security services, components and policies]. Security services such as: data confidentiality, data integrity and Email security. Security policies. Access control mechanisms.
[Cryptography] Introduction of classical and modern cryptographic techniques and demonstration of the application of cryptography in the provision of security services.
[Symmetric-key cryptography] Stream ciphers and classical Feistel-block ciphers. Examples such as: DES, IDEA, RC-5 and AES.
[Introduction to Cryptanalysis] Cryptanalysis of classical ciphers and determination of cipher strength.
[Public-key cryptography] The requirements of public-key cryptography. The intractability of factoring and calculating discrete logarithms. The RSA and El Gamal schemes and implementation issues. Elliptic curve cryptography. Identification and digital signature schemes. Zero-knowledge schemes. The DSA digital signature standard. Public key infrastructure.
[Key management] Key distribution, key-sharing. Use of key distribution centres, authentication servers and certification authorities.

EE6031 - MULTIMEDIA COMMUNICATIONS
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: *Provides students with an understanding of applications and networking infrastructures used in communications for data in form of text, images, audio and video.*

Syllabus: Introduction to data communications and multimedia.
Information representation. Standards for multi-media communication.
Digital communication basics: Data transmission, Transmission media, Data Encoding, Multiplexing.
Interfacing and Data Link Controls.
Local and wide area networks.
Routing and Internetworking operation.
Internet and Internetwork protocols
Transport level protocols
Client Server Model
Application Layer
ISDN and B-ISDN
The world-wide web.
Multimedia applications

EE6411 - C++ PROGRAMMING
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: *To introduce the C++ language and develop C++ programming skills.*

Syllabus: Basic C++; syntax and semantics of the C++ procedural subset.
Objects and Classes; what a C++ object is and how it is de?ned by the use of a C++ Class. The use of C++ classes to represent abstract data types.
Function and Operator Overloading: function polymorphism.
Inheritance and Polymorphism: software re-use via composition, inheritance and object polymorphism.
Input and Output: introduction to the iostream library.
Memory Management: the new and delete operators: memory leaks and the use of programs such as ôpurifyö to detect them.
Templates: class and function templates as a way of writing reusable software. The Standard Template Library: introduction to the components and their use.
Exception handling: throw, try and catch.

The ANSI/ISO Standard. Development Environments; Debuggers, Prolers, Browsers.

EE6421 - SOFTWARE ENGINEERING
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: *To understand and apply the object-oriented approach to software development. To emphasise Good Software Engineering Practices. To enhance individual and team working skills via individual investigative project and presentation, individual exercises and a team project.*

Syllabus: Object Oriented Analysis/Design: Object Oriented Paradigms (one in detail e.g. OMT/UML) focusing on architecture and behavioural design and representation. Use Cases. Design Patterns. Software Reuse. Overview of Object-Oriented Programming Languages (e.g. Java/Smalltalk). Team Project in the area of Software Design for an Object Oriented System.

EE6451 - DIGITAL SIGNAL PROCESSING
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: *To introduce the theory of digital signal processing, including the following very important topics: the discrete Fourier Transform, the Z-transform and digital ?lter design.*

Syllabus: Discrete signals and systems. The DFT, its properties and applications; relationship to other transforms; Fourier, Laplace, Z-transform etc. Railings as theoretical samplers. Spectral descriptions of sequences. Analogue and digital convolution, the z-transform in the design of FIR digital ?lters. Linear-phase, all-pass ?lters, minimum-phase ?lters. Differentiators and Integrators. Windowing techniques in ?lter design.
Filter design and fast convolution by FFT. Frequency-sampling ?lters. IIR ?lters: mapping from analogue ?lters, bi-linear mapping, review of other mappings, their application in digital and sampled-data (e.g. switched-capacitor) ?lters. Up-sampling and down-sampling. Band-pass signals and modulation. Finite word-length effects; impact on architectures. Noise topics. Sigma-delta noise shaping, applications in A/D and D/A conversion. Correlation principles. Fast correlation by DFT. Introduction to adaptive ?ltering. Wiener ?lter. LMS algorithm. Selected applications. Power spectra and spectral estimation.

EE6461 - INFORMATION THEORY AND CODING
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: *This module aims to guide the student through the implications and consequences of fundamental theories and laws of information theory and to impart a comprehensive grounding in source coding, random and burst error protection coding theory with reference to their increasingly wide application in present day digital communications and computer systems.*

Syllabus: Information Theory.
Entropy. Information rate. ShannonÆs Theorem, channel capacity: Bandwidth - S/N trade-off. Fundamentals of information theory: source encoding theory and techniques. Communication channels:
m-ary discrete memoryless, binary symmetric. Equivocation, mutual information, and channel capacity. Shannon-Hartley theorem. Channel coding: random and burst error protection on communication
channels. Interleaving principles. Types and sources of error. Linear block coding. Standard Array and syndrome decoding. Cyclic and Convolution codes. Soft and hard decision detection. Viterbi decoding.

EH4003 - INTRODUCTION TO LITERARY THEORY
ECTS Credits: 6

School of Culture and Communication

Rationale and Purpose of the Module: *The aim of this module is unsettle æcommon senseÆ approaches to literature in English and to theorise the ways in which literature is produced, received and interpreted.*

Syllabus: The module provides an introduction to literary theory, incorporating modes of analysis which emphasise the relationships of literature to issues of race, class, and gender. Though theory will be introduced historically, twentieth century literary theory will make up the core of the module. Students are encouraged to compare and contrast the various models of literary discussion presented during the course, and to think about how the following models might be applied to texts:
Russian Formalism; 'new' criticism; reader-response criticism; psychoanalytic criticism; Marxist criticism; structuralism, post-structuralism, feminism, deconstruction, cultural materialism, new historicism, queer theory and post-colonialism.

EH4007 - LITERARY MODERNISM
ECTS Credits: 6

School of Culture and Communication

Rationale and Purpose of the Module: *This module studies British literature from the turn of the twentieth century to the end of the Second World War. Students will explore the turn to interiority and experimental modes of writing and will become familiar with major historical, political and social factors involved in this turn. Topics will include the impact of the two world wars; the influence of major theorists of the mind such as Freud, Jung, William James and Melanie Klein; the cross-fertilisation of the arts, including painting, film and photography; the role of the Cambridge Ritualists and the archaeological discoveries; the battle for suffrage and the subsequent debate about the nature of gender and the relation between and among the sexes.*

Syllabus: This module covers British literature from 1900-1945. Writers will include major novelists of the period such as E.M. Forster, D.H. Lawrence, Virginia Woolf and James Joyce; and/or major poets such as T.S. Eliot, William Butler Yeats, W.H. Auden and the poets of the First World War. In defining the themes and interpreting the literature of the period, attention is paid to political, social and cultural constructs (for example, the World Wars, the suffrage movement, the impact of other art forms), to significant concepts and philosophies (for example, Primitivism, psychoanalysis, physics) and to literary movements (for example, Bloomsbury).

EH4017 - CONTEMPORARY AFRICAN LITERATURE IN ENGLISH
ECTS Credits: 6

School of Culture and Communication

Rationale and Purpose of the Module: *On successful completion of this module, students will be able to apply a critical and cogent awareness of*

Contemporary literature from across the African continent
Multiple socio-political and cultural contexts associated with Anglophone African literatures
A sample of key theoretical debates in the field of African studies at large (connected to additional theoretical fields such as postcolonialism, human rights, feminism, ecocriticism, postmodernism, and so on)
A sample of key genres in African literature, include the memoir and autobiography, the novel, and drama
Ways to compare, contrast and combine different theoretical and methodological positions in the field of African Studies

Syllabus: This module will examine the literary representation of violence by authors writing across the African continent today. Specifically, our analyses of selected works and writers will explore the following themes: 1. how attempts toward the national catharsis of post-genocide Rwanda and post-apartheid South Africa have been unsuccessful in ridding the two countries of cruelty and bloodshed; 2. how child soldiers come to terms with their violent and violated childhood while struggling to reinvent themselves in the midst of ruined societies; 3. how anti-colonial liberation warfare is remembered and informs contemporary identity struggles; and 4. how the memory of slavery informs the desire for rootedness and home. We will read novels, autobiographies, and hybrid texts, alongside watching films and reviewing key essays in the field of African literature.

EH4023 - THE NEW WORLD: AMERICAN LITERATURE TO 1890
ECTS Credits: 6

School of Culture and Communication

Rationale and Purpose of the Module: *This module offers students a survey of some of the primary literary themes and cultural concerns that have contributed to the formulation of a distinct tradition of American literature from the initial colonisation of the continent to 1890.*

Syllabus: American literature pre-1620 (for examples, Columbus, de Vaca, Harriot, Smith): American literature from 1620 to the early 18th century (for example, Bradford, Bradstreet, Rowlandson, Byrd); the Puritan influence (for example, Williams, Taylor, Mather, Edwards); the Age of Enlightenment and Revolution 1750-1820 (for example, Paine, Jefferson, The Federalist, Murray); 19th century American literature (for example, Emerson, Hawthorne, Thoreau, Whitman, Melville, Dickinson); incipient American modernism.

EH4027 - CONTEMPORARY WOMEN'S WRITING
ECTS Credits: 6

School of Culture and Communication

Rationale and Purpose of the Module: *To introduce students to key texts and themes in contemporary womens writing; to introduce students to critical methodologies for the analysis of gender in literary texts.*

Syllabus: This course will introduce students to a number of key fictions by British and North American women authors, written between the 1970s and the present day. We will examine the ways in which these fictions respond to the changes in female experience in the second half of the twentieth and beginning of the twenty-first century, as well as exploring how these fictions reflect upon, and re-figure, conventional understandings of gender identity. Key issues for discussion will be the ways in which the texts respond to their social and cultural contexts, and how gender identity is shaped by location and place in these fictions. We will also explore the significant motifs that emerge across texts, such as women and madness; mother-daughter relationships; femininity and desire; fantasy and romance; the body; and the writing of race and gender.

EH4028 - STUDY OF A MAJOR IRISH AUTHOR
ECTS Credits: 6

School of Culture and Communication

Rationale and Purpose of the Module: *This module offers students the opportunity to engage in intensive study of an author whose work has significantly affected the traditions of Irish literature written in English. Students will read an extensive selection of the authors works in order to understand fully his/her individual development and his/her important contributions to literary history.*
On successful completion of this module, students will have gained
An understanding of the author in his/her political, historical, and cultural contexts;
Familiarity with a range of the authors works and with a range of his/her thematic, stylistic, aesthetic, and formal concerns;
An understanding of the authors importance in the literary canon;
An understanding of different theoretical and methodological ways of interpreting the major author.

Syllabus: This module will function as a critical survey of the work of a major Irish author. Students will study the authors development from early efforts to mature output and will analyse and discuss the authors overall impact on literary history. The module will position the author historically and politically, considering the authors role as a contributor to intellectual history. By locating the author in different theoretical and methodological frameworks, students will have the opportunity to assess and interpret a wide range of the authors work.

Example One - James Joyce
Addressing the production of Irish cultural and social identities in these texts, students will construct readings of Joyces work using contemporary literary and cultural theory. Focusing on the major fictions of Joyce, the module will also consider his prose and life-writing, and explore the interconnections between these various writings. Joyces literary experimentation provides an opportunity to explore narrative form and technique and so the module will consider the ways in which literary conventions and cultural discourses are challenged in his work. Given the range of new media available in this field as well as Joyces own commitment to film, we will explore a number of methods of reading Joyce from photographs, to archive footage, to the contemporary documentaries about and film productions of his work, to the Joyce hypertext and other online resources.

EH4037 - INTRODUCTION TO CREATIVE WRITING
ECTS Credits: 6

School of Culture and Communication

Rationale and Purpose of the Module: *There is a strong tradition in the Limerick area of creative writing which includes the works of writers such as Kate O'Brien, Frank McCourt, and Kevin Barry. With the creation of the new McCourt Chair in Creative Writing, a general module is needed out of which the first steps towards the creation of undergraduate and graduate creative writing streams might be taken.*

Syllabus: Ireland has a long and well established tradition of excellence in the genre of short story, theatrical, creative non-fiction and poetry writing. This creative writing module draws on that tradition and offers students an opportunity to develop their skills in creative writing in these four genres. Students will benefit from lectures and workshops in which they will learn about the practices of other writers, and from thence explore strategies for effective writing. Students will participate in regular writing activities, working collectively and individually to complete a piece of work in their chosen genre.

EH4043 - IRISH LITERARY REVOLUTIONS 1880 - 1930
ECTS Credits: 6

School of Culture and Communication

Rationale and Purpose of the Module: *This module replaces and re-situates in second year an earlier first year module (EH4111-- The Irish Literary Revival). It is a revised and updated module which covers the period of the Revival but also broadens the canon. It will introduce students to a range of Irish literary work and cultural movements in the period 1880-1930. It aims to introduce students to selected literature from this revolutionary period in Irish culture, attending to innovations in style, structure, and genre in the period, and concentrating on formal as well as cultural experimentation.*

Background: from the 1880s on, the 'Irish Question' was a central site of struggle in British and Irish public discourse, and in this turbulent period a new generation of writers began to interact with this and other questions in their literary work. Writers such as W. B. Yeats, J. M. Synge, Lady Gregory, George Moore, and Eva Gore-Booth identified (temporarily, in some cases) with cultural nationalism, and became associated with the Irish Literary Revival and cultural arenas including the Abbey Theatre and the Gaelic League. Decadent and 'New Woman' writers Oscar Wilde, George Egerton, and Sarah Grand, resisted hegemonies of a different kind, subverting gender and sexual identities and challenging prescribed roles in the family. Against the backdrop of an emerging socialist movement, writers such as G. B. Shaw and Seán O'Casey, tackled class activism; while others, including Anna Parnell, Roger Casement, Ernie O'Malley, and Maud Gonne began to write autobiographical accounts of their involvement in Irish national struggles. Over the course of this period, the work of James Joyce began to draw on these radical discourses and other transnational literary movements in the production of his important literary experiments.

Syllabus: Exploring selected Irish writers and literary movements 1880-1930, this module aims to introduce learners to one of the most radical periods in Irish culture. Attending to formal and cultural experimentation, and drawing on a range of literary genres, the module will explore the local and transnational dynamics of the Irish literary world. By developing a "thick description" of the period, the module aims to enable students to become better critical thinkers and literary researchers by focusing on close reading, on comparative studies of different writers and (sometimes intersecting) literary movements, and on the reception and critical analysis of this material at the time and since.

EH4053 - AUGUSTAN AND ROMANTIC LITERATURE
ECTS Credits: 6

School of Culture and Communication

Rationale and Purpose of the Module: *This module is designed to draw together and combine the current first year Restoration and Augustan Literature module and the second year elective module Sensibility and Romanticism to offer a broader and more inclusive survey of British and Irish Literature between 1660 and 1830. This innovation is intended to offer students a more comprehensive 'long' eighteenth-century option in second year in the proposed new BA.*

Syllabus: The aim of this course is to provide students with a survey of literature in English between the Restoration of the British monarchy in 1660 through to the democratic reforms of 1830. This course aims to immerse students in the literary language of the time across several genres. We will first look at contexts for the emergence of modern genres such as the polemical pamphlet, the novel, and the journalistic essay. In this first part of the course is studied the prose and poetic writings of figures such as Aphra Behn, Jonathan Swift, Alexander Pope, Mary Wortley Montagu, and Oliver Goldsmith.

In its second half this module provides students with a survey of literature of the eighteenth and early nineteenth centuries, a period in which literature was involved with, and inspired by, revolutionary political activity. The writers of this period grappled with issues of race, slavery, gender, democracy, and republicanism. We will trace a shift from a negative and trivialising concept of 'the romantic' towards the more complex Romantic cults of Nature and Imagination, thought through in the context of intense friendships and collaboration between clusters of poets and critics. We will survey the writings Robert Burns, Williams Blake, William Wordsworth and Samuel Taylor Coleridge, Jane Austen, Percy Bysshe and Mary Shelley, among others.

EH4141 - ENGLISH LITERATURE 1: NOVELS AND SHORT FICTION
ECTS Credits: 6

School of Culture and Communication

Rationale and Purpose of the Module: *This module aims to develop the skills of literary analysis and criticism with a focus on English literature and on novels and short fiction in particular.*

Syllabus: Intended as a foundational course for students moving from second to third level models of studying literature(s) in English, students will be introduced to the basic skills necessary to develop critical readings of literary texts. Literary genres will be addressed within the module with primary texts drawn from British and American prose fiction. Basic elements of literary theory will also be introduced.

EN4015 - CURRICULUM AND POLICY STUDIES
ECTS Credits: 6

School of Education

Rationale and Purpose of the Module: *In this module students will be invited to develop their thinking and understanding on the contested nature of the curriculum and policy-making processes in both the national and international arenas. They will become more aware of the influence and increasing significance of national and international organisations on their practice as teachers.*

Syllabus: The definitions of curriculum as content and experience as well as hidden curriculum; the philosophical and ideological foundations of curriculum are considered from the perspectives of knowledge, society and the individual; the dynamics of curriculum development and policy reform in education ; the particularities of curriculum and policy-making development in the Irish context; curriculum and policy developments in education internationally; influence of national and international bodies on education policy and curriculum-making processes nationally; partnership approach; recent curriculum policy developments; core curriculum; the work of the NCCA and their proposals for post-primary reform; curriculum change, reform, innovation and development; curriculum design; key factors associated with the adoption, implementation, dissemination and evaluation of curriculum reform; impact of school and teacher culture on curriculum reform efforts; case studies of recent curriculum reforms; the pedagogy and assessment of the curriculum; purposes, modes and techniques of assessment; assessment for learning; contemporary national and international curriculum issues; some radical alternatives.

EN4025 - INCLUSIVE EDUCATION 1: CONTEMPORARY PERSPECTIVES
ECTS Credits: 6

School of Education

Rationale and Purpose of the Module: *Irish society has experienced unprecedented demographic change in recent times resulting in educators responding quickly to the changing nature of cultural diversity in the classroom and other learning communities. This module seeks to explore, recognise and appreciate new expressions of race and culture with the aim of developing students' awareness and understanding of diversity in society and its implications for their professional practice. Through these lenses students will consider schools as social settings (social class, gender, ethnicity, diversity, equality of treatment) and as sites of teaching, learning and assessment.*

Syllabus: Recognising and understanding the origins of diversity within self and others; cultural diversity and the politics of difference; social inclusion and cultural diversity at local, national and international levels; policy and legal dimensions of diversity and implications for inclusive education from the perspective of race and ethnicity; implications for professional practice within the context of the classroom, school and wider community. Reflect critically on schools as institutions from a sociological perspective (gender, social class and equality of treatment) and from the perspective of teaching, learning and assessment (e.g. dominant teaching strategies and school structures; models of assessment; homework; technologies for teaching, learning and assessment including school design).

EN4041 - CONTEMPORARY UNDERSTANDINGS AND THINKING ON EDUCATION
ECTS Credits: 6

School of Education

Rationale and Purpose of the Module: *During this module students will be exposed to some of the major contemporary thinkers in education. They will be encouraged to critically analyse these through the lens of deconstruction of their own very recent experiences of schooling. It is intended that the module will foster amongst students an appreciation of the interplay between educational theory and practice. Through induction into the scholarship of education, the module will aim to foster an understanding of teacher identity through critical engagement with the nature and purpose of education.*

Syllabus: A brief overview of development of early influential thinkers in education exploring the core question what is education: Plato/Socrates (dialogic perspective); Descartes (enlightenment thinking and logical rationalism); Rousseau (Emile) exploration of modern thinkers that have influenced education Dewey (experience and democracy in education) Buber (on relationship); Frankyl (meaning making). An overview of schooling exploring the core question what is schooling; Illich (de-schooling society) Bourdieu & Lortie (cultural reproduction & deconstruction of the apprenticeship of observation) Freire & McLaren (critical pedagogy); Eisner (the art and appreciation of education) Greene (imagination and education); Sugrue (deconstructing lay theories of teaching); Lessing and Robinson (indoctrination and changing educational paradigms); Palmer (courage in teaching).

EN4043 - UNDERSTANDING CLASSROOM PRACTICES
ECTS Credits: 6

School of Education

Rationale and Purpose of the Module: *This module focuses on the development of knowledge, skills, and attitudes which will support student teachers in preparing for School Placement (SP) in the spring semester by developing their capacity to engage in and reflect upon effective planning, preparation and management of learning environments.*

Syllabus: Students are provided with an introduction to the complexities of teaching to help students fulfil their role as facilitators of learning drawing upon Evidence Based Practice; Teacher as Researcher; Pedagogical Strategies; Classroom Management; Assessment for/of learning; benefits and limitations of using statistical analysis strategies to determine the effectiveness of pedagogical approaches. This module will help students to understand schools and the dominant teaching approaches that are used within them by looking at the history of Irish post-primary schools - educational provision in modern Ireland (school type; patronage/governance). The concept of the reflective practitioner will be central to this module where students will be given an introduction to the knowledge, skills and practices of reflection. The module examines the requirements of the Teaching Council and other bodies in relation to professional conduct, and child welfare issues.

EN6151 - BECOMING A TEACHER: IDENTITY AND AGENCY
ECTS Credits: 6

School of Education

Rationale and Purpose of the Module: *This module aims to help student teachers identify and analyse influences which shape the individual in becoming a teacher (past experiences, lay theories and cultural understandings of teaching, learning and schooling). It focuses on extending student teachers' identity and agency through an introduction to influential philosophers of education and the development of reflective and communicative capacities as part of a critical pedagogic approach.*

The overall theoretical framework for this module is the concept of identity formation and the notion of life long learner. Students will explore their preconceived and lay theories of teaching and learning and will focus on how these theories are formed. Students will also explore their trajectory and values in becoming a professional educator. The module will introduce students to the concept of developing a professional identity and how to be agents of their own learning through reading, writing, speaking and listening. This identity and agency work will be scaffolded through an exploration of the philosophical foundations of teaching and learning and critical analysis of key philosophers and their theories. Students will develop their own personal philosophies of teaching and learning and examine how they will/may influence their practice. This will be supported by reading and responding to key educational thinkers (e.g. John Dewey, Maxine Greene, Paulo Freire, Peter McLaren, Deborah Britzman etc.), through dialoguing and communicating perspectives in a community of practice and through linking these theorists to the practice of teaching and learning. The module will also concentrate on the empowerment that literacy and numeracy bring to living, with a particular focus on literacy and numeracy development in the classroom and school.

Syllabus: This module will explore students' preconceived and lay theories of teaching and learning and will focus on how these theories are formed. Students will also explore the values which underpin their decisions to become a professional teacher. The module will introduce students to the concept of developing a professional identity and how they can be agents of their own learning. This identity and agency will be fostered through theoretical and practical work on communication and reflection. As part of the communication process, students will be encouraged to value the empowerment that literacy and numeracy bring to living and there will be a particular focus on school literacy and numeracy. They will also be supported to consider their role as agents of change in school and society, particularly in relation to issues of social and global justice. The concept and practice of reflection will be addressed in developing a professional identity

---

EN6161 - UNDERSTANDING LEARNING
ECTS Credits: 6

School of Education

Rationale and Purpose of the Module: *The purpose of this module is to introduce students to different theoretical views of how people learn and the factors influencing this learning. Employing an evidence-based perspective, it aims to challenge the lay theories often associated with learning as a result of formal educational practices.*

Syllabus: The purpose of this module is to provide students with a critical understanding of key topics in learning theory, examining behavioural, cognitive and constructivist theory. The role of motivation is also discussed and an introduction to learner differences is included. Several concepts, such as intelligence and learning style will be critically examined as part of this module. An introduction is given to the personal, social and emotional
development of young people, including ways in which this impacts on the second level school. Students will reflect on their own learning and show an awareness of how their approach differs from that of others. Students will be introduced to key educational thinkers and will be expected to develop an initial outline of their own educational philosophy

---

EP4005 - NEW ENTERPRISE CREATION
ECTS Credits: 6

Management and Marketing

Rationale and Purpose of the Module: *Small firms are a critical component of the Irish economy and play key roles in the stimulation and development of all economies. In recent years high-profile success of both Irish and international entrepreneurs in building profitable business has been inspiring. Creating a new enterprise is a challenging task, one that requires specific knowledge as well as general business and entrepreneurial skills. Successful entrepreneurship and the transformation of creative ideas into commercially viable businesses requires more than merely luck and money. It is a cohesive process of creativity, risk taking and business planning. This module will expose students to the process of entrepreneurship and more specifically to the process of opportunity recognition, the elements of business planning and provides hands-on experience in the creation and development of a new business enterprise. Students will apply the knowledge they learn in the classroom to real-world business opportunities and subsequently will develop a more entrepreneurial mindset.*

Syllabus: The aim of this module is to provide students with an understanding of the stages involved in creating a new venture, including the development of skills in evaluating, preparing and presenting a business plan. It will provide an entrepreneurial mindset and a sense of entrepreneurial behaviour, which can be effectively used in a number of different work environments. The module will facilitate students in the development and application of the analytical and decision-making skills necessary in formulating, implementing and controlling a business plan. The module will also establish project credibility and improve students' presentation and communication skills. The module will therefore address the following:
• the importance of SMEs and business planning
• developing and screening business ideas
• feasibility analysis
• components of the business plan
• financing options for the business
• presenting the business plan with confidence

EP4007 - ENTERPRISE MANAGEMENT AND GROWTH
ECTS Credits: 6

Management and Marketing

Rationale and Purpose of the Module: *How best to scale up and expand the small enterprise into international markets are key managerial challenges facing the owner-manager and if not accomplished effectively can lead to the demise of a potentially successful business. When managed successfully, it provides interesting, creative, and rewarding experiences*

for the owner-manager. In the small enterprise context there is a constant pressure to create and sustain a competitive advantage and to achieve this, the owner-manager needs to become sophisticated in their management practices and strategic thinking. This requires the owner-manager to move from the "entrepreneurial" to "professional" manager and leadership roles. This module will provide students with a strong theoretical knowledge of the challenges of managing a new and growing enterprise with an international perspective and will develop their skills and competencies to apply and integrate this knowledge to the realities of small enterprises.

Syllabus: The aim of the module is to provide students with an understanding of components of management and the process of strategy development to achieve firm growth and the creation of a competitive advantage in international markets. The module will develop a critical awareness and a detailed understanding of the challenges facing the entrepreneur/owner manager as they manage and grow their enterprise. The content will explore a range of classical and contemporary theories around enterprise management and the challenges and difficulties in implementing these in the growing enterprise. It will provide students with an understanding of the components of and the process of strategy development, implementation and evaluation by reviewing the various growth strategies available to the owner-manager to achieve international growth.

EP4315 - ENTERPRISE FORMATION
ECTS Credits: 6

Management and Marketing

Rationale and Purpose of the Module: *The aim of the module is to provide participants with an understanding of the entrepreneurial process and the role of small firms in economic development. Students will also benefit from identifying the external and internal factors that impact on business start-up. Students are expected to prepare a feasibility analysis on a business idea to examine the viability of starting this business in a real-life situation.*

Syllabus: Mode of Instruction is lecture and tutorials workshops. Knowledge is structured in two main sections, theory and application of theory to real life economic conditions. Initially the concepts and factors affecting the entrepreneurial process are imparted to students, following which students work together in teams engaging in experiential learning in assessing the feasibility and viability of their business idea.

EP4407 - ENTERPRISE DEVELOPMENT
ECTS Credits: 6

Management and Marketing

Rationale and Purpose of the Module: *Creating a new venture is a challenging task, one that requires specific technical and business knowledge as well as general business and entrepreneurial skills and competencies. The aim of this module is to introduce students to the stages involved in the establishment and management of a new business. This includes opportunity recognition, analysis of market potential, the analysis and acquisition of resources required to capture market opportunities and the launch of a new business. In addition the module content explores the backgrounds, motivations, characteristics and skills of enterprising individuals. On completion of the module the student will have a better understanding of the issues involved in forming a business enterprise. The module will serve as a strong foundation for those aspiring to own and operate their own business.*

Syllabus: The module will address the following topics- Understanding the role and importance of the small firm sector to the Irish economy. The entrepreneur/owner/manager characteristics and classifications; identification and evaluation of business opportunities; product/service development; market research; industry analysis; market/sales strategies; management structure; manufacturing/operations; sources of start-up finance; financial projections (projected cashflow, profit and loss and balance sheet); managing the new business (people and process management) and exit strategies for a new business

---

EQ4013 - FOUNDATIONS OF EQUINE LOCOMOTION
ECTS Credits: 6

Biological Sciences

Rationale and Purpose of the Module: *The module provides students with the knowledge on the principles of athletic movement in the horse, which includes simple gait evaluation and consideration of various factors that impinge on efficient movement / locomotion. The module also develops a greater understanding of the physical preparations necessary for performance and the use of effective practices pre and post exercise. These are key skills in industry to prevent and recognise injury and maximise performance in race and sport horses.*

Syllabus: Locomotion; the role of nervous, skeletal and muscular systems in locomotion, use of body segments - head and neck, back and ribs, hindquarters, ring of locomotion, limiting factors - joint range of movement, injury, willingness, opposing muscle groups, stance and flight phases of movement, simple gaits - walk, trot, canter, gallop. Common misconceptions in equine movement. Qualitative and quantitative analysis of equine movement, comparison with competition requirements, locomotion and soundness. Common simple gait abnormalities; lateral and medial deviation, skeletal foundations of gait abnormality, farriery and gait abnormality. Video analysis of simple gait abnormality. Developing equine movement; use of simple techniques on the flat over ground poles and jumping to promote efficiency, co-ordination and power in equine movement. Factors affecting equine locomotion; tack and equipment, the rider, ground surfaces. Lungeing methods and equipment, loose schooling methods and safe practice in accordance to established guidelines.

EQ4025 - THE YOUNG HORSE
ECTS Credits: 6

Biological Sciences

Rationale and Purpose of the Module: *The module provides the students with the skill to examine the physical and mental pre-requisites for training the young horse, which includes the evaluation of young horse conformation, maturity and developmental stage of the horse ready to begin training. Additionally, it aims to develop the students ability to critically evaluate different training approaches and techniques commonly used in industry in the context of horse behaviour, welfare and learning ability, which are critical skills necessary to evaluate the effectiveness and ethics of standard industry practices currently in use.*

Syllabus: Conformation and suitability; indicators of maturity, estimation of maturity, suitability for purpose, muscular development. Training the young horse; behavioural bases, alternative approaches, developing understanding of and obedience to simple cues, timing of

initial training by discipline and maturity, commonly used approaches for sport horses and racehorses, establishing trust and confidence, improving balance and strength, developing athletic technique on the flat and jumping both loose and on the lunge, accustoming the horse to the rider early riding of the young horse. Equipment; lungeing and longreining equipment, side reins, De Gouge, Chambon, training aid systems, mouth examination and bitting for the young horse, use of a mounted dummy for rider introduction.

EQ4027 - EQUESTRIAN FACILITIES
ECTS Credits: 6

Biological Sciences

Analysis of requirements for equine facilities with regard to; racing, sports horses, breeding, competition, exercise and training, client facilities, horse welfare and soundness, disease control, isolation and quarantine facilities. Ancillary facilities; feed stores, gallops, arenas, fixed and portable fences, dry and water treadmills, solaria, wash boxes, weighing facilities, loading bays, equipment storage, farriery and breeding areas, road and air transport environments. Planning and building requirements; materials, environmental impact, waste disposal, aesthetics. Use of ICT in equestrian establishments; staff training, monitoring horses, entries and administration, horse and client records, veterinary applications.

EQ4037 - PERFORMANCE RIDER DEVELOPMENT
ECTS Credits: 6

Biological Sciences

Analysis of performance demands on the rider; sports disciplines, racing (flat and National Hunt), endurance, mental and physical capacities. Characteristics of performance riders; body morphology, attitudes to training, relationships with coach and supporters, technical, tactical, physical, mental and lifestyle capacities.
Analysis of rider motor and proprioceptive capacity; video analysis, appropriateness and efficiency of sport movement, common difficulties in movement patterns, developmental plans for riders in various disciplines. Developing the rider; use of technology and equipment to provide feedback and support practise, use of novel development tools, athlete diaries, athlete driven reflection and goal setting, maintaining technique and focus in stress environments - race finishes, jump offs. Models of motor skill development and use of appropriate technology and equipment to support motor skill development.

EQ4051 - INTRODUCTION TO HORSEMANSHIP
ECTS Credits: 6

Biological Sciences

Rationale and Purpose of the Module: *The purpose of this module is provide the students with the basic understanding of horsemanship, a foundation level of knowledge and practical skill in working with the horse in a safe manner, to highest industry standards.*

Syllabus: Safety around the horse in all working environments; health and safety legislation, best safety practice, individual responsibility for recognising and minimising risk, equine behavioural bases of established safety practice. Gaits and movement; analysis of basic gaits, effect of equipment and the rider on the qualitative and quantitative aspects of movement. Horse management; basic methods of management for horses stabled, at grass and at competition, simple health indicators. Tack and equipment; recognition and application of simple commonly used items, principles of design and function, physiological and psychological effect on the horse. Rider/trainer capacities; proprioception, communication, simple work from the ground and ridden, simple methodologies of horse training.

ER4001 - ENERGY AND THE ENVIRONMENT
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: *To draw upon core scientific module of the program e.g, thermodynamics while exposing students to the local, regional & global environmental effects that arise from the generation and use of energy.*

Syllabus: Energy Resources & Supply
Thermodynamics of energy conversion
Electricity generation & storage
Fossil fueled power generation
Transportation
Clean Technology for energy generation and transmission
Nuclear power generation

ER4003 - ENVIRONMENTAL MODELLING & GIS 2
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: *Note: ERxxxx Environmental Modelling & GIS 1 is a prerequisite for this module.*

To enhance and further strengthen the students ability to apply his/her
knowledge of GIS in solving particular environmental scenarios.
To provide the student with a scientific understanding of the important
principles in relation to pollutant transport and degradation in the
environment.
To facilitate the student in using both computational and computerised
approaches to environmental fate modelling.
To facilitate the students' understanding of the role and relevance of
environmental fate modelling in the prediction of environmental impacts
and human/ecological risk.

Syllabus: Selected Environmental Case Studies in GIS.
Introduction to transport and degradation of chemicals in the environment.
Mechanisms of pollutant transport: air, surface water, groundwater, soil.
Air Sources: source parameters, meteorology, buoyancy, topography,
gaussian mathematics, deposition.
Surface Water Sources: source parameters, river hydrogeometry,
dispersion, mixing, low depth & velocity, diffusion.
Groundwater: hydraulic conductivity, gradient, advection, diffusion.
Pollutant Degradation Pathways: bioaccumulation, biodegradation.
Analysis of Degradation Rate Data: zero, first, second order, integral method.
Environmental Fate Scenarios: Screen3 model

application.

Prerequisites: ER4002

ER4011 - INTRODUCTION TO ENVIRONMENTAL & BIOSCIENCES
ECTS Credits: 3

Chemical Sciences

Rationale and Purpose of the Module: *Environmental and Biosciences are broad interdisciplinary subject areas. It is important that first year students, entering through the common science intake programme, gain a useful understanding and knowledge of the scope of these subject areas to effectively ensure that they can make appropriate choices at the end of their first year in UL. This module provides an overview of the broad areas and current topics within both the bioscience and environmental science areas.*

Syllabus: Sustainable development; environmental impact assessment; ecosystems and functioning: fossil fuels and the environment; water and air pollution; waste management. Topics in Biosciences include: development in cancer therapies; new immunotherapies; understanding cell communications; the human condition - us and our microbes

Prerequisites: CH4701, CH4711, CH4721, BY4001

ER4407 - ENVIRONMENTAL MANAGEMENT 1
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: *To understand the relationship between economic development and the environment: The evolution and contemporary application of the concept of environmental management. The interaction between nature, society and enterprise.*

Syllabus: An understanding of the nature and significance of local, national and global environmental issues and challenges, and their historical background.

A grounding in the main elements of recognised environmental management systems (ISO 14001) and the issues involved.

An understanding of the concept of sustainable development and its importance.

ER4417 - ENVIRONMENTAL IMPACT ASSESSMENT
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: *Environmental impact assessment (EIA)is a key skill for environmental scientists, and forms the bulk of work undertaken by consultancy companies which employ many of our environmental science graduates. The module also provides a synthesis for environmental science students, in which it is made clear how their various modules in chemistry and biology are each relevant to the work of the environmental science practitioner. As EIA is linked to spatial planning, it is also of relevance to geography students. EIA is a process undertaken by many companies when they wish to establish to establish or expand, and is therefore of relevance to Business students with an interest in environment.*

Syllabus: Environmental Impact Assessment (EIA) definition and purpose, genesis and development both present and likely future; relevant EU Directives and national legislation; stages in the implementation of EIA; monitoring and auditing; Impact Statement (EIS) review and the role of EIA in planning; cases in EIA, strategic environmental assessment (SEA) Directive, purpose and stages.

ER4507 - EFFLUENT CONTROL - WASTE MANAGEMENT 1
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: *To provide an understanding of the principles underlying waster water treatment.*

Syllabus: Principles of wasterwater management, composition of waste; domestic, indsutrial. Effects of waste on receiving water sites and groundwater, eutrophication: water borne standards disease. Pollutant tests: BOD, S.S., coliforms. Legislation. Technology of wastewater treatment and disposal. Screening; grit removal; maceration; nutrients and flow balancing; flotation. Sedimentation. Biological treatment of wastewater - Biological kinetics: Activated sludge, trickling filters, biomass; high rate treatment contractors. Sludge disposal: dumping; thickining; nitrification; denitification; drying bed; centrifuges; vacuum filtration; bulk press. Anaerobic digestion. Tertiary/Advanced process; phosphorus, nitrogen renewal; stabilisation pounds, activated carbon; reverse osmosis; ion exchage; microstrainers. Waste water reclamation. Ultrafiltration.

Prerequisites: ER4507

ER4627 - Safety and Industry
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: *To provide an understanding of the principles of accident causation and prevention in the workplace.*

To familiarise the student with hazard and process safety analysis techniques as practised in industry.

Syllabus: Principles of accident prevention; accident causation modes, risk identification, evaluation and control, hazard reduction techniques, design out, safety devices, warning devices. Hazard analysis, HAZAN, frequency, consequence, ALARA, Fatal Accident Rate, Hazard rate. Process Safety Analysis, HAZOP, guide words, what if reports, Fault tree analysis, primary and intermediate events, gate symbols, transfer symbols, Fire & explosion Indices. Fire safety management, current legal requirements, fire hazard identification, and risk assessment, active and passive fire protection, safe operating procedures, fire training, information and communication. Selected industrial case studies.

ER4707 - MONITORING AND RESEARCH METHODS
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: *To familiarise the student with the chemical and physical nature of a broad range of pollutant types which are currently of environmental concern.*

To facilitate the student in understanding the nature of environmental sampling and the industrial origin of specific pollutants and associated environmental impacts.

Assessment of sampling technologies covering a range of environmental samples from a variety of media including air, soil, surface water and groundwater.

Development of the students' working knowledge of industrial and ambient monitoring techniques on a practical and quantitative basis.

Syllabus: [Emissions & Impacts] industrial plant emissions û sources û emissions impact assessment methods û primary/secondary/tertiary/quaternary systems.
[Groundwater Pollution] subsurface environment, groundwater movement, sources of pollution, point sources û diffuse sources û microbial activity.
[Pollutant transport in groundwater], non-aqueous phase liquid pollution (NAPL) / (DNAPL).
[Groundwater Monitoring Wells] construction û design.
[Sampling Groundwater] well depth measuring û well evacuation û sampling.
[Analysis of Groundwater] techniques.
[Surface Water Pollution] emissions to water, water quality monitoring, water quality assessment.
[Atmospheric Pollution] odour, SOx, NOx & Acids, organics, temperature pressure, humidity, molar volumes, converting ppmv to mg/m3, STP/NTP - time weighted averages, dust, USEPA methods, isokinetic sampling methods

---

ES4001 - EUROPEAN STUDIES: A GLOBAL PERSPECTIVE
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *This module aims to provide an induction into third-level study for European Studies students and to mediate to new third-level learners the nature of European Studies as a combination of different academic disciplines and interdisciplinary possibilities. The module seeks to develop critical analytical skills, oral and written presentational skills and to provide new students with a critical overview of the contemporary state of their field of study. It will also have the goal of enhancing group experience and dynamic within the course with a view to maximising the educational benefit students derive from their disciplinary and linguistic studies. It will foster an awareness of the importance of autonomous learning and participatory research in the undergraduate educational experience. Finally, it will promote awareness among students of the fact that they will be working in an intercultural field and of the consequent importance of developing intercultural competences.*

Syllabus: This introductory module is organised around selected set of themes in the interdisciplinary field of European Studies. Each theme set is formulated as a question put to participants, for unpacking, development, autonomous research, and intensive, teacher-facilitated discussion. The central focus of the module will be on fostering in new entrants the skills necessary for full engagement with the European Studies degree. Topics for study may include the following: Geographical and territorial definitions of Europe. Linguistic issues in Europe. Unity and diversity of European culture. The `cultural industry in Europe. `European values, democracy and diversity as case studies. The question of a `European economic model. Citizenship in European and global contexts. The role(s) of Europe within globalisation and a wider `world system. Colonialism, its practices and its legacies. Ireland in a European and a global context.

ET4003 - ELECTRO TECHNOLOGY (ED)
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: *This module provides an introduction to electrotechnology for students studying in the area of enterprise engineering, materials and construction.*

The electronics content of the LM095/LM094 programmes is being expanded to meet the requirements of the impending revised leaving cert. syllabi in Technology and Engineering Technology. Replaces ET4111 Electrotech.. ID

Syllabus: Electrical concepts: electric current, voltage, resistance, power. The relationship between them, units of current, voltage, resistance, power and frequency. The resistor colour code. Measurement of current, voltage, resistance, capacitance, frequency (V, A, W, F, Hz). Indirect measurement of power. The difference between AC and DC. Interpretation of circuit diagrams. Assembly of simple circuits using strip and breadboard. Passive components, resistors, capacitors, inductors, magnetic and electric field effects of charge and current. Diodes. The transistor switch. Voltage regulators, photoresistors, photodiodes, LEDs, phototransistors, variable resistors, potential dividers, potentiometers and relays. Sensors for sound, heat, light (photoresistive and photovoltaic), movement. Electric motors, The mode of operation of the DC motor; back EMF; the variation of current requirement with the load, Reversing a DC motor. Strategies for teaching this subject area at second level. Designing, planning and managing appropriate teaching and learning activities for this subject area.

ET4011 - FUNDAMENTALS OF COMPUTER ORGANISATION
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: *Students will gain a familiarity with the architecture, design and organisation of
modern machines.
Students will become familiar with Boolean algebra and digital logic gates, as the
building blocks of a computer.
Students will conduct basic arithmetic with binary and hexadecimal numbers,
learn how coding systems allow different representations of data as binary numbers,
understand the importance of memory organisation and caching on machine
performance and learn how the computer goes about executing programs.*

Syllabus: History of computing: topics include Van Neumann's architecture, 0th to 5th
generation languages;

Data representation and binary arithmetic including floating point representation;
Introduction to Boolean algebra and digital logic with topics ranging from truth
tables, dualities, and De Morgan's Law, to circuits such as decoders and full adders,
flip-flops and registers.
Multi-level machine and translation of high-level language programs to the execution
stage;
Fetch-Decode-Execute cycle and data path, simple CPU and computer block
diagrams, and memory hierarchy
Evolution of computing models such as IoT, cloud, GPUs, multicore,
embedded systems etc

ET4013 - COMMUNICATIONS NETWORKING FUNDAMENTALS
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: *The aim of this module is to provide an introduction to data communications and networking. The module includes an overview of essential foundation topics and also introduce students to the internetworking principles and concepts.*

Syllabus: Introduction to telecommunications: Definitions and concepts, standards bodies, communications tasks, protocol elements, characteristics and functions; reference communications models (OSI vs. TCP/IP). History/evolution of telecommunications networks. Physical Layer: Transmission modes and types; analog vs. digital signals; baseband vs. broadband; modulation/demodulation; transmission impairments (attenuation, delay distortion, noise); channel capacity; data encoding and compression; physical interfacing; asynchronous vs. synchronous transmission; transmission media (guided, unguided); structured cabling standards; multiplexing techniques (FDM, TDM, WDM). Network topologies (star, ring, bus, tree, mesh). Data link layer: Line disciplines (ENQ/ACK, poll/select); framing; frame synchronisation and data transparency, flow control; addressing; link management; protocol examples (HDLC, LAPB, LAPD, LAPM, PPP). Introduction to higher communications layers: Switching (circuit-, message-, packet-); routing (main types, concepts and principles), congestion control, QoS management, connection-oriented vs. connectionless transport services; segmentation and re-assembly; session management; data presentation; client-server model; internetworking principles and concepts (repeating, hubs, bridges, routers, gateways).

ET4017 - COMMUNICATIONS NETWORKING STANDARDS
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: *The aim of this module is to provide further education in communications networks and provides detailed overview of the main international networking standards. The module also introduces students to modern communications standardised infrastructures and associated business models and paradigms.*

Syllabus: Personal Area Networks (PANs): Bluetooth, IEEE 802.15 standard.
Local Area Networks (LANs): Medium Access Control (CSMA/CD vs. CSMA/CA); logical link control (LLC), IEEE standards: 802.3/u/z/ae (ethernet), 802.5 (token ring), 802.11 (WiFi), 802.1Q (VLAN).
Metropolitan Area Networks (MANs): IEEE 802.16 (WiMax) standard.
Wide Area Networks (WANs): Frame relay: Asynchronous Transfer Mode (ATM),; Multi-Protocol Label Switching (MPLS); Integrated Services Digital Networks (ISDN).
Broadcast audio/video carrier technologies: Terrestrial (DAM, DRM, DVB-T/DVB-H, MBMS), satellite (DVB, S-DMB, Digital Audio Radio Satellite).
Modern communications business models and paradigms: Subscriber-centric model; consumer-centric model; integrated heterogeneous networking, infrastructural elements.

ET4023 - INTRODUCTION TO SECURITY AND CRYPTOGRAPHY
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: *To introduce fundamental concepts of information and network security.*
To introduce the ideas of threats and vulnerabilities such as viruses, worms, malware etc.
To introduce fundamental ideas in cryptography.
To place them in their historical perspective.
To provide an appreciation of approaches to preventing such attacks.

Syllabus: [Introduction to information and network security:] Why security is an important issue.
[Threats and vulerabilities:] Threats from passive and active attackers and from digital pests such as virus, worms and malware.
[Historical development of codes and ciphers:] Classical ciphers (Caesar, Vigenere, one-time-pad etc.) Machine based codes: Enigma, Purple. Classical cryptanalysis (Beltchley Park, the Bombes etc.)
[Introduction to cryptography:] Basic approaches of symmetric key encryption. Block ciphers and stream ciphers. Basic approach of public key encryption. Introduction to key management. Application of ciphers.
[Protection against attacks:] Introduction to security components such as firewalls and IDS, virus scanner, file integrity checker, OS update management. Role of passwords. Password cracking techniques.

ET4025 - NETWORK PROTOCOLS LABORATORY
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: *The aim of this module is to offer the students a learn-by-doing approach in communications and computer networks, for a better understanding of how networking technologies, mainly network protocols, operate in practice. Using appropriate laboratory facilities (real network equipment, protocol analysis software), the students will be allowed to observe, measure and experiment various communications protocols. It provides the student with a comprehensive coverage of computer networking and their protection, with a strong practical emphasis.*
At the completion of the module, students should have an understanding of the important issues in providing communications software for various types of computer networks. This includes LAN medium access protocols, WAN data link protocols and the TCP/IP protocol stack, mainly focusing on application protocols for file transfer, network management network security.

Syllabus: Introduction to layered architectures, basic concepts: open systems, layering, peer protocols, primitives and services.

Reference models: telecommunications vs. computing approaches, OSI vs. TCP/IP, layers functions.
Layer 2 LAN protocols: Ethernet, token ring and FDDI: basic characteristics, frame types, fields and troubleshooting tips, capture and decode frames.
WAN protocols: HDLC, frame relay, PPP; ATM: basic characteristics, frame types, fields and troubleshooting tips, capture and decode frames.
TCP/IP protocol stack: IPv4 and IPv6, TCP and UDP: functions and PDU structure, protocol analysis, debugging tips; capture and reassemble PDUs, extract data.
Client/server software used by TCP/IP protocols; design and implementation for client programs.
Network management: SNMP case study.
Network security: Using routers as firewalls, PGP case study.

ET4035 - COMPUTER LAW, INVESTIGATION AND ETHICS
ECTS Credits: 6

Electronic & Computer Engineering

Overview of computer forensics technology.
Compute forensics evidence - capture and analysis.
Legal permissions and restrictions on investigations of incidents.
Collecting evidence for trial: evidence integrity, chain of custody and admissibility.
RFC 1087 - Ethics and the internet including the 10 commandments of computer ethics.
ISC2 Code of ethics.
Irish Information Society Commission Ethics and Values in a Digital Age.

ET4047 - EMBEDDED SOFTWARE
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: *The aim of the module is to provide an introduction to embedded processor systems and applications. The main objectives are to provide the student with an overview of the architecture of a simple microprocessor, to explain the operating principles and provide a functional understanding of assembly language.*

Syllabus: Introduce a simple microprocessor architecture - Registers, buses and memory organisation and how it is used in embedded applications. Describe memory and I/O devices. Explain memory and I/O accesses.
Introduce instruction sets, addressing modes, data move instructions, arithmetic instruction, stack operation and usage, program flow control instructions, sub routines and loops.
Detail assembler directives and the program translation process. Review the build and load process for embedded application programs. Introduce simulation tools and debugging techniques Introduce the monitor program and how to use it to test applications using target hardware.
Describe how to control/communicate with I/O devices through polling and interrupts. Interrupt service routines, interrupt priority, multiple interrupts, nesting.
Use practical programming examples to illustrate concepts.

ET4077 - CLOUD COMPUTING
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: *To introduce the student to Secure Cloud Computing. This is to enable them to fully understand the Cloud, its vulnerabilities and how to offset them.*

Syllabus: Cloud Computing Fundamentals: Characteristics, Technology and Operational issues.
Cloud Computing Architecture: Delivery and Deployment Models.
Cloud Computing Security Fundamentals: Requirements and Services,
Cloud Computing Risk Issues and Security Challenges: Threats and Vulnerabilities.
Cloud Computing Security Architecture: Security management and Access control issues.

ET4087 - ELECTRICAL AUTOMATION
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: *This module provides the necessary understanding, knowledge and skills for students to design automated systems for industrial, built environment and other domains.*

This module replaces modules EE4207 - Industrial Automation, ET4315 Robotics 1: Industrial Automation and EE4057/EE4067 Electronics Systems for the Built Environment 1 on the BSc Electronics, and BSc Energy degrees. The modules have significant overlap and the change is to rationalise and update the modules. The purpose of this module is to equip students with the necessary skills to design, build and install automated systems in the built environment, in industry and elsewhere.

Syllabus: [Motion Control] Open Loop and servos/closed loop electric motors, drives and controllers. steppers, DC servos, brushless motors. motion sensors / transducers for servo operation, tachometers, optical encoders, resolvers,. [Pneumatics] Electro pneumatics, valves, pneumatic devices, pneumatic control systems. [Programmable Logic Controllers PLCs], PLC programming and installation. [Mechanical System Components] and considerations friction, low friction designs, inertia matching, gear boxes, screws, worms, toothed belts, harmonic drives. Choice of motor system to match speed, accuracy, stiffness, efficiency requirements etc. [Industrial Robots] Classification; robot programming.
[Building Automation] Use of programmable logic devices for home/building automation and security applications in modern buildings. [Laboratory Work] Problem based laboratories will use a combination of Automation Rigs Labview and PLC exercises.

Prerequisites: ET4224

ET4111 - ELECTROTECHNOLOGY ID
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: *An introduction to the overall basics of electrotechnology and electrical machines.*

Syllabus: Electric charge, movement of charge as a current, conductors and insulators, what makes electrical current flow

potential difference, voltage, resistance to electric current, simple dc circuit analysis, series and parallel

connection of components, capacitors and charge storage, charging capacitors

magnetic fields generated by electric current, electromagnetics.

alternating current (ac), simple ac circuits.

magnetism , magnetic flux, electro-magnetic induction.

electrical generators, transformers, rectification, direct current (dc) generators, dc motors, induction motors.

electronics, semi-conductor theory, diodes - rectification, transistors - switches/digital, amplifiers/analogue, IC's.

ET4132 - INTRODUCTION TO WEB AND DATABASE TECHNOLOGY
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: *This module will introduce you to the concepts and techniques underlying the World Wide Web, such that you will gain a working knowledge of how to design and build web sites. The module will also present an introduction to relational databases and data models and manipulation.*

Syllabus: Overview of the Internet and World Wide Web; standards and specifications
Web browsers, Web servers and protocols
Designing & creating Web Pages with HTML
Web programming: overview of XHTML, XML, CSS and ActiveX controls
Multimedia on the WWW including Audio, Video and graphics
Data & information: characteristics, differences and structures
Data management: simple file storage & retrieval; Introduction to data modelling
Introduction to the concept of Database Management System (DBMS)
Introduction to Structured Query Language (SQL)

ET4224 - ROBOTICS 1: SENSORS AND ACTUATORS
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: *This module introduces students to fundamental principles of*

* *Measurement of physical phenomena utilising various sensing techniques.*
* *Transducer action and signal conversion*
* *Various Actuator types and principles of operation.*
* *Specification of a complete measurement system.*

Syllabus: Introduction to Physical Phenomenon:-
* SI Units.
* Principles of sensor operation (mechanical, thermal, sound, light).

Sensors and Transducers:-
* Concept of transducer action as signal conversion with particular emphasis on an electrical signal as the output.
* The ideal transducer.
* Resolution, accuracy, linearity definitions and relevance.
* Review of some physical phenomena that result in electrical parameter variations

Actuators
* Magneto Motive Force & magnetic circuits, transformers, DC generators and motors.
* Motors: DC machines with permanent magnet and field windings, Induction motors, Stepper Motors,. Stepper drives.
* Motor Drive Circuits.

Sensor Interfacing Circuitry introduction/review
* Review of Op-Amp as applied to sensing systems, Instrumentation amplifiers, diff amps, etc. Simple DACs, ADCs successive approximation and integrating, operating principles and suitability for industrial applications. Overall concepts of accuracy, drift, resolution, and common mode rejection applied to a measurement system, complete system composed of a transducer, amplifier and ADC.

Prerequisites: EE4102, EE4313, EE4101

ET4244 - OUTCOME BASED LEARNING LABORATORY 2
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: *In this module students will further develop skills to study, experiment and report on representative electronics based real world systems through interfacing via a PC or over communications networks. The students will apply programming skills, data management skills and theoretical and practical knowledge developed in preceding and concurrent modules in programming, databases and computer systems.*

Study will be through a problem-based approach that will integrate material from elsewhere in the programme of study and look forward to future modules.

Syllabus: The module is a follow-on from the Outcome-based Learning Laboratory 1. It will further develop the concepts from the 1st year laboratory modules and will target user-oriented web based design and interactive on-line data acquisition and control, for example, write programs to use the external system to carry out specified task, e.g. temperature control, weather observation, lift control.

* Design of dynamic web based user oriented systems, top down, bottom up design.
* Extraction and display of real world data, data transmission point to point and through networks.
* Data exchange in multipoint systems
* Data manipulation and storage on a PC
* Interfacing PC to external system directly/over a network.
* Control of simple devices via active web pages
* Data display in user-friendly format, graphic displays, data on demand.

Prerequisites: ET4112

ET4305 - INSTRUMENTATION AND CONTROL 1
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: *This module introduces students to the fundamental principles of: practical control engineering, the use and specification of instrumentation and the use of a computer to instrument and control systems and processes.*

Syllabus: System dynamics: measurement of behaviour of system in the time domain. Benifits and costs of feedback. Intro to instrumentation and data aquisition

software.
Stability and performance: time analysis of open and closed loop systems, Bode plots.
Controller design: PID control.
Sampled data processes, digital PID.
Instrumentation buses and standards.

Prerequisites: ET4224, ET4204

ET4407 - ELECTRONICS AND THE ENVIRONMENT
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: *The protection of the environment in conjunction with economic growth will become one of the great challenges of the 21st century for a multitude of reasons. If the electronics industry is to sustain its growth levels of the last number of decades going forward this challenge will become foremost in the job function of its employees. This module will introduce the concepts which underpin this challenge. It seeks to inform students of the necessity of environmental awareness in the electronics industry and to introduce the means by which these environmental issues can be addressed.*

Syllabus: 1. Environmental Forces in the Electronics Industry: Market Driven, Sustainability Driven, Legislation Driven.
2. Design for Environment (ECO Design): Life cycle chain analysis, design for recycling, reverse manufacturing, reverse logistics, end of life solutions.
3. Green materials: lead free interconnects, halogen free materials, all other materials outlined in WEEE and ROHS, packaging.
4. Sustainability, energy efficiency, alternative power supply.
5. Case studies discussing such issues as environmental challenges in the semiconductor industry, producer responsibility in the electronics industry and sustainable trade in the electronics sector of emerging economies among other topics.
6. Invited talks: Seminars by the local electronics industry on environmental challenges in their company.

ET4437 - DISTRIBUTED COMPUTING AND JAVA
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: *To introduce the student to Java and Distributed Computing including Remote Method Invocation and JavaBeans. To examine the role of Java in Distributed Systems and Web based Services including Security issues. In addition XML and advanced GUI features will be investigated.*

On completion of this module the student should have an appreciation of the issues pertaining to the use of Java in a large Distributed Enterprise Environment.

Syllabus: JavaBeans Component Model, Creating a JavaBean.
Security - Digital Signatures, Java Keystores, Java Authentication and Authorization Service.
Java-based Wireless Applications and J2ME.
Remote Method Invocation.
Enterprise JavaBeans and Distributed Transactions.
Messaging with the Java Messaging Service (JMS).
Jini - plug and play interfaces, discovery services.
JavaSpaces - Communicating and sharing information in asynchronous environments
Peer-to-Peer Applications.
Case Study.
Extenible Mark-up Language (XML) and Simple Object Access Protocol (SOAP).
Major programming project.

Prerequisites: ET4355

EV4003 - EQUINE FEEDING AND BEHAVIOUR
ECTS Credits: 6

Biological Sciences

Rationale and Purpose of the Module: *To understand the basic principles of nutrition and the practical aspects of feeding.*
To understand normal patterns of equine behaviour and the identification of behavioural problems.

Syllabus: Digestive anatomy of the horse; Feedstuffs and forages in the horse's diet; Diet formulation and nutrient requirements for horses; Feed composition; Feeding management; Bodyweight and Condition Scoring; Ethology and ethograms; Effects of domestication on behaviour; Learning Theory, Normal and abnormal equine behaviour; Environmental effects on behaviour; Causation, function, ontogeny of equine behaviours; Horses as herd animals; Behaviour in the wild; Normal and abnormal equine behaviour; Environmental effects on behaviour; how the horse learns; stereotypic behaviours; causes of abnormal and other undesirable behaviours; Behaviour as an indicator of welfare.

EV4005 - GRASSLAND AND GRAZING MANAGEMENT
ECTS Credits: 6

Biological Sciences

Rationale and Purpose of the Module: *To educate students in the principles of grazing and grassland management with particular reference to the equine industry in Ireland*

Syllabus: 1. Introduction
2. Soil formation
3. Physical and chemical properties of soil
4. Soil fertility
5. Lime and pH
6. Major and minor elements in soil
7. Fertilisation in horse pastures
8. Grass growth
9. Reseeding of pastures
10. See mixtures
11. Grazing management
12. Hay production
13. Silage production
14. Poisonous plants
15. Racing track management

EV4012 - EQUINE ANATOMY AND PHYSIOLOGY
ECTS Credits: 6

Biological Sciences

Rationale and Purpose of the Module: *To introduce students to fundamental concepts of Equine Anatomy and Physiology.*

Syllabus: The anatomy of the horse] to be discussed with reference to musculoskeletal structure and organs. [The main systems of the horse; digestive, respiratory, circulatory (including lymphatics); reproductive

(including embryology and physiology of reproduction); urinary; nervous and immune].
[Consideration of the theoretical background to the use and operation of modern diagnostic/treatment equipment] such as X-ray, ECG, ultrasound, laser and fibre optic based devices.

EV4023 - EQUINE HEALTH AND ENVIRONMENTAL MANAGEMENT
ECTS Credits: 6

Biological Sciences

Rationale and Purpose of the Module: *The purpose of this module is to give students an understanding of the concept of 'dis-ease' as a departure from health and the multifactorial nature of disease pathogenesis. The module provides basic information on the individual components (host, disease agent and environment) and a perspective on the interactions of these components (the disease triad) in determining the outcome for the host.*

Syllabus: The causes and effects of infectious and non-infectious agents on the health of the horse; the Disease Triad and the multifactorial nature of disease; overview of bacterial and viral diseases affecting the horse; environmental requirements of the stabled horse and the role of the environment as a pre-disposing factor to disease in the horse, vis a vis ventilation, temperature, dust and waste; Heat and moisture balance; Dust Control in Animal Production Buildings; Ventilation Systems; Temperature Regulation; Effects of Environment on Various Body Systems; Management of the Environment to optimise animal health.

EV4025 - EQUINE BREEDING AND GENETICS
ECTS Credits: 6

Biological Sciences

Basic genetics including, cells, chromosomes, genes, alleles, gametes, genotype, phenotype; mitosis; meiosis and its role in genetics, genetic recombination; distances between genes; linked genes, Gene mapping; chromosome structure; DNA; replication, transcription, translation and the genetic code; Inborn errors of metabolism; Sex limited inheritance; PCR; Mendelian genetics including recessive, dominant, X linked and polygenic inheritance. Gene interaction, codominance and incomplete dominance; epistasis; Equine coat colour loci including extension, agouti, colour diluting loci, epistatic modifiers, tobiano, overo and spotting loci, mendelian and non mendelian aspects of equine coat colour; Biological basis of sex; X chromosome inactivation; Pedigree analysis and inheritance, determination of inheritance patterns; the normal karyotype; parentage testing of horses, including blood group testing, biochemical polymorphisms, DNA testing; Abnormal chromosome number and structure; including sex chromosome abnormalities and autosomal trisomies; population genetics, The Hardy-Weinberg law, extensions to the Hardy-Weinberg law including multiple alleles and X linked genes; genotype frequencies; heritability; narrow and broad sense heritability; quantitative trait loci; genotype-environment interaction; estimated breeding values and selection; BLUP; Relationship; Inbreeding and linebreeding.

FI4003 - FINANCE
ECTS Credits: 6

Accounting & Finance

Rationale and Purpose of the Module: *The course provides an introduction to corporate finance and finance theory. The aim of the course is to develop students understanding of fundamental topics in corporate finance and financial theory. The course provides students with the skills needed to engage in basic analysis of projects and financial assets.*

Syllabus: The primary focus of this introductory course is on discounted cash flow techniques, and their application to corporate finance. This course introduces the concept of the time value of money, and the key methods of project appraisal including the net present value method, the payback period, the book rate of return, internal rate of return, profitability indices etc. the merits and demerits of each are explained. Qualitative aspects of capital budgeting and investments are also covered. The concept of market efficiency and of the link between risk and return are illustrated by reference to historical returns. Basic issues around share valuation are also discussed, and the students are introduced to derivative instruments, and how they may be used both defensively and aggressively.

FI4007 - INVESTMENTS: ANALYSIS AND MANAGEMENT
ECTS Credits: 6

Accounting & Finance

Rationale and Purpose of the Module: *The module is designed to provide students with a thorough understanding of international financial investments. In particular the module will provide students with an appreciation of the investment environment and the skills and critical awareness necessary to make good investment decisions. More specifically, key material includes portfolio and capital market theory, asset valuation, investment management and behavioural aspects of investment decisions.*

Syllabus: The topics covered include an introduction to the investment environment: equity securities, fixed income securities; the efficient market hypothesis and behavioural finance; risk and return: measures of risk and returns; Portfolio and capital market theory: dealing with uncertainty, portfolio risk and return, analysing portfolio risk, the role of diversification, modern portfolio theory; Portfolio selection: efficient portfolios and diversification; Asset Pricing Models: risk-return trade-off, capital market line, security market line, Capital Asset Pricing Model (CAPM), Arbitrage Pricing Theory (APT); Equity valuation: dividend discount models, technical analysis, the role of sentiment; Evaluation of investment performance.

Prerequisites: FI4407

FI4015 - CORPORATE FINANCE
ECTS Credits: 6

Accounting & Finance

Rationale and Purpose of the Module: *This module provide students with a solid grounding in corporate finance, its application in share valuation within international capital markets and focuses on the decisions faced by corporate financial managers.*

Syllabus: The course builds on students existing knowledge of discounted cash flow technique and covers more advanced capital budgeting, taking into account inflation, uncertainty and tax. Simulation and scenario analysis are covered and concept of a real option is introduced. The students are introduced to the international capital markets, and the main approaches

to share valuation are discussed and contrasted. The importance of the assessment of risk and its impact on returns from financial assets are introduced, leading to an assessment of the cost of capital for a firm. The theory of the firm is explored in more detail, under the framework of agency theory. Dividend policy is studied, by reference to theory, taxation, the value of the firm and the wealth of shareholders. Capital structure is covered from a similar perspective. Mergers and acquisitions are evaluated. Ideas around the impact of corporate financial decisions on wider stakeholder groups and society more generally are discussed.

Prerequisites: FI4003

FI4407 - FINANCIAL INSTITUTIONS AND MARKETS
ECTS Credits: 6

Accounting & Finance

Rationale and Purpose of the Module: *The aim of this module is to give students an awareness and understanding of the current issues in, and key features of, the financial markets; Money Markets, Bond Markets, Foreign Exchange Markets and Derivative markets. It builds on the basic knowledge of finance obtained from the second year core module in Finance. It introduces the students to the various types of financial institutions and explores the function, typical activity and risk profile of each.*

Syllabus: The determinants of interest rates and how interest rates affect bond valuations; primary and secondary markets; money markets; bond markets; equity/stock markets; foreign exchange markets, derivative markets; the differences between investment banks and commercial banks; how companies and issuers interact with financial institutions; insurance companies; hedge funds; venture capital companies; risk exposures of financial institutions; regulation; contributors to the financial crisis.

Prerequisites: FI4003

FI5001 - FINANCIAL MANAGEMENT
ECTS Credits: 6

Accounting & Finance

Rationale and Purpose of the Module: *The purpose of the module is to provide students with a knowledge and appreciation of basic financial management for business. The programme will develop students' understanding of key topics in financial theory and it will enable students to understand the principles of investment appraisal.*

This module will be offered on the programme Higher Diploma in Accounting (title to be changed to Professional Diploma in Accounting)

Syllabus: The syllabus is made up of the following topics:
-> The elements of the financial and economic environment (including the impact of factors such as interest rates, economic growth and inflation; the need for a proactive approach to addressing potential conflicts between management and shareholders).
-> Capital investment appraisal methodologies such as payback, discounted payback, accounting rate of return, net present value and internal rate of return.
-> The use of appropriate investment appraisal methodologies in various scenarios including capital rationing in a single period, sensitivity analysis and uncertainty.
-> The elements of working capital management including the business cash cycle; stock management techniques such as EOQ and perpetual inventory; receivables & payables management techniques; cash budgets.
-> Personal financial planning including the ability to creatively select the most economic forms of personal investments (including insurance/protection, savings, investments, mortgages and pensions).

FR4141 - FRENCH LANGUAGE AND SOCIETY 1: INTRO FRENCH STUDIES1
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *This module is set at B1 on the Common European Framework of Reference for Languages (CEFR).*
(i) To present key issues in contemporary French society;
(ii) to enable students to develop receptive and active language skills;
(iii) to review French grammar;
(iv) to examine developments in the French language;
(v) to introduce students to the study of French literature.

Syllabus: This syllabus is set at B1 on the Common European Framework of Reference for Languages (CEFR).
Lectures introduce students to the study of social, historical, linguistic and literary aspects of French culture and society.
Themes presented this semester are:
(i) the Republican heritage
(ii) the modern short story and
(iii) the history of the French language. Tutorials explore these subjects and students reading and writing skills are improved through regular exercises. Oral and aural skills in French are stressed and they are developed through the discussion of a broad selection of contemporary oral and written texts from diverse media. A review of French grammar is carried out.

FR4143 - FRENCH LANGUAGE AND SOCIETY 3 EDUCATION AND WORK E
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *This module is set at B2 on the Common European Framework of Reference for Languages (CEFR).*
(i) To increase students awareness of key issues in French business;
(ii) to develop students linguistic knowledge of business communication in French;
(iii) to build on students practical language skills acquired in first year;
(iv) to further students understanding of advanced French syntax;
(v) to extend students reading and analytical skills in the study of French literature and film.

Syllabus: This syllabus is set at B2 on the Common European Framework of Reference for Languages (CEFR).
Lectures introduce students to the study of social, historical, linguistic and literary aspects of contemporary France.
Themes presented this semester are:
(i) the world of work and business in France;
(ii) representations of French modernity in film and literature;

(iii) French discourse genres. Tutorials explore these subjects and students reading and writing skills are improved through regular exercises. Oral and aural skills in French are stressed and they are developed through the discussion of a broad selection of contemporary oral and written texts from diverse media. A review of French grammar is carried out at a more advanced level.

Prerequisites: FR4142

FR4147 - FRENCH LANGUAGE AND SOCIETY 5 FRANCE, EUROPE AND B
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *This module is set at B2+ on the Common European Framework of Reference for Languages (CEFR).*
This module is an introduction to contemporary social, economic and political life in France in a European and global perspective. This is achieved:
by developing studentsÆ knowledge of French culture and society
by focusing on the country's cultural, social and political aspects
by encouraging team-work and intercultural understanding.
by focussing on key moments in the history of France in European affairs and that of France with the francophone communities, language varieties in France and the francophone countries.

Syllabus: This syllabus is set at B2+ on the Common European Framework of Reference for Languages (CEFR).
The module provides students with a platform to broaden and advance their experience of language learning. Language and culture are interwoven through the four distinct parts of the module. In the lectures, students are introduced to analytic tools to study particular social political and cultures aspects. In the tutorials, analysis work of newspaper articles is undertaken making students aware of the vital link between culture and language learning.
In short, The module is centred on a series of lectures analysing the major issues with repect to France and wider world. Language tutorials review some of the points raised in the lectures through close reading and discussion of authentic texts related to the lectures. Language tutorials also endeavour to develop written skills in the French language through translation and/ or essay writing. Tutorial are also devoted to the study of a literary text closely related to the subject matter.

Prerequisites: FR4146

FR4241 - FRENCH LANGUAGE, CULTURE AND SOCIETY 1
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *This module is set at B1+ on the Common European Framework of Reference for Languages (CEFR). (i) To provide students with an introduction to major aspects of contemporary French society and culture;*
(ii) to familiarise students to issues related to the evolution of the French language;
(iii) to introduce students to the study of French literature;
(iv) to give a solid grounding to a number of points of French Grammar.
(v) to enable students to develop practical language skills (oral and written).

Syllabus: This syllabus is set at B1+ on the Common European Framework of Reference for Languages (CEFR).
Students are introduced in lectures to the study of social, historical, linguistic and literary aspects of French society and culture.
Themes explored this semester are
(i) the Republican heritage
(ii) the modern short story
(iii) the history of the French language. These topics are discussed in depth in the more active setting of weekly tutorials. Oral and aural skills in French are a particular focus, and they are developed through the discussion of a broad selection of oral and written material from diverse media. An overall review of French grammar is carried out with special emphasis on French grammatical metalanguage.

FR4243 - FRENCH LANGUAGE CULTURE AND SOCIETY 3
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *This module is set at B2 on the Common European Framework of Reference for Languages (CEFR).*
(i) To deepen students awareness of major developments and issues in business in contemporary France;
(ii) to provide students with the language skills needed to communicate and work in a French business context;
(iii) to extend students reading and analytical skills in the study of French literature;
(iv) to further students understanding of advanced French syntax;
(iv) to build on students practical language skills acquired in first year.

Syllabus: This syllabus is set at B2 on the Common European Framework of Reference for Languages (CEFR).
Students are introduced in lectures to the study of social, historical, linguistic and literary aspects of French society and culture.
Themes explored this semester are
(i) the contemporary French world of work and business
(ii) representations of French modernity in film and literature
(iii) French discourse genres. These topics are discussed in depth in the more active setting of weekly tutorials. Oral and aural skills in French are a particular focus, and they are developed through the discussion of a broad selection of oral and written material from diverse media. French grammar is studied at a more advanced level.

Prerequisites: FR4242

FR4247 - FRENCH LANGUAGE CULTURE AND SOCIETY 5
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *This module is set at B2+ on the Common European Framework of Reference for Languages (CEFR).*
This module aims:
(i) to enable students to develop their written and oral language skills; (ii) to provide a detailed study of aspects

of France in a European and global perspective; (iii) to provide an understanding of the postcolonial cultural context through a study of selected literary texts; (iv) to provide practice in translation in the context of theoretical issues in Translation Studies.

Syllabus: This syllabus is set at B2+ on the Common European Framework of Reference for Languages (CEFR).
The module is centred on a series of lectures analysing the major issues with repect to France and wider world. Tutorials explore some of the issues raised in the lectures through close reading and discussion of relevant authentic texts. Language tutorials focus on the theory and practice of translation in two specific contexts (literature and computer science). Literary tutorials are devoted to the study of a selection of poems from the 1930s to the 1960s and of a francophone African novel.

Prerequisites: FR4246

FR4621 - FRENCH LITERATURE AND CULTURE 1: 20TH CENTURY LITERATURE
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *To introduce students to the study of twentieth-century literature in French from a variety of critical perspectives.*

To give students the opportunity to examine particular authors in greater detail.

To develop students' skills in communicating ideas in oral and written French.

Syllabus: A number of literary texts of an appropriate linguistic level and representativity in terms of period and genre will be studied in this module.

FR4623 - FRENCH LITERATURE AND CULTURE 3 THE ENLIGHTENMENT
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *To examine the development of Enlightenment ideas in France in relation to the social, cultural and political climate of eighteenth-century Europe*
To enable students to apply critical skills to the study of eighteenth-century French texts.
To develop students' skills in communicating ideas in oral and written French

Syllabus: Students are introduced to the Enlightenment in France through the study of a selection of cultural and literary texts. Texts are selected with a view to their linguistic accessibility and to their appropriateness on aesthetic, philosophical and historical levels.

FR4627 - FRENCH LITERATURE AND CULTURE 5: INTELLECTUAL MOVEMENTS
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *To study modern intellectual movements in France in the context of crisis and change in French society and culture in the twentieth century. To enable students engage critically with cultural theories, and to apply such theory to their understanding and analysis of modern French texts. To develop students' skills in communicating ideas in oral and written French.*

Syllabus: Two/ three topics will be chosen each year, and a variety of theoretical and literary texts will be addressed in relation to each topic, for example existentialism;
structuralism/semiology; post-modernism; feminist theory.

FR4921 - FRENCH FOR BUSINESS 1A
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *This module is set at B1 on the Common European Framework of Reference for Languages (CEFR).*
(i) To introduce students to Business French relevant to their future professional needs,
(ii) to provide students with an understanding of key aspects of contemporary French society,
(iii) to enable students to develop practical skills (receptive and active),
(iv) to consolidate students knowledge of French vocabulary and grammar.

Syllabus: This syllabus is set at B1 on the Common European Framework of Reference for Languages (CEFR).
Students are introduced to the study of social, historical, linguistic and literary aspects of French culture and society.
Themes studied in this semester are
(i) the Republican heritage
(ii) the modern short story and
(iii) the history of the French language. Oral and aural skills in French are improved through the discussion of a broad selection of contemporary oral and written texts, from diverse media. With the use of authentic material and with a variety of linguistic activities simulating a business environment students are asked to deal competently with tasks encountered in specific situations; the areas of focus include: applying for a job, job interview, working in a company. Students are also asked to do oral presentations on contemporary French society and culture. Students grammatical competence acquired in secondary school is further developed.

FR4923 - FRENCH FOR BUSINESS 3A
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *This module is set at B1+ on the Common European Framework of Reference for Languages (CEFR).*
(i) To deepen students awareness of key aspects of the contemporary French world of business;
(ii) to provide students with an understanding of key aspects of contemporary French and Francophone societies;
(iii) to further develop practical language skills (receptive and active);
(iv) to promote students critical reading of French literature;
(v) to build on the grammatical skills acquired in year 1.

Syllabus: This syllabus is set at B1+ on the Common European Framework of Reference for Languages

(CEFR).
Students are introduced in lectures to the study of social, historical, linguistic and literary aspects of contemporary France.
Themes presented this semester are
(i) the French world of work and business,
(ii) representations of French modernity in film and literature, and
(iii) French discourse genres. Oral and aural skills in French are a particular focus, and they are developed through the discussion of a broad selection of contemporary oral and written texts from diverse media. With the use of authentic material (both written and oral) and with a variety of linguistic activities simulating a business environment students are asked to deal competently with tasks encountered in specific situations. The areas of focus include: insurance, advertising and export. Students also study a literary text related to one of the lecture themes. The study of French grammar -in year 1- is continued.

Prerequisites: FR4922

FR4925 - FRENCH FOR BUSINESS 5A
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *This module is set at B2 on the Common European Framework of Reference for Languages (CEFR).*
To prepare students for study or work placement abroad taking place in semester 6. This is achieved:
by developing studentsÆ knowledge of French for Specific Purposes
by focusing on cultural aspects which will be encountered in and outside the workplace while residing in the target country
by encouraging team-work and intercultural understanding via tandem learning with French speaking students.

Syllabus: This syllabus is set at B2 on the Common European Framework of Reference for Languages (CEFR).
The French for Business 5 module provides students with a platform to broaden and advance their experience of language learning. Language and culture are interwoven through the four distinct parts of the module. In the lecture on stereotypes, students are introduced to analytic tools (semiotic analysis, stereotypes and advertising strategies, film analysis, etc.) to study particular cultures and identities. In the tutorials, translation work on Newspaper articles is undertaken together with French students making them aware of the vital link between culture and language learning. In addition, students conduct research on a French company via the Internet (company website and other Internet sources) and complete a task based Internet project. Finally, students also work on case studies related to Business issues. This last component includes writing business correspondence with a contextualised grammar revision.

Prerequisites: FR4924

FR4927 - FRENCH FOR BUSINESS 7A
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *This module is set at B2+ on the Common European Framework of Reference for Languages (CEFR).*
While building on previously acquired reading, speaking, writing and listening skills, the course aims to enhance studentsÆ abillity to engage with and express effectively ideas and concepts through the means of the target language
- by analysing primary sources relating to institutions and policies of the EU and the place and role of France within Europe
- by giving students opportunities to practice their oral and written skills (e.g. video-viewing tasks)
- by encouraging team-work and intercultural understanding via collaborative learning with Erasmus students.

Syllabus: This syllabus is set at B2+ on the Common European Framework of Reference for Languages (CEFR).
The French for Business 7 module provides students with a language rich environment to further their knowledge and increase their confidence.
In the lecture, students are introduced to the main policies and institutions governing the European Union and issues regarding its unity and diversity. In the tutorials, students are taught the techniques necessary to make a detailed presentation on social or economic issues through the use of statistics, graphs and key phrases. In addition, through the study of TV documentaries and news bulletins students explore French and European society and culture from a linguistic and socio-economic point of view. Finally, students study a literary text related to the module title, currently, VoltaireÆs Candide.

Prerequisites: FR4925

FT4305 - FOOD ENGINEERING PRINCIPLES
ECTS Credits: 6

Biological Sciences

Rationale and Purpose of the Module: *To provide students with an understanding of the basic engineering principles underpinning the processing of foods.*
To provide students with a understanding of the basic principles of heat and mass transfer as applied to food engineering.

Syllabus: Heat transfer; Conduction, convection and radiation. Convection: natural and forced. Heat transfer in parallel and in series. Heat transfer co-efficients. Operation of Heat transfer systems. Solving Heat transfer problems. Saturated and Supersaturated Steam tables. Mass transfer: Unit operations, Steady and non steady state operations. Overall and Component Mass Balances. Fluid Transport: Fluid statics and dynamics. Momentum and energy conservation in fluid systems. Flow behaviour: Newtonian and non-Newtonian fluids. Flow in pipes, pressure drop, friction factor. Pumps; Centrifugal and positive pumps. Flowmeters, Venturi meter, Rotameter. Units of measurement. Solving fluid flow problems. Humidity/Psychrometrics: Air moisture content. Dry and wet bulb temperatures. Psychrometric charts. States of water, triple point. Drying curves.

Prerequisites: PH4022

FT4355 - ADVANCED NUTRIENT METABOLISM AND HEALTH
ECTS Credits: 6

Biological Sciences

Rationale and Purpose of the Module: *The purpose of this module is to give students a comprehensive*

understanding of energy metabolism and the metabolic processes involved in nutrient catabolism at a whole body level. This module will critically evaluate selected nutrients and bioactives with a focus on their potential health benefits. It will provide a comprehensive understanding of the aetiology and management of nutrition-related disorders in the clinical setting.

The purpose of this module is to:

Provide advanced concepts in nutrient metabolism including an overview of the metabolic pathways involved in energy metabolism, catabolism and anabolism. The control of metabolic reactions.

Outline the metabolism of selected nutrients. Critical evaluation of the evidence on selected nutrients and bioactives and their potential health benefits.

Explore the use of nutrition for health in the clinical setting. Practical case studies will give students a practical understanding of the importance of nutritional management in a range of clinical conditions.

As part of the overall assessment, and to further student ability to critique scientific research, a detailed literature review on a relevant research area will be conducted. Students will be expected to prepare a detailed report on their research work and to make a presentation on their findings to enhance communication skills.

Syllabus: 1.Overview of energy metabolism for the whole body including carbohydrate, protein and lipid metabolism.
2.Interplay between various metabolic regulatory systems (metabolic and hormonal) and adaption to various metabolic demands (starvation, overfeeding etc.)
3.The importance of physical activity in energy expenditure and the thermic effects of food.
4.Metabolism of selected nutrients and dietary bioactive components in relation to health (including fat- and water-soluble vitamins, essential fatty acids, phytochemicals, prebiotics).
5.Overview of nutritional strategies to manage disease conditions.

Prerequisites: BY4214

FT4375 - FOOD PROCESSING OPERATIONS
ECTS Credits: 6

Biological Sciences

Rationale and Purpose of the Module: *to provide students with a direct link between the theoretical aspects of different food processing operations with the practical aspects of processing of specific consumer foods*

Syllabus: A detailed overview of the major unit operations used to convert raw materials into foods merged with specific practical sessions on dairy processing, such as in the manufacture of cheese and yoghurt. Basic principles of evaporation, spray drying, refrigeration, freeze drying, membrane separation technologies (ultrafiltration, microfiltration, reverse osmosis, electrodialysis), canning, freezing and irradiation. Basic principles of mechanical and phase separations. Microbiological, chemical and physical effects of processing on foods. Practical examples of the application of different unit operations in the manufacture of safe and nutritious consumer foods such as cheese, yoghurt and emulsified food products.

Prerequisites: FT4204

FT4421 - INTRODUCTORY FOOD SCIENCE AND HEALTH
ECTS Credits: 6

Biological Sciences

Rationale and Purpose of the Module: *To provide an introductory course in food science and technology, highlighting the linkages between food and health.*
To highlight factors affecting food quality, safety and nutrition

Syllabus: General overview of Food Science and its relationship to human health.
Brief introduction to basic food components.
Introduction to the scientific principles underpinning food production, preservation and packaging. Control systems to ensure food safety and quality e.g. Hazard Analysis Critical Control Point (HACCP). Impact of food processing technologies on health and nutrition, safety and quality.
Introduction to the chemistry of nutritional and anti-nutritional components relevant to human health e.g. Malliard-browning reactions, protein degradation, lipid oxidation. Food and health issues of consumer concern including bovine spongiform encephalitis (BSE), genetically modified foods, E. coli 0157:H7.

FT4437 - MILK PROTEINS AS FOOD INGREDIENTS
ECTS Credits: 6

Biological Sciences

Rationale and Purpose of the Module: *To provide students with an advanced understanding of the role of milk proteins as food ingredients.*

Syllabus: Milk protein chemistry: caseins, whey proteins, minor constituents. Functional properties of milk proteins: emulsification, foaming, gelation. Significance of milk protein variants to the processing properties of milk, rennet coagulation, cheesemaking, heat stability. Enzymatic hydrolysis of milk proteins: commercial proteinases, hydrolysate characterisation. Milk protein allergenicity: immunoreactive peptide sequences, reduced/hypoallergenic milk protein hydrolysates. Nutraceutical/ bioactive peptides: caseinophosphopeptides, angiotensin converting enzyme inhibitors. Special assignments will involve review and discussion of relevant research papers.

FT4447 - FOOD QUALITY
ECTS Credits: 3

Biological Sciences

Rationale and Purpose of the Module: *To provide a comprehensive course on food quality and safety.*
To develop an understanding of the physical, molecular, and microbiological basis of food quality.

Syllabus: Physical properties of foods. Instrumental methods for measurement of colour, texture, viscosity. Organoleptic procedures. Relationship between instrumental and sensory methods of analysis. Chemical aspects of flavour. Microbiological quality standards. ISO 9002, quality systems. Effects of food packaging technology on food quality during distribution and storage. Human nutrition issues in food quality.

Prerequisites: FT4204, FT4325

FT4457 - RESEARCH TRENDS IN HEALTH AND FOOD
ECTS Credits: 3

Biological Sciences

Rationale and Purpose of the Module: *To develop a high standard of competence in the acquisition and evaluation of scientific research information.*
To enable students develop a critical awareness of emerging research in the field of food science and health.

Syllabus: Using specific examples, students will be trained how to critically evaluate research information. Students will be made aware of the requirements in technical writing and presentation skills. Demonstration of advanced information retrieval using the web of science and other abstracting services. Individual students will be assigned topics on emerging issues in food science and health research. Students will be required to write scientific reports and give presentations on their findings.
Representative areas and specific topics include:
Food quality and safety (acrylamide, dioxins, genetically modified foods, organic foods)
Novel food processing (ultrasonic and high pressure processing)
Diet and health (cardiovascular disease, diabetes, the immune system, cancer, dieting and health)
Food toxicology and allergenicity (novel food ingredients, food protein allergenicity)
Neutraceuticals (Hypotensive peptides, peptides and cognitive function)
Neutrigenomics (Diet and gene interactions)

Prerequisites: FT4335

FT6001 - FOOD SCIENCE AND FOOD SKILLS
ECTS Credits: 6

Biological Sciences

Rationale and Purpose of the Module: *In this module students will develop a detailed knowledge of food science and its application in dietetic practice and food industry. The chemistry, composition, functions and nutritional properties of foods will be explored to enhance understanding of nutrient digestion, absorption and metabolism. Practical classes and workshops will allow the students to gain an understanding of the physical, biochemical and nutritional changes that occur during food preparation, processing and production. Students will apply knowledge of food safety, food production, sensory analysis, food labelling laws, health claims and nutritional analysis in the development of a food product suitable for sale. The translation of science to practice will be inherent in the development of a food label with supporting marketing, appropriate health claims and publicity materials. Field trips will enable students to develop an appreciation of the 'farm to fork' food journey and ensuing nutritional and dietary implications.*

Syllabus: Food systems, food production methods, food database analysis programmes, food marketing, food and nutrition labelling, health claims.
Practical classes will cover cereals, grains and baked goods, fruits and vegetables, the modification of recipes to make them gluten free, low fat, no added sugar and salt, meat, seafood and eggs, dairy and dairy products, cooking in large quantities.
Workshops will cover the preparation of a ready reckoner, costing recipes, sensory analysis, food safety and modifying recipes and food standards codes.

Year 1 Semester 1 Autumn - 2 hours of lectures per week for 12 weeks. Six 3 hour practical's at a commercial teaching kitchen over 12 weeks. Two 3 hour field trips

One field trip will involve an outing to a Farmers market where local produce is being sold. The second field trips will involve a trip to a Food Production and Food Analysis Lab.

GA4011 - CELTIC CIVILISATION: CULTURE, LANGUAGE AND REPRESENTATIONS
ECTS Credits: 6

School of Culture and Communication

Rationale and Purpose of the Module: *To offer an introductory module in Celtic Civilisation for the Autumn Semester encompassing heroic Celtic literature, the history of the Celts and of the Celtic languages, as well as interpretation of the earliest accounts of the Celtic peoples and their customs and beliefs.*

Syllabus: This module will give an overview of the history of Celtic languages, culture and literature, focusing on the following:
•an introduction to theoretical and scholarly debates on the origin of the Celtic speaking peoples
•Celtic prehistory and archaeology; customs and way of life
•critical interpretation of the earliest accounts of Celtic people
•the history and current position of the Celtic languages
•introduction to Early Irish Heroic Tales and representations of the heroic in Early Welsh Literature

---

GA4103 - INTRODUCTION TO IRISH FOLKLORE
ECTS Credits: 6

School of Culture and Communication

Rationale and Purpose of the Module: *To introduce students from various disciplines (e.g. anthropology, comparative religion, ethnology, history, literature, sociology, etc.) to the area of folkloristics and to the study of Irish folklore*

Syllabus: An introduction to Irish folklore with special reference to the following areas: definitions of folklore, folklore collection and classification; verbal arts and minor genres; story-telling and narrative genres; indigenous and international tale-types in Ireland; and traditional custom and belief, including calendar customs

---

GA4105 - IRISH FOLKLORE 1
ECTS Credits: 6

School of Culture and Communication

Rationale and Purpose of the Module: *To introduce students from various disciplines (e.g. anthropology, comparative religion, ethnology, history, literature, sociology, etc.) to the area of folkloristics and to the study of Irish folklore*

Syllabus: An introduction to Irish folklore with special reference to the following areas: definitions of folklore, folklore collection and classification; verbal arts and minor genres; story-telling and narrative genres; indigenous and international tale-types in Ireland; and traditional custom and belief, including calendar customs

Prerequisites: GA4105

GA4113 - CELTIC CIVILISATION 1
ECTS Credits: 6

School of Culture and Communication

Rationale and Purpose of the Module: *To offer an introductory module in Celtic Civilisation for the Autumn Semester encompassing heroic Celtic literature, the history of the Celts and of the Celtic languages, as well as interpretation of the earliest accounts of the Celtic peoples and their customs and beliefs.*

Syllabus: This module will give an overview of the history of Celtic languages, culture and literature, focusing on the following:
an introduction to theoretical and scholarly debates on the origin of the Celtic speaking peoples;
Celtic prehistory and archaeology; customs and way of life;
critical interpretation of the earliest accounts of Celtic people
the history and current position of the Celtic languages;
introduction to Early Irish Heroic Tales and representations of the heroic in Early Welsh Literature.

GA4115 - IRISH LANGUAGE 1
ECTS Credits: 6

School of Culture and Communication

Rationale and Purpose of the Module: *The course aims to provide the student with a strong basic knowledge of Irish. It introduces students to the history of the Irish language and to early Irish literature. The course is designed to:*
Enable the student to understand and use basic structures of Irish grammar.
Expose the student to a range of vocabulary and expressions which will allow her/him to present her/himself to, and communicate with Irish speakers.
To foster autonomous language learning skills.
To develop listening and speaking skills in Irish.
To equip the student with basic writing skills.

Syllabus: Language element: This is an introductory course. Topics covered include: Meeting people, background and place of residence, the family, the house and accommodation, pastimes, daily life and talents and skills. Gaeltacht regions and certain dialect features will be discussed and some of the many Irish-language materials and resources available online will be explored.

Note: The language syllabus of this course has been developed by NUI-Maynooth and follows the guidelines established by the Council of EuropeÆs Common European Framework of Reference for Languages. Those who continue with module GA4116 in the spring semester will gain enough practice with the language to sit the A1 level European Certificate in Irish, known as Teastas Eorpach na Gaeilge. The certificate examination is completely voluntary and is not administered by the University of Limerick, but does give the student an internationally recognized qualification in Irish. Please see course tutor if you would like more details.

Lectures / Léachtaí:
Lectures will cover the history of the Irish language and early Irish literature. Topics include the genetic relationship between Irish and other European languages, particularly other Celtic ones, and trace the development of the language from its primitive ancestor through to Old, Middle, and Early Modern Irish. A survey of early Irish literature will include selected stories from the Mythological, Ulster, and Fenian Cycles with analysis of predominant themes and symbolism.

GE4141 - GERMAN LANGUAGE AND SOCIETY 1: INTRO GERMAN STUD 1
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *This module is set at B1 on the Common European Framework of Reference for Languages (CEFR).*
To introduce students to the academic study of the German language, its historical, social and structural dimensions as well as into language learning strategies and resources. To provide students with an introduction to the German-speaking countries as physical, cultural and political entities with a focus on the first half of the twentieth century. To introduce students to the analysis of literary texts in German. To consolidate linguistic knowledge (written and oral) gained at school.

Syllabus: This syllabus is set at B1 on the Common European Framework of Reference for Languages (CEFR).
Lecture: The German language, its history and relationship with other languages; political geography of the German-speaking countries; sociocultural and historical background to the German-speaking countries of Europe in the 19th and early 20th century.
Tutorials: a) reading of literary texts to provide further access to the period while at the same time introducing reading techniques, principles of textual analysis and text discussion in oral and written form; b) contrastive grammar work: grammatical categories and terminology, English/German translation exercises, grammar in use/communicative grammar.
Language laboratory: exercises in pronunciation, listening comprehension and grammar utilizing CALL facilities.

GE4143 - GERMAN LANGUAGE AND SOCIETY 3: LIVING AND WORKING GER
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *This module is set at B1+ on the Common European Framework of Reference for Languages (CEFR).*
Linguistic and cultural preparation for Co-op or SOCRATES placements in a German-speaking environment.
To explain the German educational system, structures in a German company and in the world of trade and business in general patterns of everyday life
To develop students' skills in the analysis of more complex literary texts in German.
To provide students with the skills to do a presentation in the foreign language
To further consolidate grammatical structures, extend vocabulary and increase accuracy in oral and written German.

Syllabus: This syllabus is set at B1+ on the Common European Framework of Reference for Languages (CEFR).
Lecture: education environment: the educational system, universities and university life, work environment: vocational education, industrial relations, company structures, trade unions; Germany as a multicultural country; intercultural communication theory; the media landscape in Germany.
Tutorials: a) discussion of authentic text material and a literary text to support the lecture; focus on the development of writing skills and cultural awareness; b)

grammar in context.
Language laboratory: CALL exercises; language-related exercises based on German TV programmes dealing with the issues covered in the lecture.

Prerequisites: GE4142

GE4147 - GERMAN LANGUAGE AND SOCIETY 5:GERMANY EUROPE AND BEYON
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *This module is set at B2+ on the Common European Framework of Reference for Languages (CEFR).*
To examine Germany's role in present day Europe and explore the interrelatedness of German social and cultural developments with those of its neighbours.
To develop inter-cultural awareness and communication skills. To continue the study of more complex literary texts in German.
To develop translation skills and enhance students' presentation skills in the foreign language.

Syllabus: This syllabus is set at B2+ on the Common European Framework of Reference for Languages (CEFR).
Lecture: Germany and its neighbours; Germany and the Third World; German economic and cultural activities abroad; national images and their origins; the image of Germany abroad and the German self-image; German/Irish relations.
Tutorials: a) discussion of texts connected with the lecture; contrastive cultural studies including students' presentations in the foreign language; b. grammatical exercises c) graded translation exercises focussing on German/English translations.

Prerequisites: GE4146

GE4211 - GERMAN FOR BEGINNERS 1
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *This module is set at A1 on the Common European Framework of Reference for Languages (CEFR).*
To provide students with an introduction to the German-speaking countries as physical, cultural and political entities.
To give an overview of the major social and cultural developments in the German-speaking countries of Europe in the 19th and early 20th century.
To introduce students to the academic study of the German language, its historical, social and structural dimensions.
To provide communicative skills (listening, speaking, reading, writing) at a basic level in German through the introduction and practice of simple grammatical structures, functions and vocabulary.
To introduce students to autonomous language-learning methods.

Syllabus: This syllabus is set at A1 on the Common European Framework of Reference for Languages (CEFR).
Lecture: The German language, its history and relationship with other languages; political geography of the German speaking countries; sociocultural and historical background to the German-speaking countries of Europe in the 19th and early 20th century

Tutorials: Working with the set textbook, back-up audio-visual and online materials, students are introduced to the concepts of gender, number and case and to the basic structures of the German language. Students are also made aware of approaches to language learning, including developments of autonomous learning skills, exploitation of reference material and dictionaries, etc.
Language Laboratory: Consolidation is provided through ICT and language laboratory work, and students are expected to make full use of all laboratory facilities in their private language study.

GE4213 - GERMAN FOR BEGINNERS 3 (APPLIED LANGUAGES)
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *This module is set at A2+/B1 on the Common European Framework of Reference for Languages (CEFR).*
This module completes students' basic language study. It aims to increase studentsÆ confidence in writing and speaking German and to both promote intercultural awareness and provide linguistic and cultural preparation for study/work in a German-speaking environment.

Syllabus: This syllabus is set at A2+/B1 on the Common European Framework of Reference for Languages (CEFR).
Lecture: education environment: the educational system, universities and university life, work environment: vocational education, industrial relations, company structures, trade unions; Germany as a multicultural country; intercultural communication theory; the media landscape in Germany.

Tutorials: Students complete their grounding in the basic structures and vocabulary of the German language, focusing particularly on grammar and lexis in context. Students are encouraged to consolidate the skills they have acquired in earlier modules, focusing particularly on the development of speaking and writing skills and cultural awareness.
Work is supplemented by short authentic texts on contemporary issues in German-speaking countries. One hour a week is devoted to studying short literary texts, one to prepare students for living and working/studying in a German-speaking environment (application letters, cvs, practice of short interview situations, using the telephone, etc.)

Language Laboratory: CALL exercises; language related exercises based on German TV programmes dealing with the issues covered in the lecture

Prerequisites: GE4212

GE4241 - GERMAN LANGUAGE, CULTURE AND SOCIETY 1
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *This module is set at B1 on the Common European Framework of Reference for Languages (CEFR).*
To provide students with an introduction to German-speaking countries as physical, cultural and political entities; to develop communicative skills by revising and consolidating basic structures and vocabulary; to introduce autonomous language learning methods. Emphasis in modules GE4241 and GE4242 is placed on

establishing a solid foundation in the language; by the end of Year 1, students are expected to use all basic grammatical structures with a high degree of fluency and correctness.

Syllabus: This syllabus is set at B1 on the Common European Framework of Reference for Languages (CEFR).
Lecture: The German language, its history and relationship with other languages; political geography of the German-speaking countries; sociocultural and historical background to the German-speaking countries of Europe in the 19th and early 20th century.
Tutorial work: Grammar/translation: introduction to basic grammatical categories and terminology; consolidation of existing grammatical knowledge and expansion into more complex structures; contrastive work by means of English/German translation exercises; Text analysis & production: principles of textual analysis and text discussion (literary and non-literary); grammar in use/communicative grammar.
Laboratory: 1 hour per week in the CALL/language laboratory will support grammar and oral work.

GE4243 - GERMAN LANGUAGE CULTURE AND SOCIETY 3
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *This module is set at B1+ on the Common European Framework of Reference for Languages (CEFR).*
To promote intercultural awareness and provide linguistic and cultural preparation for study/work in a German-speaking environment. To enable students to acquire the necessary linguistic and cultural skills so that they may communicate effectively in a German-speaking work environment. To continue to provide an insight into socio-economic, cultural and political structures in Germany with a special emphasis on the educational system and employment sector.

Syllabus: This syllabus is set at B1+ on the Common European Framework of Reference for Languages (CEFR).
Lecture: education environment: the educational system, universities and university life, work environment: vocational education, industrial relations, company structures, trade unions; Germany as a multicultural country; intercultural communication theory; the media landscape in Germany.
Tutorial work: one hour textwork consolidates skills relating to textual analysis/production, grammar in use and German-English translation; one hour oral discussion/presentation will also focus on authentic text material (written, video, etc) relating to the lecture series. Literary texts relating to lectures will also be discussed and examined in the oral and written exams; one hour German linguistics continues with past and current developments in the German language.

GE4247 - GERMAN LANGUAGE CULTURE AND SOCIETY 5
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *This module is set at B2+ on the Common European Framework of Reference for Languages (CEFR).*
To examine Germany's role within Europe and beyond and explore points of contact between Ireland and Germany; to continue improvement of text analysis and oral, reading and writing skills, to revise further problem areas in German grammar and increase students' confidence in using more complex grammatical and syntactic structures. To continue the systematic study of translation theory and practice, introducing students to a range of text-types and registers.

Syllabus: This syllabus is set at B2+ on the Common European Framework of Reference for Languages (CEFR).
Lecture: Germany and its neighbours; Germany and the Third World; German economic and cultural activities abroad; national images and their origins; the image of Germany abroad and the German self-image; German/Irish relations.
Tutorial work: Oral presentation & discussion class: drawing on text and audio-visual materials to develop formal oral skills (analysing tone & register; reporting and commentary); Text analysis & production; contemporary literature; Translation theory and practice: scientific, economic and journalistic texts.

GE4621 - GERMAN LITERATURE AND CULTURE 1: INTRODUCTION TO GERMAN LITERATURE
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *To give an overview over the different ways of approaching a literary text, the different genres and text types, defining their characteristics.*
To introduce students to the major periods and movements in the history of German literature focusing on its interrelatedness with other European literatures in conjunction with the general lecture (to be continued in the Spring Semester). To develop students' analytic and interpretative skills.

Syllabus: Lecture: What is literature? How do we interpret a literary text? A brief history of German literature.
Tutorials: a) analysing literary examples from different periods; b) detailed analysis of a longer text in the German language; introduction to the interpretation of literary texts in a foreign language.

GE4623 - GERMAN LITERATURE AND CULTURE 3: ROMANTICISM
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *To give students an insight into German Romanticism as a literary and artistic movement, placing it in a European framework and focusing in particular on its socio-historical background. To examine the legacy of Romanticism in the 19th and 20th centuries.*
To further improve students linguistic skills, in particular those needed for dealing with literary texts.

Syllabus: Lecture: critique of the enlightenment; the preromantics (Sturm und Drang); romanticism in Europe; romanticism in art and literature; political romanticism, particularism and nationalism; Young Germany, Vormõrz, 1848; the legacy of romanticism in the 20th century.
Tutorials: discussion and analysis of selected writers of the romantic era including Novalis, E. T. A. Hoffmann, Eichendorff, de la Motte-FouquÚ, Heine and women writers like Bettina von Arnim, Rahel Varnhagen and Dorothea Schlegel. Study of romantic paintings (C. D.

Friedrich, P. O. Runge), also of German fairy tales as products of Romanticism.

GE4627 - GERMAN LITERATURE AND CULTURE 5: ASPECTS OF 20TH CENTURY LITERATURE
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *To examine aspects of 20th century writing in German through close study of individual texts.*

Syllabus: The works covered in this module may be drawn from the Expressionist Movement, Weimar and exile literature, and post-war writing. Aspects which may be considered include literature and cultural identity, the role of literature in political change, the writer as social critic and women's writing.

GE4921 - GERMAN FOR BUSINESS 1A
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *This module is set at B1 on the Common European Framework of Reference for Languages (CEFR).*
To consolidate existing language skills and to improve general competency in German. To provide an insight into socio-economic and political structures in Germany, Austria and Switzerland and to familiarise students with culture and history of the German-speaking countries. To introduce students to learning strategies and multimedia facilities in language learning.

Syllabus: This syllabus is set at B1 on the Common European Framework of Reference for Languages (CEFR).
Lecture: The German language, its history and relationship with other languages; political geography of the German-speaking countries; sociocultural and historical background to the German-speaking countries of Europe in the 19th and early 20th century.
Tutorials: a) reading of literary texts to provide further access to the period while at the same time introducing reading techniques, principles of textual analysis and text discussion in oral and written form; b) introduction to business in German and project work in Business German
Language laboratory: exercises in pronunciation, listening comprehension and grammar utilizing CALL facilities.

GE4923 - GERMAN FOR BUSINESS 3A
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *This module is set at B1+ on the Common European Framework of Reference for Languages (CEFR).*
To enable students to acquire the necessary linguistic and cultural skills so that they may communicate effectively in a German-speaking work environment. To continue to provide an insight into socio-economic, cultural and political structures in Germany with a special emphasis on the educational system and employment sector. To develop awareness of German companies in Ireland / Irish companies in Germany. To introduce issues in intercultural communication (German/Irish).

Syllabus: This syllabus is set at B1+ on the Common European Framework of Reference for Languages (CEFR).
Lecture: education environment: the educational system, universities and university life, work environment: vocational education, industrial relations, company structures, trade unions; Germany as a multicultural country; intercultural communication theory; the media landscape in Germany.
Tutorial: a) discussion of authentic text material and a literary text to support the lecture; focus on the development of writing skills and cultural awareness; b)

Prerequisites: GE4922

GE4925 - GERMAN FOR BUSINESS 5A
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *This module is set at B2 on the Common European Framework of Reference for Languages (CEFR).*
To provide a general introduction to researching business subject matters in German. To consolidate existing language skills and familiarisation with the language of marketing, economics, human resources, insurance and accounting. To prepare students for Cooperative Education.

Syllabus: This syllabus is set at B2 on the Common European Framework of Reference for Languages (CEFR).
Lecture: Focus on the different specialisations within business studies chosen by the students; introduction to key principles of marketing, economics, human resources, insurance and accounting in German with presentions
Tutorial: a) consolidation of topics discussed in lecture; b) discussion of authentic text material to support the lecture c) strengthening of complex grammatical structures

Prerequisites: GE4924

GE4927 - GERMAN FOR BUSINESS 7A
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *This module is set at B2+ on the Common European Framework of Reference for Languages (CEFR).*
To examine Germany's role in present day Europe and explore the interrelatedness of German social and cultural developments with those of its neighbours.
To develop inter-cultural awareness and communication skills, especially in a business cocontext. To develop translation skills and enhance students' presentation skills in the foreign language. To expand on knowledge and skills acquired during Cooperative Education.

Syllabus: This syllabus is set at B2+ on the Common European Framework of Reference for Languages (CEFR).
Lecture: Germany and its neighbours; Germany and the Third World; German economic and cultural activities abroad; national images and their origins; the image of Germany abroad and the German self-image; German/Irish relations.
Tutorials: a) discussion of texts connected with the lecture; contrastive cultural studies including students'

presentations in the foreign language; b. business text analysis and production, consolidation of language skills in a range of registers c) translation theory and practice, focussing on German/English scientific, economic and journalistic texts.

Prerequisites: GE4925

HI4063 - NASTY, BRUTISH AND SHORT? EARLY MODERN EUROPE, C. 1450-1700
ECTS Credits: 6

History

Rationale and Purpose of the Module: *This module aims to give students a thematic and chronological overview of the history of continental Europe during the sixteenth and seventeenth centuries. It is intended as an introduction into the early modern period, combining various aspects of the discipline expected to appeal to second-year students.*

Syllabus: The waning of the middle ages and the culture of the renaissance; the political geography of early modern Europe - republics, new monarchies and composite polities; Europe in the broader context of the discovery of America and the rise of the Ottoman empire; society: orders, minorities and outsiders; family life - birth, marriage and death; humanism and education; confessionalization in the Holy Roman Empire; Wars of Religion in France and the Netherlands; Philip II and Spanish world hegemony; the Thirty Years' War and the military revolution; congress diplomacy at Westphalia, the Pyrenees, Nijmegen and Utrecht-Rastatt; the witch craze and its critique; the scientific revolution; Dutch economic primacy; gender and women; court society and the world of the minister-favourite; France and Spain in the age of Louis XIV and Carlos II; Austrian expansion into the Hungarian plain; the partition of the Spanish Monarchy in 1713-14.

HI4071 - DOING HISTORY: PAST, PRESENT AND PRACTICE
ECTS Credits: 6

History

Rationale and Purpose of the Module: *The purpose of this module is to introduce history students, at the start of their primary degree programme, to the central significance of sources - whether primary or secondary - to gaining an understanding of history as a discipline and especially how an appreciation of the nature of sources enriches the work of the history student as well as that of the professional historian.*

Syllabus: Historians and their sources; primary and secondary sources; identification, location, accession, critical evaluation and use of sources; public and private archives; origins, ideologies and holdings; using archives: access, availability, procedure and professional practice; the range and scope of electronically available source materials; audio and visual sources; old histories and new histories; forgery, fabrication and the historian; the withdrawal, suppression and destruction of sources; professional practice and political necessity; appropriate citations of primary and secondary sources; presenting a small research project

---

HI4073 - FROM THE PROPHET TO ISIS: THE MIDDLE EAST AND EUROPE, ANCIENT TO MODERN
ECTS Credits: 6

History

Rationale and Purpose of the Module: *The rationale for introducing a new module is to offer students the possibility to choose a new subject not previously taught at UL. The purpose of the module is to provide students with a general overview of the History of the Middle East from the age of the Prophet in the 7th century to the 21st century highlighting historical events and trends that may help them to better understand current socio-political events in the region that impact the wider world.*

Syllabus: Course Content:
This module provides a foundational overview of the history of the Middle East and its relationship with Europe from the emergence of Islam in the 7th century to the contemporary era including the recent struggle against ISIS and the self-proclaimed Caliphate.During the twelve weeks we will explore the emergence of Islam as a religion and the political institutions that were created with its expansion throughout the region and beyond. We will focus on chronology but also on themes, such as the development of science, technology, social life, religion and politics. Moving forward in time, we will discuss the transitional period towards modernity and its meaning, the increasing foreign presence and what this meant for the region and the creation of the modern Middle East following the end of the First World War. The last few classes will explore some of the contemporary events with the purpose to use previous history in order to shed light on current matters.
The topics discussed will include: definition of the Middle East; Muhammad and the Rise of Islam; Institutions of Government and Religion; Culture and Society; Regionalisation vs. Centralisation of political authority; Islam in Europe; The rise of the Gunpowder Empires 1500-2000; The age of Reforms; The First World War in the Middle East and Colonialism; Nationalism and its 'Others'; Independence and Revolution; The Middle East and Europe in the contemporary World.

HI4083 - MAKING IRELAND BRITISH?: EARLY MODERN IRELAND, 1536-1750
ECTS Credits: 6

History

Rationale and Purpose of the Module: *To provide a survey of sixteenth, seventeenth, and early eighteenth-century Irish history.*

Syllabus: The Anglo-Irish and Gaelic lordships; Tudor Reform and Reformation;, the Tudor conquest (1579-1603); British settlement in Ireland; The crisis in the three kingdoms and the 1641 rising; the Catholic Confederates; Cromwellian reconquest and settlement; demographic and social trends in Restoration Ireland; The War of the Three Kings 1685-91; patriotism and the Irish parliament.

HI4103 - IMAGINING IRELAND: FROM EARLY MODERN TO MODERN
ECTS Credits: 6

History

Rationale and Purpose of the Module: *This module centres on how Ireland and Irishness was imagined by people from the early modern to modern periods. The imagining of history is a key trend in popular culture and therefore, students need to be provided with the skills to deconstruct representations of the past and to interrogate their own working assumptions about history. Using a chronological approach examining key events, themes and milestones from the Battle of Kinsale in 1601, to the collapse of the Irish economy in the early*

twenty-first century, it covers political, social, economic and cultural dimensions of Irish history during tumultuous times. However, three large themes will be examined throughout the module - nation and state building; identity formation and the experience of life. Issues to be addressed will include Ireland's transition from a traditional to a modern society, economy and polity, language, gender, religion and how the broader European, Atlantic and global framework influenced the imagined 'nation'. The modules enables students to examine the ways in which the past has been presented, interpreted and re-interpreted in various genres; to uncover the assumptions or agendas behind representations and to reflect critically upon how Ireland has been and is imagined using the critical methods of historical enquiry.

Syllabus: land of saints and scholars?: origins of Ireland's various identities; imagining ascendancy Ireland; Irish culture, religion, and language; the nation depicted by competing interests: political factions, religious groups and commercial organisations; nationalisms and unionism; Images and Irish identity; symbolism and ritual; myths and realities; the state and its motives; religion, gender and identity creation in modern Ireland

---

HI4117 - THE IRISH CONFLICT, 1948 - 98
ECTS Credits: 6

History

Rationale and Purpose of the Module: *To provide students with a comprehensive grasp of the origins and nature of the 'Irish Troubles' from the birth of the Irish Republic to the 'Good Friday Agreement'. The course traces the evolution of the political crisis in both Irish jurisdictions, with reference to the British perspective. Themes will include the Anti-Partition League, Clann Na Poblachta and the United Nations; Saor Uladh, Sinn Fein and the IRA during the 'Border Campaign'; Unionism and Loyalism, Cathal Goulding and the move to the Left; special powers and civil rights; Official and Provisional IRA; 'Bloody Sunday' at home and abroad; counter-insurgency in the two jurisdictions; Long Kesh, Portlaoise and Wakefield; Ulster Defence Association, Ulster Volunteer Force, Red Hand Commando and Ulster Resistance; Saor Eire, Irish National Liberation Army, Irish Republican Socialist Party and Irish People's Liberation Organization; The Hunger Strikes, 'Ulsterization' and the 'Long War'; Section 31, propaganda and 'D notices'; Foreign Affairs, the White House and United Nations; Abstentionism, rise of Sinn Féin and the origins of the Peace Process*

Syllabus: The course is divided into seminars which address key concepts, events and dynamics of the period. The student will learn to assess the role of such organizations as the Anti-Partition League, Saor Uladh and Sinn Fein in relation to the partition issue. Other themes of the module include Unionism and Loyalism, special powers and civil rights, Official and Provisional IRA, 'Bloody Sunday', counterinsurgency, Long Kesh and paramilitary imprisonment, Hunger Strikes, 'Ulsterization' and 'The Long War', Section 31, and the origins of the Peace Process.

HI4127 - UNDERSTANDING THE HOLOCAUST IN 20TH CENTURY EUROPE
ECTS Credits: 6

History

Rationale and Purpose of the Module: *The aim of this module is to examine significant political, social and cultural aspects of modern life in Europe. This module will, therefore, probe some of the key social and cultural transformations of the nineteenth and twentieth centuries, and discuss the key political issues and events that have defined that period.*

Syllabus: Introduction to the course: war, revolution, restoration 1848-1924; European societies at war; revolutionary situations/regime change; restoration of order; democracy/dictatorship and war 1924-44; American money and reconstruction; decadent decade? jazz, cocaine and sex; depression and sobriety; political mobilisation and violence; authority restored; conservatism/fascism/Stalinism; the twenty-year crisis: international relations; the Nazi new order and total war; Holocaust; reconstruction/Cold War 1944-74; 1945: Europe's 'zero hour' re-establishing order: Europe's political divisions; recovery, growth, and limits: the European economy; seducing Europeans: mobility, consumerism, and culture; the 'second sex'; feminism and post-feminism; turning tides: youth, political protest and cultural revolt; the post-post war society and state (1970s-90); rebuilding the European house: Thatcher and Gorbachev; Which Europe? race, ethnicity, and memory; after the Wall: the return of 'Europe' and Union.

HI4152 - FROM KINGDOM TO REPUBLIC: IRISH HISTORY, 1660-1960
ECTS Credits: 6

History

Rationale and Purpose of the Module: *This general history module will provide those with little or no prior experience of history with an overview of Irish society and politics from c.1660 to 1960. It is ideal for the general arts student, the international student and those who wish to have a general introduction to Irish history. This is to be offered to students of the new BA Arts.*

Syllabus: Defining Ireland; economy, society and class; women and politics; the Three Kingdoms; the Boyne and the emergence of a protestant ascendancy; agrarian society in pre famine Ireland; the Famine: dealing with the catastrophe; patriots, nationalists, republicans, unionists, and others: politics and its followers; origins of independence; constitutional developments and the two states of Ireland; economic development; population and social change; education and language; the evolution of popular culture; the Irish diaspora.

Please note that this module is Pass/Fail.

HS4003 - OCCUPATIONAL HYGIENE 1
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: *To familiarise the student with a broad range of occupational hygiene issues currently pertinent to the workplace environment.*

To further develop the students' awareness of the occupational hygiene approach to hazard recognition, evaluation, monitoring and control in respect of selected chemical and physical hazards.

To enhance the students skills in the use of appropriate measuring equipment and evaluation of findings in the context of occupational exposures.

Syllabus: [Hazards]: recognition, measurement & evaluation control;
[Survey design]: personal monitoring, area monitoring,

surface monitoring
[Chemical hazards]: Atmospheric Dust & fumes, active/inert, total/respirable fraction, occupational exposure levels, time-weighted average of exposure, analytical techniques. Gases/Vapours, active versus passive sampling, sampling techniques, direct reading instruments, units of concentration, control of airborne contaminants, ventilation, dilution ventilation, number of air changes, local exhaust ventilation, collection devices, ducting, fans, capture velocity, transport velocity. Safety technologies and personal protective equipment.
[Physical hazards]: Noise, sound, sound frequency, wavelength, sound power, sound pressure, intensity, sound levels in practice, sound weighting, statistical noise levels, LAeq, LAepd, sound measurement techniques, sound radiation, Noise control, absorption, reduction, enclosures, noise barriers, hearing protection, audiometry. Safety technologies and personal protective equipment.
[Relevant Legislation and Codes of Practice]

IN4003 - PRINCIPLES OF RISK MANAGEMENT
ECTS Credits: 6

Accounting & Finance

Rationale and Purpose of the Module: *To introduce the students to concepts and principles relating to the management of risk in both the public and private sector. The student will be expected to understand basic mathematical and financial models in dealing with risk theory as well as understanding the basics of the central theories on risk.*

Syllabus: Concepts of risk, pure and speculative risk; actuarial mathematics and elementary risk theory; perceptions of risk; risk in the economic and legal environment; models of risk management; risk management as a decision making process, identification, analysis, evaluation, control, financing of risk; risk management in an organisation and in the public sector; formulation and implementation of risk management strategies; quality and risk management.

IN4005 - RISK ANALYSIS
ECTS Credits: 6

Accounting & Finance

Rationale and Purpose of the Module: *1. To develop in the student an understanding of and insight into risk analysis.*
2. To examine the nature of the interface between the corporate risk management function and the insurance sectors servicing response.
3. To introduce students to the theory and practice of risk analysis and to acquaint students with the complex and rapidly changing environment within which risk managers operate.

Syllabus: 1. Analysis of overall corporate risk
- concept of enterprise risk management
- categories of risk and control strategies

2. Statistical concepts and probability
3. Types and costs of risk
4. Managing risk
5. Decision making under conditions of total uncertainty
   - minimax ; maximax criteria
   - minimal regret criterion

   Using measures of probability
   - determining threshold probability factors
   - economic value of information.

6. Bayesian decision analysis
   - prior probabilities
   - insurance applications
7. Design of retention programmes
   - types of retention/accounting treatment
   - overview of process
   - determination of ruin probabilities
8. Portfolio management
   - portfolio co-variance factors solvency strategies
9. Alternative risk transfer
10. Risk control
    - use of NPV as decision tool
    - stochastic interest rate theory
11. Risk analysis
    - Intellectual Capital
    - types of intellectual capital
    - risk management options
12. Analysis of the occupational noise risk
13. Analysis of the ionising radiation risk
14. Analysis of the pandemic

IN4007 - GOVERNANCE AND RISK
ECTS Credits: 6

Accounting & Finance

Rationale and Purpose of the Module: *To develop in the student an understanding of and insight into the concepts of goverance and risk 2. To examine the nature of the interface between governance structures and risk management practices.*

Syllabus: The students will gain a general understanding of risk and governance and produce an some in-depth analysis of specific examples. The content will address risk and governance from a number of disciplinary perspectives including accounting, regulation and legal.

IN4015 - RISK AND INSURANCE
ECTS Credits: 6

Accounting & Finance

Rationale and Purpose of the Module: *To meet the needs of the risk management and insurance industry by providing students with a strong understanding of how the insurance industry operates. Students will also learn the important principles underlying risk management. The interest in, and study of, risk has grown significantly due to improvements in the technology used to assess and measure risk and the development of innovations in the insurance and capital markets that control risk. Insurance is one of the main mechanisms used to control risk, through the transfer of that risk to a third party, usually an insurance company. The insurance company in turn is exposed to a variety of risks and can transfer some of these through reinsurance whilst other risks can be controlled using alternative markets. This module will introduce students to the role of insurance within the health market. Furthermore, this module seeks to raise awareness of global issues such as public health, natural disasters, terrorism etc. and the mitigating role of risk management and insurance.*

Syllabus: The module details the historical development of insurance industry and more generally the discipline of risk management. The theoretical framework used by insurance companies to internalise risk and attribute a price to that risk are discussed in detail. The module details the development and implementation of a risk management strategy by both private corporations as well as public sector bodies.

IN4427 - INSURANCE ORGANISATIONS AND MARKETS
ECTS Credits: 6

Accounting & Finance

Rationale and Purpose of the Module: *1. To develop in the student an understanding of and insight into the management of an insurance organisation in the current economic and legal environment.*
2. To examine the nature of the interface between insurance organisations and regulators.
3. To introduce students to the theory and practice of insurance institutions and to acquaint students with the complex and rapidly changing environment within which insurers operate. Stress will be given to the achievement of appreciation of recent developments in the field.

Syllabus: Develop in the student an understanding of and insight into the management of insurance organisations in the current, social, economic and legal environment. Examine the nature of the interface between insurance organisations and regulators. Introduce students to the theory and practice of insurance institutions and to acquaint students with the complex and rapidly changing environment within which insurers operate. Stress will be given to the achievement of appreciation of recent developments in the field.

Prerequisites: IN4003

IN4735 - INSURANCE ORGANISATIONS
ECTS Credits: 6

Accounting & Finance

Rationale and Purpose of the Module: *1. To develop in the student an understanding of and insight into the management of an insurance organisation in the current economic and legal environment.*
2. To examine the nature of the interface between insurance organisations and regulators.
3. To introduce students to the theory and practice of insurance institutions and to acquaint students with the complex and rapidly changing environment within which insurers operate. Stress will be given to the achievement of appreciation of recent developments in the field.

Syllabus: The students will gain a general understanding of insurance organisations and markets and produce some in-depth analysis

---

JA4111 - JAPANESE LANGUAGE, CULTURE AND SOCIETY 1 (ADVANCED)
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *To develop communicative skills by revising and consolidating basic structures and vocabulary; to introduce autonomous language learning methods. Emphasis is placed on establishing a solid foundation in the language; by the end of Year 1, students are expected to use all basic grammatical structures with a high degree of fluency and correctness.*

Syllabus: Lecture: Japanese culture and society in the early 21st century. This lecture will be shared with the ab initio stream.
Tutorial work: Grammar: introduction to basic grammatical categories and terminology; consolidation of existing grammatical knowledge and expansion into more complex structures; Text analysis & production: principles of textual analysis and text discussion (literary and non-literary); grammar in use/communicative grammar.
Autonomous project work on aspects of Japanese culture and society using authentic materials.

JA4211 - JAPANESE LANGUAGE, CULTURE AND SOCIETY 1
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *This module is set at A1 on the Common European Framework of Reference for Languages (CEFR).*
To provide a firm grounding in understanding, speaking, reading and writing basic Japanese, and aspects of Japanese culture and society, as well as to begin to develop life-long language learning strategies with learners.

Syllabus: This syllabus is set at A1 on the Common European Framework of Reference for Languages (CEFR).
Listening practice leading to the recognition of numbers, times, days, dates, locations, greetings and questions. Conversation practice based on grammar structures and vocabulary necessary to use greetings, introduce oneself politely, ask basic questions, explain schedules, and talk about pastimes. Reading practice progressing from the understanding of notices and posters to descriptions of peopleÆs everyday lives. Writing practice introducing the hiragana and katakana writing systems and 80 kanji progressing to being able to write passages involving self-introduction, daily routines, hobbies, and shopping. Reading and discussion in English about Japanese customs, culture and society.

JA4213 - JAPANESE LANGUAGE, CULTURE AND SOCIETY 3
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *This module is set at A2+ on the Common European Framework of Reference for Languages(CEFR).*
To consolidate further students' ability to understand, speak, read and write Japanese and to further their understanding of Japanese culture and society, particularly relating to the world of work.

Syllabus: This syllabus is set at A2+ on the Common European Framework of Reference for Languages (CEFR).
Understanding of instructions, needs and wants, descriptions of events in order. Speaking exercises explaining actions in sequence, telling stories, making requests and asking permission. Reading more demanding and authentic passages about Japanese life and society. Written exercises concentrating on descriptions and narratives; also memos, letters and notes. Study of a further 170 kanji to bring the total up to 250 characters. Discussion of modern Japanese culture, literature and films.

Prerequisites: JA4212

JA4247 - JAPANESE LANGUAGE, CULTURE AND SOCIETY 5
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *This module is set at B2 on the Common European Framework of Reference for Languages (CEFR).*
This module consolidates and extends students' abilities in listening and reading comprehension, spoken and written intermediate level Japanese. It also introduces translation from Japanese to English of a variety of literary and other contemporary texts.

Syllabus: This syllabus is set at B2 on the Common European Framework of Reference for Languages (CEFR).
Listening practice consolidating functions and vocabulary studied up to now; authentic listening from a variety of sources. Speaking practice involving further use of polite language; presentations about work experience and current affairs; spoken summaries of broadcast and reading material at various levels. Reading of authentic or near-authentic passages at intermediate level. Translation of a variety passages into English. Writing practice involving summaries, descriptions, and letters of various levels of formality. Study of a further 170 kanji, to bring the total to 550 characters. Introduction of authentic material by modern Japanese authors.

Prerequisites: JA4246

JA4627 - JAPANESE LITERATURE: POETRY, DRAMA, PROSE
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *To survey the development of characteristically Japanese literary genres - tanka, haiku, kabuki, bunraku - examine their modern manifestations, to enable students to apply critical skills to the study of current Japanese texts; to develop students' skills in communicating in oral and written Japanese.*

Syllabus: The module allows students to improve their ability to speak and write Japanese by analyzing developments in Japanese literature and culture through a close reading and analysis of a range of representative texts. The module will further develop students' written skills through translation and / or essay writing as well as developing spoken skills through in-class discussion.

JA4911 - JAPANESE FOR BUSINESS 1
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *This module is set at A1 on the Common European Framework of Reference for Languages (CEFR).*
To provide a firm grounding in understanding, speaking, reading and writing basic Japanese, and aspects of Japanese culture and society, as well as to begin to develop life-long language learning strategies with learners.

Syllabus: This syllabus is set at A1 on the Common European Framework of Reference for Languages (CEFR).
Listening practice leading to the recognition of numbers, times, days, dates, locations, greetings and questions. Conversation practice based on grammar structures and vocabulary necessary to use greetings, introduce oneself politely, ask basic questions, explain schedules, and talk about pastimes. Reading practice progressing from the understanding of notices and posters to descriptions of peoples everyday lives. Writing practice introducing the hiragana and katakana writing systems and 80 kanji progressing to being able to write passages involving self-introduction, daily routines, hobbies, and shopping. Reading and discussion in English about Japanese customs, culture and society.

JA4913 - JAPANESE FOR BUSINESS 3
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *This module is set at A2+ on the Common European Framework of Reference for Languages (CEFR).*
To consolidate further students' abilty to understand, speak, read and write Japanese and to further their understanding of Japanese culture and society, particularly relating to the world of work.

Syllabus: This syllabus is set at A2+ on the Common European Framework of Reference for Languages (CEFR).
Understanding of instructions, needs and wants, descriptions of events in order. Speaking exercises explaining actions in sequence, telling stories, making requests and asking permission. Reading more demanding and authentic passages about Japanese life and society. Written exercises concentrating on descriptions and narratives; also memos, letters and notes. Study of a further 170 kanji to bring the total up to 250 characters. Discussion of modern Japanese culture, literature and films.

Prerequisites: JA4912

JA4915 - JAPANESE FOR BUSINESS 5
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *This module is set at B1 on the Common European Framework of Reference for Languages (CEFR).*
To consolidate students' abilities to comprehend, read, speak and write Japanese developed up to now and to develop further their ability to deal with material relating to Japanese culture and business particularly in the world of work.

Syllabus: This syllabus is set at B1 on the Common European Framework of Reference for Languages (CEFR).
Listening comprehension, particularly authentic news broadcasts about business topics; readings about contemporary Japanese life and business; spoken exercises, particularly short presentations and workplace-related conversations; writing of short reports and summaries as well as students' own opinions on everyday topics.

Prerequisites: JA4914

JA4917 - JAPANESE FOR BUSINESS 7
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *This module is set at B2 on the Common European Framework of Reference for Languages (CEFR).*
This module consolidates and extends students' abilities in listening and reading comprehension, spoken and written intermediate level Japanese. It also introduces translation from Japanese to English of a variety of literary and other contemporary texts.

Syllabus: This syllabus is set at B2 on the Common European Framework of Reference for Languages (CEFR).Listening practice consolidating functions and vocabulary studied up to now; authentic listening from a variety of sources. Speaking practice involving further use of polite language; presentations about work experience and current affairs; spoken summaries of broadcast and reading material at various levels. Reading of authentic or near-authentic passages at intermediate level. Translation of a variety passages into English. Writing practice involving summaries, descriptions, and letters of various levels of formality. Study of a further 170 kanji, to bring the total to 550 characters. Introduction of authentic material by modern Japanese authors.

Prerequisites: JA4915

JM4003 - INTERVIEWING AND REPORTING
ECTS Credits: 6

School of Culture and Communication

Rationale and Purpose of the Module: *Interviewing and reporting aims to develop studentsÆ skills at researching and carrying out interviewing face to face and by telephone, and covering a patch as for a local newspaper.*

Syllabus: Students will study interviewing in depth, learning how to select interview subjects, research topics and prepare for the interview. They will carry out a face-to-face interview with a newsmaker in class, reflect on that interview and the ones by fellow classmates, and write up both their own and classmatesÆ interviews as news stories. They will research and carry out a telephone interview. During the second half of the semester students will be assigned to a local patch, from which they will, with the guidance of the tutor, produce a portfolio including a report on the area, off diary and on diary stories and short features, with suitable pictures. This material must be designed into pages for a dummy local paper. Classes throughout the semester will include revision on news writing as the students develop and polish their stories. Assessment will be by coursework: production of a portfolio of interviews and a folder of work from the studentÆs patch, and a timed exam on news writing and editing.

JM4007 - ADVANCED PRACTICAL JOURNALISM
ECTS Credits: 6

School of Culture and Communication

Rationale and Purpose of the Module: *To give students live reporting practice in a variety of areas to prepare them for the professional world. This module aims to bring students to a professional standard in reporting which would enable them to obtain paid work on a local paper or a B2B magazine.*

Syllabus: Students will report news events to a deadline from courts, council meetings, other public events and news conferences. They will have practice in reporting from statistics, finding off-diary stories, and generating stories from internet research followed by telephone interviews. They will practise covering breaking stories and constructing news stories from multiple sources (wraps). Students will be helped to create a professional portfolio of their work on the course, on student publications and on their work placements which they can use to obtain paid jobs. Assessment will be by a portfolio of coursework and a timed news writing and editing examination.

JM4008 - INVESTIGATIVE JOURNALISM
ECTS Credits: 6

School of Culture and Communication

Rationale and Purpose of the Module: *The Investigative Journalism module aims to give students an insight into how to conceive, research and write a piece of investigative journalism to professional standards.*

Syllabus: Students will originate an idea, and under the guidance of the tutor will develop it, research it using printed sources and the internet, compile a list of interview subjects and carry out at least two face to face interviews. The research will end in a 2,000 word investigative news feature, with background fact boxes and other material if relevant. The feature must be aimed at a specific newspaper or magazine, and designed into a spread or spreads appropriate to the style of that publication. A research journal of at minimum of 1,500 words will set out the way the research was carried out, what difficulties were encountered, and will include contacts of the interviewees for checking. Assessment will be by the individual studentÆs contributions to the final project.

JM4011 - Introduction to Journalism
ECTS Credits: 6

School of Culture and Communication

Rationale and Purpose of the Module: *Introduction to Journalism has aims to introduce students to the broad range of writing in journalism alongside a grounding on core issues of Journalism theory and practice*

The module will introduce a broad range of writing skills from newspapers to magazines of all types, both print and online. It aims to teach students to write short news stories for a variety of publications, including local and national newspapers and websites.

Syllabus: Students will learn the core theories of journalism structures and practice, this will inform students both of existing and changes in structures and practice in the ever changing field. This will include an introduction to journalistic ethics.

In the practical labs students will learn the principles of news reporting, including grammar and working to a style book. They will learn by comparing reports in national and local newspapers and magazines. They will have extensive practice in creating news stories. They will learn to report from speakers, radio and TV programmes and documents and will practise writing intros and structuring a news story both for print and the internet. They will learn about newsroom practices and journalistic routines. They will consider the work of leading news and feature writers and their distinct styles. They will write short profiles of people in the news. Assessment will be by the production of a portfolio of

work completed during the course, and a final timed examination.

JM4017 - JOURNALISM TEAM PROJECT
ECTS Credits: 6

School of Culture and Communication

Rationale and Purpose of the Module: *The Team Project aims to polish studentsÆ reporting, writing and designing skills to a professional level. It will enhance their ability to work in a team and to meet deadlines.*

Syllabus: Students will produce a dummy one-off magazine and/or local newspaper (print or internet-based) on a subject of their choice. They will develop the concept to ôpublicationö producing a reader profile and a business case. Students will write news and original features and other material, source pictures, design pages and edit accurately. The final submission will include a statement from each student about what s/he wrote, details of his or her role in the production, and contacts for the sources for the written pieces. Assessment will be by the individual studentÆs contributions to the final project.

JM4037 - INDIVIDUAL JOURNALISM PROJECT AND PORTFOLIO 1
ECTS Credits: 6

School of Culture and Communication

Rationale and Purpose of the Module: *The individual project aims to help students in-depth reporting, comma writing and design skills through work on a subject of their own choice. It aims to help them project an extended piece of journalism with appropriate research.*

Syllabus: Students will choose and research a subject of their choice using all available resources and personal interviewing. They will be guided by a supervisor to ensure their research will be adequate to produce a 4,500 word extended journalistic product, either as one piece, or a group of related pieces. Students will also be required to produce a 30-minute radio documentary OR a 10-minute television documentary OR a multimedia project on this or a related topic, or a series of shorter packages. A target publication and broadcast outlet must be identified. The final work will be designed for print / web / edited for broadcast as appropriate and presented as part of a portfolio of publications produced while a BA student. Students should conduct a series of interviews as appropriate and follow ethical guidelines and use on-the-record sources.

JM5011 - JOURNALISTIC WRITING FOR NEWS
ECTS Credits: 9

School of Culture and Communication

Rationale and Purpose of the Module: *Journalistic Writing News aims to equip students to tackle a broad range of news stories, including stories from interviews, documents, radio and television and lectures and speeches. It will introduce students to different styles of writing for different media.*

Syllabus: Students will learn the principles of news reporting, including grammar and working to a style book. They will learn by comparing reports in national and local newspapers and magazines. They will have extensive practice in creating news stories. They will learn to report from different sources and will practise writing intros and structuring a news story both for print and the internet. They will learn about interviewing, and will practice interviewing both in class and on their own. They will learn about newsroom practices, journalistic routines writing to deadlines.
Assessment will be by the production of a portfolio of work completed during the course, and a final timed examination.

JM5051 - PROFESSIONAL SKILLS FOR JOURNALISM AND TEAM PROJECT
ECTS Credits: 9

School of Culture and Communication

Rationale and Purpose of the Module: *Professional Skills for Journalism aims to introduce students to the range of skills needed for editing and headline writing for print and internet and designing and creating for print and internet.*

The Team Project aims to polish students reporting, writing and designing skills to a professional level. It will enhance their ability to work in a team and to meet deadlines.

Syllabus: Students will learn the principles of professional editing, headline and standfirst writing and cutting to length. They will be introduced to the basic principles of illustrating news including taking photographs and generating graphics. They will learn print and website design and will create their own websites.
Students will produce a local newspaper or magazine (print or internet-based) for the Team Project. They will write news, features, analysis and editorials; source pictures, design pages and edit accurately.
Assessment will be on work produced during the course, a final timed examination (6 credits) and on each individual students contribution to the team project.

JM5061 - INTRODUCTION TO BROADCAST JOURNALISM
ECTS Credits: 3

School of Culture and Communication

Rationale and Purpose of the Module: *This module is being created to introduce broadcast journalism to the Graduate Diploma/MA in Journalism programme in Semester 1 in light of feedback from media professionals, and to improve the current and future employment prospects of the students. The purpose of the module is to give students an historical perspective on radio and to develop their professional practice skills in broadcasting*

Syllabus: The module examines the current organisational structures of radio in Ireland and it analyses the changes that have come about in broadcast journalism. The impact of broadcast journalism on democracy is also examined.
The module examines radio research techniques, interviewing for audio and scriptwriting. Practical classes focus on the development of professional journalism practice skills for audio-based outputs and web casting. These classes are held in the radio studio and in a dedicated newsroom. Writing and presentation skills for radio, telephone recording procedures and editing of audio and visual reportage are examined

---

LA4001 - LEGAL SYSTEM AND METHOD
ECTS Credits: 6

Law

Rationale and Purpose of the Module: *To introduce the discipline of law through an examination of the functioning of the legal system, sources of law and legal methodology.*

Syllabus: The concept of law, common law, civil law in Europe. Classification of law: municipal, international, substantive, procedural, public, and private. The administration of justice in Ireland. Sources of law: common law, legislation, the Constitution, European law. Elements of the Constitution of Ireland. Legal reasoning and methodology.

LA4005 - LEGAL ENVIRONMENT OF BUSINESS
ECTS Credits: 6

Law

Rationale and Purpose of the Module: *To provide students with a knowledge of the legal environment in which business operates and of the legal principles central to commercial life.*

Syllabus: The concept of law. Legal systems: common law systems; the civil law systems; the European Union legal system. Sources of Law; precedent; legislation; the 1937 Constitution, the European Treaties. The administration of justice in Ireland, courts and quasi-judicial tribunals; legal and equitable remedies. The role of law in the business environment, its function and methods, legal philosophy in business law. Core elements of private law. Contractual transactions: formation; formalities; capacity; contractual terms and obligations; standard form contracts; statutory regulation; discharge. Civil liability: negligence; statutory duties and remedies; economic torts: inducement to breach of contract; conspiracy; passing off; deceit and injurious falsehood.

LA4013 - MEDIA LAW
ECTS Credits: 6

Law

Rationale and Purpose of the Module: *This course aims to make students fully aware of the legal framework and constraints within which the media operates, and to enable then to cover courts and other stories with legal implications effectively and with confidence. It also aims to make students fully aware of the major ethical issues that concern journalists. Students will be able to form judgments about ethical dilemmas and articulate a response to them.*

Syllabus: The structure of the legal system, with specific relevance to the law as it affects journalists, including defamation, malicious falsehood, criminal libel, blasphemy, contempt of court, reporting restrictions, breach of confidence and copyright. The course will introduce students to major sources (individuals, institutions, campaigning bodies, government bodies, journalists, journals) on media law issues. Students will analyze complex legal issues and be able to apply them to specific legal dilemmas. The course will cover recent developments in the laws on privacy and in particular European human rights legislation. Students will be introduced to the ethical framework surrounding journalism, including the various codes of conduct, and touching on laws such as those of privacy. They will discuss issues of public interest and its bearing on private lives, and the importance of truth, fairness and objectivity. There will be discussions on reporting suicide, mental health issues, questions of taste and decency, and the use of subterfuge to obtain stories, and the questions of sleaze and sensationalism. Representation of women and minorities in the press will be covered, as will the impact of competition, ownership and advertising on journalism. Assessment will be by examination and coursework essay.

LA4021 - CHILD LAW
ECTS Credits: 6

Law

Rationale and Purpose of the Module: *The desire to protect children from harm and to recognise their rights as autonomous individuals is an increasingly accepted goal in legal scholarship. The aim of this module is to consider the rights of children and how they may be advanced by the legal system. This involves gaining an understanding of the protection of children's rights both at domestic and international levels, as well as considering specific aspects of the law which impact upon children's lives.*

Syllabus: This module covers: children's rights in the Irish Constitution, the European Convention on Human Rights and the United Nations Convention on the Rights of the Child; child participation and representation in legal proceedings; child protection and children in care; youth justice; garda vetting procedures and mandatory reporting of child abuse; bullying; child abduction; adoption and; education.

LA4022 - COMMERCIAL LAW
ECTS Credits: 6

Law

Rationale and Purpose of the Module: *To familiarise the student with the legal background of commercial transactions.*

Syllabus: Contracts for the sale of goods, consumer protection, reservation of title clauses, hire purchase and leasing. Commercial contracts of agency, bailment, carriage of goods by land, sea and air. Financial services law, negotiable instruments, cheques, electronic transfer of funds, free movement of capital within Europe, European banking regulation. Intellectual property rights, trademarks, copyright and patents, creation, protection, endurance and profit. Regulation of competition policy, national and European, comparative view of US anti trust legislation, enforcement mechanisms, the relationship between intellectual property rights and competition abuses. Remedies at Law and Equity, alternative mechanisms for dispute resolution, arbitration, private courts, negotiation. Bankruptcy, personal versus corporate, historical evolution, philosophical basis, Bankruptcy Act 1988, comparative views from the U.S.

LA4033 - LAW OF THE EUROPEAN UNION 1
ECTS Credits: 6

Law

Rationale and Purpose of the Module: *The aim of the module is to equip the student with an understanding and knowledge of the basic principles and rules of the European Union, including: the origins and character of European Union law, beginning with the three original Community Treaties, developments from the 1960s up to the Lisbon Treaty. Each of the Institutions will be examined: Parliament, Commission, Council, European Council, Court of Auditors, European Central Bank and the Court system. Sources of law-Primary (Treaties), Secondary (Regulations, Directives etc), Case law of the Court of Justice of the European Union. Enforcement of EU law-Infringement proceedings (Article 258), proceedings for failure to act (Article 265), proceedings for failure to fulfil an obligation (Article 259); Preliminary references-Article 267; Legislative process-role of the institutions, Relationship between EU Law and national law-Supremacy and Direct Effect; Development of Human rights and the effect of EC/EU membership on Ireland.*

Syllabus: The module covers, in the first instance, the history of the European Communities and the various Treaty amendments up to the Treaty of Lisbon. The module proceeds to consider the role, function and legislation powers of the Commission, Parliament and Council. The module will also examine the European Council, the Court of Auditors and the European Central Bank. The Court system and the types of actions heard by the Court of Justice, the General Court and the Civil Service Tribunal will also be covered. The new legislative procedures, the ordinary legislative procedure and the special legislative procedure as introduced by Lisbon will be examined. The development of human rights and the principles of direct effect and supremacy will be considered. Finally, the evolution and impact of membership of the EC and EU on Ireland will be examined.

LA4056 - HOUSING LAW AND POLICY
ECTS Credits: 6

Law

Rationale and Purpose of the Module: *The aim of this module is to provide students with an understanding of the legal and policy issues surrounding housing law - an area of law that is attracting increasing attention and controversy at both a national and international level. In addition to affording students a broad understanding of the various sources of housing law in Ireland, the module will consider the policy implications of housing and homelessness. The module seeks to introduce students to key areas of legal study including social housing and the Housing Acts, landlord and tenant law and the Residential Tenancies Acts.*

As well as meeting the needs of our undergraduate students, the introduction of a module focused on Housing Law and Policy responds to a clear educational need as identified by those in the Community Education & Volunteer sector (initially the Community Law and Mediation Group, see http://www.communitylawandmediation.ie/). Collaborating with partners such as CLM and meeting their educational needs (by also delivering the module online, see below), enables UL to support its local and regional communities. Such engagement moreover supports the University of Limerick in achieving its Strategic Goals as identified in Broadening Horizons, particularly those in Theme 1.2 "Support our local and regional communities".

The module will be offered on both the daytime and evening scheduled periods. However, the application form will not allow for both.

Syllabus: This module covers: an introduction to the historical, cultural and legal foundations of Irish housing law; the right to housing under Irish and international human rights law; social housing and the Housing Acts; property law including mortgage law; landlord and tenant law; Residential Tenancies Acts; housing liability; social policy considerations of housing law; homelessness.

LA4068 - CRIME AND CRIMINAL JUSTICE
ECTS Credits: 6

Law

Rationale and Purpose of the Module: *The Crime and Criminal Justice module aims to critically evaluate the institutions and operation of the criminal Irish justice system in comparative perspective. The module aims to introduce students to the main approaches and theories in the field of crime and criminal justice studies, and the mechanisms by which the criminal justice system responds to the incidence of crime. The module also examines the influence of the media influence on public attitudes towards crime, criminal justice processes and sentencing, criminal justice policy making, reform and anti-crime initiatives.*

Syllabus: Historical development of the criminal justice system. Models of criminal justice: due process versus crime control. Criminal justice values and policies. Human rights and the criminal justice system. The making of criminal justice policy: the Department of Justice, Equality and Law Reform; the National Crime Council; the Law Reform Commission; the role of Non-governmental Bodies. The influence of European institutions on the Irish criminal justice process. Influence of the media on the criminal justice process and policy implementation. Diversion from the criminal justice system including Garda cautions and prosecutorial discretion. Alternative processes in the criminal justice system: restorative justice; the Drugs Court. The juvenile justice system. Penal policy and rationales for sentencing. Sentence management and the treatment of offenders; conditions of imprisonment; scrutiny of the prison system including judicial review and visiting committees; the Inspector of Prisons and Place of Detention. The adoption of civil mechanisms in the criminal justice system: seizure of criminal assets and other proceeds of crime; anti-social behaviour orders.

LA4073 - INTRODUCTION TO CRIMINAL JUSTICE
ECTS Credits: 6

Law

Rationale and Purpose of the Module: *The module aims to introduce students to the main approaches and theories in the field of crime and criminal justice studies, and the mechanisms by which the criminal justice system responds to the incidence of crime. It is a study of major components of criminal justice in Ireland, which include concepts of law and crime, the criminal justice process, and overview of criminal justice agencies, current criminal justice issues, interactions and conflicts between criminal justice agencies. The module also examines the influence of the media influence on public attitudes towards crime, criminal justice processes and sentencing, criminal justice policy making, reform and anti-crime initiatives.*

Syllabus: Historical development of the criminal justice

system. Models of criminal justice: due process versus crime control. Criminal justice values and policies. Human rights and the criminal justice system. Making of criminal justice policy. Influence of the media on the criminal justice process and policy implementation. Diversion from the criminal justice system including Garda cautions and prosecutorial discretion. Alternative processes in the criminal justice system: restorative justice. The juvenile justice system. Penal policy and rationales for sentencing. Sentence management and the treatment of offenders; conditions of imprisonment; scrutiny of the prison system including judicial review and visiting committees; the Inspector of Prisons and Place of Detention. The adoption of civil mechanisms in the criminal justice system: seizure of criminal assets and other proceeds of crime; anti-social behaviour orders.

LA4093 - LAW OF THE EUROPEAN UNION 1
ECTS Credits: 6

Law

ACADEMIC CONTENT IS NOT CURRENTLY AVAILABLE FOR THIS MODULE – UPDATES ARE IN PROGRESS

LA4205 - NURSING AND MIDWIFERY AND THE LAW
ECTS Credits: 3

Law

Rationale and Purpose of the Module: *This module provides an understanding of the role and application of the legal process in the practice of nursing and midwifery.*

Syllabus: The sources of law: the Constitution, case law, and legislation. The court structure; tribunals and other dispute resolution mechanisms. The regulatory framework: The Nurses and Midwives Act, An Bord Altranais, registration, and control on the right to practice, disciplinary issues: fitness to practice, investigation and sanction. Drug administration., proposed Nurses and Midwives Act. Record keeping and the Misuse of Drugs Acts, Cconfidentiality., record keeping, data protection legislation, and freedom of information legislation, The midwifery and nursing environment hospitals, community, nursing homes;. Health and safety provisions as applied to the health care environment. Wills. Charter of Patients rights Patients' Rights. Disciplinary issues: fitness to practice, investigation, and sanction. Issues in criminal and tort law in the practice of nursing and midwifery: lLiability for negligence. Administration Issues of drugs; issues of informed consent., informed choice, right of refusal. Mental health provisions. Wills issues in Fundamental human rights issues.

LA4211 - CRIMINAL LAW 1
ECTS Credits: 6

Law

Rationale and Purpose of the Module: *To examine the general principles of criminal law through consideration of their ethical, social and legal dimensions.*

Syllabus: Historical and ethical consideration of criminal law, characteristics of a crime. Parties to a crime: principals and accessories, vicarious liability. The elements of a crime. Actus reus, conduct, omissions, status. Mens rea, intention, recklessness, criminal negligence. Mens rea in penal statutes. Offences of strict liability. General defences: insanity, infancy, automatism, intoxication, mistake, necessity, duress, self defence. Inchoate offences: attempt, incitement, conspiracy.

LA4290 - COMPANY LAW 1
ECTS Credits: 6

Law

ACADEMIC CONTENT IS NOT CURRENTLY AVAILABLE FOR THIS MODULE – UPDATES ARE IN PROGRESS

LA4310 - LAW OF TORTS 1
ECTS Credits: 6

Law

Rationale and Purpose of the Module: *To evaluate critically the role of the law of torts in society, to examine the basic elements of a tort with particular emphasis on negligence and the defences thereto.*

Syllabus: Nature and function of torts: origin and development; alternative compensation systems; relationship of torts with constitutional law & EC law. General torts: negligence, breach of statutory duty - elements of a tort (breach of duty, damage, causation, remoteness). Particular areas of liability: nervous shock, negligent misstatement, economic loss, product liability, employers' liability, occupiers' liability, liability for defective premises, liability of administrative agencies. General defences in tort. Parties: minors, the State, diplomats, corporate and unincorporated bodies, concurrent liability, vicarious liability.

LA4330 - LAW OF TORTS 1 (B)
ECTS Credits: 6

Law

Rationale and Purpose of the Module: *To evaluate critically the role of the law of torts in society, to examine the basic elements of a tort with particular emphasis on negligence and the defences thereto.*

Syllabus: Nature and function of torts: origin and development; alternative compensation systems; relationship of torts with constitutional law & EC law. General torts: negligence, breach of statutory duty - elements of a tort (breach of duty, damage, causation, remoteness). Particular areas of liability: nervous shock, negligent misstatement, economic loss, product liability, employers' liability, occupiers' liability, liability for defective premises, liability of administrative agencies. General defences in tort. Parties: minors, the State, diplomats, corporate and unincorporated bodies, concurrent liability, vicarious liability.

LA4430 - CONSTITUTIONAL LAW 1
ECTS Credits: 6

Law

Rationale and Purpose of the Module: *Currently, the School of Law delivers lectures on the Irish Constitution to all our LLB degrees and to a number of FAHSS courses. These modules are entitled Public Law 1 and Public Law 2. The term Public Law is outdated and cumbersome. The two new modules being created will keep the content of the Public Law modules but will use*

the more commonly used name of Constitutional Law. It will be to the advantage of students, and professional bodies and employers with which they deal, as the term Constitutional Law bears the more commonly used term for the study of this area of law.

Syllabus: Constitutional Law I will examine the Irish Constitution from an institutional perspective. The course will examine how the Constitution regulates the legal framework of the Irish state and its institutions, including the interaction between these various institutions. Thus, during the course, fundamental issues such as sovereignty and the separation of powers will be examined. The historical development of the Constitution will be initially addressed, and then the powers and competencies of the various organs of government. The related issue of international obligations, including our obligations due to our membership of the European Union will be considered. Issues such as constitutional litigation and constitutional interpretation will also be considered.

LA4530 - COMPANY LAW 1
ECTS Credits: 6

Law

Rationale and Purpose of the Module: *Currently, the School of Law delivers two modules called Law of Business Associations 1 and 2. The name Law of Business Associations is outdated and cumbersome. The two new modules being created will keep the content of the Law of Business Associations modules but will use the more commonly used name of Company Law. It will be to the advantage of students, and professional bodies and employers with which they deal, as the term Company Law bears the more commonly used term for the study of this area of law.*

Syllabus: The aim of the module is to equip the student with an understanding and knowledge of the basic principles and rules of Irish company law, including ; the concept of separate legal personality and exceptions thereto, corporate contracts, the nature of shares in private companies limited by share, the rights of shareholders, the remedies available to shareholders, the role of share capital and issues surrounding corporate borrowing and security. The policy reasons for individual rules are explained and the aim is to assist the students understanding of company law, as well as to facilitate knowledge of those technical rules.

LA4610 - LAND LAW 1
ECTS Credits: 6

Law

Rationale and Purpose of the Module: *To examine the fundamental aspects of legal control over real property, including the legal evolution of title.*

Syllabus: The nature of land law and its historical evolution, the concept of estates and tenure. Freehold estates, fee farm grants, fee simples, fee tails, life estates, pyramid titles, future interests, incorporeal hereditaments. Co-ownership. registration of interests in real property. Extinction of interests, adverse possession, merger. Disabilities.

LA4810 - EQUITY AND TRUSTS 1
ECTS Credits: 6

Law

Rationale and Purpose of the Module: *To examine the growth and development of equity, particularly equitable doctrines and equitable remedies available in the modern Court.*

Syllabus: The nature of equity and historical development, maxims, equitable remedies - the injunction, specific performance, rescission, rectification, specific performance, estoppel. Equitable doctrines - conversion, election, satisfaction and ademption,

---

LA4890 - EQUITY AND TRUSTS 1
ECTS Credits: 6

Law

Rationale and Purpose of the Module: *To examine the growth and development of equity, particularly equitable doctrines and equitable remedies available in the modern Court.*

Syllabus: The nature of equity and historical development, maxims, equitable remedies - the injunction, specific performance, rescission, rectification, specific performance, estoppel. Equitable doctrines - conversion, election, satisfaction and ademption,

---

LA4901 - PRINCIPLES OF LAW
ECTS Credits: 6

Law

Rationale and Purpose of the Module: *Principles of Law is an introduction to law for non-law students*

Syllabus: The module provides the student with a basic knowledge of the Irish legal system, the Irish Constitution, the legal profession in Ireland, sources of Irish law, European Union law, Criminal law and Tort law.

LA5021 - MEDIA LAW
ECTS Credits: 9

Law

Rationale and Purpose of the Module: *This course aims to make students fully aware of the legal framework and constraints within which the media operates, and to enable then to cover courts and other stories with legal implications effectively and with confidence. It also aims to make students fully aware of the major ethical issues that concern journalists. Students will be able to form judgments about ethical dilemmas and articulate a response to them.*

Syllabus: The structure of the legal system, with specific relevance to the law as it affects journalists, including defamation, malicious falsehood, criminal libel, blasphemy, contempt of court, reporting restrictions, breach of confidence and copyright. The course will introduce students to major sources (individuals, institutions, campaigning bodies, government bodies, journalists, journals) on media law issues. Students will analyze complex legal issues and be able to apply them to specific legal dilemmas. The course will cover recent developments in the laws on privacy and in particular European human rights legislation. Students will be introduced to the ethical framework surrounding journalism, including the various codes of conduct, and touching on laws such as those of privacy. They will discuss issues of public interest and its bearing on private lives, and the importance of truth, fairness and objectivity. There will be discussions on reporting suicide,

mental health issues, questions of taste and decency, and the use of subterfuge to obtain stories, and the questions of sleaze and sensationalism. Representation of women and minorities in the press will be covered, as will the impact of competition, ownership and advertising on journalism. Assessment will be by examination and coursework essay on ethics.

LA5153 - COMPARATIVE INTERNATIONAL PROTECTION OF HUMAN RIGHTS LAW
ECTS Credits: 9

Law

Rationale and Purpose of the Module: *To explore the protection of human rights in international law*

Syllabus: A Comparative study of the principles, concepts, rules and proceedures underpinning the protection of human rights in international law from a comparative perspective including in particular: rights theory; universality versus cultural relativism, legislating for human rights; status of human rights treaties; judicial procedures for the enforcement of human rights; state reporting procedures; policing compliance with human rights standards; fact-finding and evidence; sanctions; individual rights and freedom; collective rights

---

LA6011 - INTERNATIONAL BUSINESS TRANSACTIONS
ECTS Credits: 6

Law

Rationale and Purpose of the Module: *To build on the students' knowledge and understanding of commercial transactions in a cross-border environment. The aim of this module is to expose students to a comprehensive understanding of the laws which govern international business transactions both at the micro and macro level. Students will gain a deeper knowledge of the legal issues arising in international contracts for the sale of goods and the international financial instruments which support such commerce.*
The Grading type for this module is Normal. The level of Award is Level 9 and the module is to be centrally scheduled in the same manner as other taught postgraduate modules.

Syllabus: The module will examine the following legal issues that arise in international transactions:

International contracts for the sale of goods, problems of formation, construction and enforcement, including e-commerce transactions, choice of law and jurisdiction issues.

Import regulation: WTO regime; US Trade authorities; US import controls; free trade agreements; tariffs; classification, valuation and origin principles; non-tarriff barriers
Export regulation: Export controls from the US; export licenses; national security issues; exports to NAFTA jurisdictions; exports to EU jurisdictions

Contextualising international trade: Anti-dumping and antitrust issues; Subsidies and countervailing subsidies; state trading entities; the Foreign Corrupt Practices Act and illegal payments abroad, US s.301 proceedings, and the US Boycott and Anti-Boycott rules.
International Finance, including letters of credit and ETF Transactions; off-shore banking and tax efficiencies

International Business Litigation and Dispute Resolution, arbitration and enforcement of arbitral awards; recognition and enforcement of foreign awards, including a documentary analysis.

Overseas investment, including investment in the EU, developing countries and investments in NAFTA members. Expropriation of overseas investments. Ethical investment policy.

LA6021 - LAW OF INTERNATIONAL BUSINESS ASSOCIATIONS
ECTS Credits: 9

Law

Rationale and Purpose of the Module: *The aim of this module is to familiarise students with modern international business structures. The module will also examine the importance of corporate governance and the appropriate governance structures in different jurisdictions.*

Syllabus: An overview of the historical development of the corporate structure in western commercial law from the early state based trading corporations to the rise of private enterprise units. This will be coupled with an introduction to theoretical frameworks of business structures and their legal regulation
An introduction to modern business structures that operate on an international level, including sole trader, registered companies, real estate investment trusts, special purpose entities, joint ventures, franchise arrangements and distribution networks.
The legal process of creating different business structures in different jurisdictions. The concept of residency, centre of management, and the determination of corporate citizenship. The historical development of corporate formation in the USA, the role of the Delaware corporation in US interstate commerce, modern formation processes in US corporate law.
Corporate frameworks in the European Union in particular the European Company (SE), The evolution of corporate governance structures in the European Union at both State and European level, including aspects of the "Smart Regulation in the European Union" agenda
Corporate formation in China as totally foreign owned entities and the role of joint ventures in corporate formation.
Governance issues in Europe, the USA and China, the role of shareholders and investors, restrictions on management, the integration of Labour into corporate oversight and development. and the different institutions involved in enforcing corporate governance provisions including the effect of the Sarbanes-Oxley Act in the USA
Cross border mergers and acquisitions, including national control over corporate ownership in protected sectors, such as the press, transportation, etc.

LA6031 - LAW OF INTERNATIONAL TRADE ORGANISATIONS
ECTS Credits: 9

Law

Rationale and Purpose of the Module: *The aim of this module is to expose students to a comprehensive understanding of the global trading environment and the legal institutions, laws, rules and regulations that apply to cross border transactions.*

Syllabus: This course will introduce students to the historical evolution of the legal provisions, relating to international trade, ranging from the Hanseatic League up to the period after World War II which establishes the

modern global trading environment. It will briefly discuss the differing theories of international trade.
The course will then examine the following institutions, their legal basis and operation and their legal control over international trade.

1. The WTO, its precursor (GATT) the establishing Treaty and the rules on accession and secession, the governance structure of the organisation, the interaction of its decisions and rules with national laws and the role it plays in dispute resolution between signatory states.

2. Regional trading organisations such as NAFTA (North American Free Trade Association) and the EU (European Union), in particular the legal basis of establishment, the interaction between national laws and the role of the regional trading organisation as arbiter, the process of dispute resolution between members of the regional organisation and the hierarchy of laws and issues of primacy between competing regulations.

3. UN bodies engaged in assisting the development of international trade, including UNCITRAL (United Nations Commission on International Trade Law) its role in providing a uniform legal environment within which international trade occurs and UNCTAD (the United Nations Conference on Trade and Development).

4. National enforcement agencies, such as CBP (Customs and Border Protection (USA)) and the EU approach, their role and function and the extra-territoriality of their legal powers.
Finally the course will look at ethical and sustainable movements in international trade and their incorporation into national and regional legal systems.

LA6051 - PENOLOGY AND VICTIMOLOGY
ECTS Credits: 9

Law

Rationale and Purpose of the Module: *The purpose of this course is to provide students with an understanding of punishment, criminal justice and social regulation. In particular the aims of the module are as follows: to provide analyses of the primary penal disposals (both contemporary and historical) utilised in society; to highlight the various political, social, cultural and economic determinants that underpin the provision of penal dispositions; to encourage theorisation about punishment and penal responses; to highlight the needs and concerns of victims of crime; to determine how change is possible in the penal complex - in particular, how sanctions are modified or supplanted and how stakeholders, such as victims, emerge; to examine new 'logics' and 'discourses' on punishment and justice as they emerge; and, to provide a framework of understanding modern penal systems and the forms of social organisation in which they operate.*

Syllabus: This module covers the emergence of penal welfarism and individualisation of treatment, the culture of control in late modern society, the emergence of prison and the disciplinary society, issues such as exclusion, governance, and expressive punishments, the politicisation of law and order, the return of the victim, Norbert Elias and the civilising society; Emile Durkheim and social solidarity; Cohen's dispersal of discipline thesis, and crime and punishment in Ireland.

LA6101 - INTERNATIONAL BUSINESS TRANSACTIONS
ECTS Credits: 9

Law

Rationale and Purpose of the Module: *To build on the students' knowledge and understanding of commercial transactions in a cross-border environment. The aim of this module is to expose students to a comprehensive understanding of the laws which govern international business transactions both at the micro and macro level. Students will gain a deeper knowledge of the legal issues arising in international contracts for the sale of goods and the international financial instruments which support such commerce.*
The Normal grading type is to apply to this module.

Syllabus: The module will examine the following legal issues that arise in international transactions:

International contracts for the sale of goods, problems of formation, construction and enforcement, including e-commerce transactions, choice of law and jurisdiction issues.

Import regulation: WTO regime; US Trade authorities; US import controls; free trade agreements; tariffs; classification, valuation and origin principles; non-tarriff barriers
Export regulation: Export controls from the US; export licenses; national security issues; exports to NAFTA jurisdictions; exports to EU jurisdictions

Contextualising international trade: Anti-dumping and antitrust issues; Subsidies and countervailing subsidies; state trading entities; the Foreign Corrupt Practices Act and illegal payments abroad, US s.301 proceedings, and the US Boycott and Anti-Boycott rules.
International Finance, including letters of credit and ETF Transactions; off-shore banking and tax efficiencies

International Business Litigation and Dispute Resolution, arbitration and enforcement of arbitral awards; recognition and enforcement of foreign awards, including a documentary analysis.

Overseas investment, including investment in the EU, developing countries and investments in NAFTA members. Expropriation of overseas investments. Ethical investment policy

---

LA6111 - Criminal Justice Processes and Sentencing
ECTS Credits: 9

Law

Rationale and Purpose of the Module: *The aim of this module is to provide a detailed understanding of criminal justice processes and sentencing procedures and to encourage students to question the place of human rights within that system. By the end of the course students should be familiar with the various stages in the processes in Ireland, be aware of the strengths and weaknesses, see how human rights should fit into that system and have knowledge of comparative systems.*

Syllabus: This course will consider the various stages of the criminal justice process û from arrest, to trial, to sentence and the various disposal mechanisms. These will be analysed through a framework of human rights to identify the strengths and weakness of the different stages, and assess the compatibility of the Irish system with human rights obligations. What human rights are involved in the criminal justice system? How are the rights of the accused and of the victim balanced within the system? What challenges does the system face in an increasingly diverse Ireland? How can deficits in human rights standards be addressed? Other jurisdictions will be looked to as comparators in efforts to answer these questions.

LA6121 - Law of the European Convention of Human Rights
ECTS Credits: 9

Law

Rationale and Purpose of the Module:
This module aims to provide students with an understanding of the role and functioning of the principal element in the Council of EuropeÆs framework for human rights protection, through critically engaging with the underpinnings of the Convention and the vast body of Strasbourg case law.

Syllabus: The module will explore the influence and progress of the most developed regional mechanism for human rights protection. Convention rights will be examined on an article by article basis providing for a critical assessment of the development of each right and its treatment by the European Court of Human Rights. At the end of the course, students will be familiar with the articles and case law of the European Convention on Human Rights, and the additional Protocols and will have gained a comprehensive understanding of the practice and procedure of the European Court on Human Rights.

LI4013 - LINGUISTICS 3: RESEARCHING LANGUAGE 1
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *This module will be offered on the new BA Arts programmes. As part of the new BA, a pathway in Linguistics is being introduced. Linguistics modules are very popular electives and attract large numbers of registrations. A high number of students opt for a linguistics focussed final year project. As the modules are taught in English they are very popular choices also with Erasmus and study abroad students. These modules will all be made available as options on the current BA in Applied Languages, thus increasing student choice. The introduction of these new LI modules is therefore designed to meet the institutional strategic objectives of increased student choice and increased opportunities for internationalisation.This is the first of two modules designed to provide students with skills in the full range of approaches to studying language in society.*

These skills are needed for three interrelated purposes: to complement the theories and principles that that they are learning about in their other modules and go provide them with the necessary skills to apply these to practical contexts; to equip students with the skills required to design and complete a language-focussed final year project; to facilitate the student's development as a life-long reflective researcher of language

Syllabus: The module is practical in nature and will focus on two interrelated aspects: formulating research questions and on types and methods of data collection. The syllabus will be organised as follows:Selecting and formulating research questions in linguistics and sociolinguistics; types of data and methods of data collection - overview; 1. sociolinguisitic interviews; 2. written surveys and questionnaires; 3. experimental methods; 4. linguistic landscapes; 5. computer-mediated data and methods.

Prerequisites: LI4212

LI4016 - DISCOURSE ANALYSIS FOR ARTS, HUMANITIES & SOCIAL SCIENCES
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *This module will be offered to all studnets on the new BA Arts programme; the module is also intended to be offered on an online basis to students in UL outside FAHSS and to external participants in an online format. Discourse analysis is a key methodological tool across all of the disciplines in AHSS and this module is designed to provide an interdisciplinary introduction for non-linguistics/language students from across the subject range on the new BA. The introduction of the module is designed to meet the strategic objectives of broadening the curriculum and increasing student choice.*

Syllabus: The syllabus will be organised around the following components:Introduction to the moudle (Why study discourse? Discourse as data). Method 1: Corpus analysis;
Method 2: Critical Discourse Analysis. Students will design and carry out a project in their own discipline to apply each of these research methods, one quantiative (corpus analysis) and one qualitative (cricial discourse analysis).

LI4023 - LANGUAGE AND SOCIETY IN IRELAND
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *This module will be offered on the new BA Arts programmes. As part of the new BA , a pathway in Linguistics is being introduced. Linguistics modules are very popular electives and attract large numbers of registrations. A high number of students opt for a linguistics focussed final year project. As the modules are taught in English they are very popular choices also with Erasmus and study abroad students. These modules will all be made available as options on the current BA in Applied Languages, thus increasing student choice. The introduction of these new LI modules is therefore designed to meet the institutional strategic objectives of increased student choice and increased opportunities for internationalisation. Linguistic variation is one of the key components of studying language in society; this module will offer students an introduction to this topic by focussing on the Irish sociolinguistic context in contemporary and historical perspective.*

Syllabus: Following a general introduction to studying language and variation, the module will focus on four main themes:

Irish-English
The Irish language
Irish traveller language
The new languages of Ireland

LI4113 - LANGUAGE TECHNOLOGY
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *To introduce students to the major pedagogical, professional and research applications of technology in modern foreign*

language learninig and to enable students to integrate these into their studies.

Syllabus: The module will seek to define and contextualise language learning and Computer-Assisted Language Learning (CALL). It will introduce a number of CALL applications for practical hands-on testing, including: Virtual learning Environments, shared workspaces and Social Networking sites. Students will be sourcing, creating, and evaluating on-line resources (covering, for example, blogs, wikis). Dedicated and generic CALL packages will be investigated. The other two main areas for study include Corpus Linguistics (corpora and concordancing) and Machine Translation techniques and application in the context of evaluating their effectiveness in personalised student Language Learning.

LI4211 - LINGUISTICS 1
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *The module is designed to serve as an introduction to basic concepts and theories in linguistics. The various subfields and branches of linguistics will be introduced and discussed in class lectures.*

Syllabus: The module comprises four distinct but also interrelated themes, each of which will be dealt with in sequential blocks over the twelve week module:
1. Nature of language and linguistics: In this first part, students will be introduced to basic concepts in linguistics, including: language, duality, arbitrariness.
2. Phonetics & Phonology. In this second part, students will learn how to recognise and categorise the sounds of English and other languages.
3. Morpho-Syntax. In the third section, students will focus on how words are formed and how they combine to make sentences.
4. Semantics and Pragmatics: The final section of the module will focus on meaning and its relevance to the study of language.

LP6005 - LANGUAGE AND CULTURE IN THE CLASSROOM 1
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *This module integrates and reinforces pedagogic approaches incorporated in the language pedagogy module. It is designed to build upon language graduates' linguistic and cultural competence in order to enable students to teach at Junior Cycle level in post-primary schools through their selected target languages. It also aims to deepen students' understanding of socio-cultural issues in the main countries where their selected languages are spoken.*

Syllabus: Structure: Three hours in elective language and one-hour in core language per week, with students selecting from the following electives: English as a Second Language, French, Gaeilge, German, Japanese, Spanish.
Students consolidate their knowledge and understanding of the relevant language systems as appropriate to their level and professional requirements in two of the languages.
Emphasis on the active use of the target language; equal promotion of language accuracy and fluency teaching and learning; selection and pedagogical exploitation of authentic materials, design of learning tasks and implementation of language-focused activities; exploration of current issues in the target cultures with a particular emphasis on those of interest to Junior Cycle post-primary school teachers and students; and introduction to online language learning tools and development of collaborative skills and communicative tasks.

LP6011 - LANGUAGE PEDAGOGY 1: THE LANGUAGE TEACHER AS PROFESSIONAL PRACTITIONER
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *This module examines the context, development and position of language teaching and learning in Ireland, introduces students to key areas of current language pedagogy, and supports them in adapting generic educational principles to the post-primary language classroom. It aims to develop a critical approach to the study of theoretical perspectives underpinning the teaching of languages and the language-learning process and to engage students in reflective discussion on the application of pedagogical theory to classroom practice in the Irish post-primary context.*

Syllabus: Structure: 2 x 2 hours per week for 12 weeks, with students selecting from the following core languages: French, Gaeilge, German, Japanese, Spanish, and ESL.

1. Language teaching and learning in Ireland: exploring national and EU language policy developments & the position of languages in Irish society;
2. Theoretical perspectives: theories of language, theories of language teaching and learning and resulting methodologies. Planning: critical evaluation of language syllabi within the broader curriculum; syllabus implementation in the language classroom; alternative post-primary programmes (e.g. LCA, LCVP, TYP).
3. The practice of language teaching through the target language: approaches to the teaching/learning of productive and receptive skills; sourcing, selecting, evaluating and managing teaching resources; traditional and new technologies in language teaching/learning; mixed ability and differentiation in the language classroom; standard and alternative assessment models & procedures with regard to assessment of and for learning; classroom management; interaction patterns; elicitation; & error correction.

MA2121 - FOUNDATION MATHEMATICS 1
ECTS Credits: 6

Mathematics & Statistics

Rationale and Purpose of the Module: *To provide a core of mathematics which is a significant mathematical experience for students.*
To provide students with an appropriate and sufficient mathematical foundation for further study of mathematics at higher education.

Syllabus: Modelling using mathematics: simple models; the modelling process; solving simple mathematical models.
Numbers and number sense 1: common number systems in use; basic arithmetic facts and operations; using a calculator.
Numbers and number sense 2: fractions; percentages; ratio and proportion; more on calculators; approximation and estimation.

Algebra 1: algebra as generalized arithmetic; terms and expressions; simplifying algebraic expressions; simple equations and their solution; using formulae.
Measurement: standard units; unit conversions; accuracy and precision; everyday use.
Geometry: basic properties of angles, triangles, circle, polygons, 3-D figures; right angle triangles; symmetry.
Functions and graphs 1: concept of function; tables and ordered pairs; coordinated plane and graphs; the straight line; gradient, chord, average rate of change.

MA2131 - FOUNDATION ENGINEERING MATHEMATICS 1
ECTS Credits: 6

Mathematics & Statistics

ACADEMIC CONTENT IS NOT CURRENTLY AVAILABLE FOR THIS MODULE – UPDATES ARE IN PROGRESS

MA4001 - ENGINEERING MATHEMATICS 1
ECTS Credits: 6

Mathematics & Statistics

Rationale and Purpose of the Module: *To develop the student's understanding of and problem solving skills in the areas of Pre-Calculus and Differential Calculus.*

Syllabus: [Series] and tests for convergence. Real valued [functions] of a real variable, [limits, continuity and differentiation from first principles]. Physical and graphical interpretation of derivatives.
[Transcendental functions]: properties of trignometric, exponential, logarithmic and hyperbolic functions and their inverses.
[Vector Algebra]: coordinates, resolution of vectors, dot product and cross product.
[Complex numbers]: Cartesian, polar and exponential forms. The algebra of complex numbers. The nth roots of unity.
[Differential Calculus: properties] of derivatives, product, quotient and chain rules. Derivatives of transcendental functions.
Applications of Differential Calculus to finding [maxima and minima, curve sketching, roots of equations] (Newton's method), [undetermined forms] (L'Hopital's Rule) and [Power Series] (Taylor and Maclaurin Series) of a univariate function.

MA4003 - ENGINEERING MATHEMATICS 3
ECTS Credits: 6

Mathematics & Statistics

Rationale and Purpose of the Module: *To introduce the student to the Laplace Transform, Fourier Series, and their use in solving Ordinary Differential Equations.*
To introduce the student to the theory and methods of Linear Algebra.
To give the student a broad understanding of the numerical processes used in solving Linear Algebra problems, and their extension to some nonlinear problems

Syllabus: Laplace Transforms, Transform Theorems, Convolution, the Inverse Transform. Fourier Series functions of arbitrary period, even and odd functions, half-range expansions. Application of Laplace transforms and Fourier series to finding solutions of ordinary differential equations. Vector Spaces, linear independence, spanning, bases, row and column spaces, rank. Inner Products, norms, orthogonality. Projection theorems and applications, e.g. least squares, and fitting data with orthogonal polynomials. Eigenvalues and eigenvectors. Diagonalisability. Symmetric matrices, including numerical methods to diagonalise same. Numerical solution of systems of linear equations : Gauss elimination, LU-decomposition, Cholesky decomposition, pivoting, iterative improvement, condition number; iterative methods including Jacobi, Gauss-Seidel and S.O.R.

Prerequisites: MA4002

MA4005 - ENGINEERING MATHEMATICS T1
ECTS Credits: 6

Mathematics & Statistics

Rationale and Purpose of the Module: *To review and reinforce the student's understanding of and problem solving skills in the areas of*
* *Multivariate and Integral Calculus and Differential Equations.*
* *The Laplace Transform and Fourier Series and their use in solving Ordinary Differential equations.*
* *Matrix Algebra and its application to solving systems of linear equations. Basic Linear Algebra.*
The numerical processes used in solving Linear Algebra problems, and their extension to some nonlinear problems.

Syllabus: Functions of several variables and partial differentiation .
The Indefinite Integral : Integration techniques including
integration of standard functions, substitution, by parts and
using partial fractions. The Definite Integral.
Application of integration to finding areas, lengths, surface areas,
volumes and moments of inertia.
Numerical Integration : Trapezoidal rule, Simpson's Rule.
Ordinary Differential Equations : first order including variables
separable and linear types. Linear second order equations with constant
coefficients. Numerical solution by Runge-Kutta.
The Laplace Transform : Tables, theorems. Application of the method
to the solution of linear ordinary differential equations.
Fourier Series functions of arbitrary period, even and odd functions,
half-range expansions. Application of Laplace transforms and Fourier series
to finding solutions of ordinary differential equations.
Matrix representation of and solution of systems of linear equations.
Matrix algebra, invertibility, determinants.
Vector Spaces linear independence, spanning, bases, row
and column spaces, rank. Inner Products, norms, orthogonality.
Eigenvalues and eigenvectors.
Numerical solution of systems of linear equations : Gauss elimination,
LU-decomposition. Cholesky decomposition; iterative methods
Extension to nonlinear systems using Newton's method

MA4007 - EXPERIMENTAL DESIGN
ECTS Credits: 6

Mathematics & Statistics

Rationale and Purpose of the Module: *To familiarise students with the theory and applications of experimental design.*
Introduce the concepts of orthogonal functions and orthogonal arrays within experimental design.
To analyse the Japanese method of experimental design and to compare it with traditional (linear models) design.

Syllabus: Multiple Regression, Residual analysis leverage and influence points.

Analysis of variance: Expanding one, two factors in orthogonal polynomials. Estimation of factorial effect, resolution of variation. robust techniques.

Statistical Experimental Design: Screening, factors, level, responses, full and fractional factorials, composite design, orthogonal arrays, signal to noise ratio, blocking confounding and D-optimal design. Product Design, parameter design, tolerance design.

Evolutionary Operations, response surface methodology, steepest ascent, canonical forms and the use of graphical techniques to classify surfaces.

Prerequisites: MA4004

MA4113 - APPLIED BUSINESS MATHEMATICS
ECTS Credits: 6

Mathematics & Statistics

Rationale and Purpose of the Module: *This module contains the first half of MA4102 and of MA4103.*

Purpose:
To introduce mathematical concepts and techniques, with applications in economics, finance and in business in general. To develop an appropriate foundation in mathematics for students from diverse mathematical backgrounds.

Syllabus: Review of algebra: fractions and rational expressions, linear equations and inequalities. Economic models: cost and revenue, supply and demand curves.

Simultaneous linear and quadratic equations (solved algebraically and graphically); applications to market equilibrium and break-even analysis.

Linear programming: plotting linear inequalities in two variables, feasible region, constrained optimisation; solving linear optimisation problems using the graphical method; applications to maximising profit/revenue, minimising cost etc.

Mathematics of finance: geometric sequences and series; applications to compound interest, present value, valuation of annuities and mortgages.

Matrices: definitions, matrix algebra: addition, subtraction, scalar multiplication,
matrix product; determinants (2X2); matrix inversion; representing and solving linear systems using matrices.

Functions and their graphs: definition of a function (including function of several variables), combining functions, inverse functions; graphs of linear, quadratic, cubic polynomials; roots and factors; negative powers and rational powers.

Exponents and logarithmic functions: laws of exponents (indices) and logarithms; the number e; the exponential function and natural log function; graphs of exponential and natural log; applications to population growth and depreciation of capital.

Differential calculus: concept of continuity; small change, secant line, slope, tangent line, definition of derivative; differentiation from first principles (quadratics only); derivative as instantaneous rate of change: application to marginal cost and marginal revenue; power rule, derivative of negative powers, fractional powers, exponentials and logs; higher derivatives; the Product, Quotient and Chain Rules.

Curve sketching using calculus and business applications: increasing and decreasing functions, turning points: local maxima and minima, the Second Derivative Test, concavity, points of inflection.

MA4601 - SCIENCE MATHEMATICS 1
ECTS Credits: 6

Mathematics & Statistics

Rationale and Purpose of the Module: * *To introduce students to the fundamental concepts of calculus and linear algebra.*
* *To develop and integrate the basic mathematical skills relevant to science.*

Syllabus: [Vectors:] definition; addition; components, resultant, position vector; scalar product; dot product and angle between vectors; cross product; simple applications in mechanics.

[Trigonometry:] basic definitions and relation to unit circle; basic formulae and
identities; frequency, amplitude and phase.

[Linear equations:] solution of systems of linear equations by Gaussian elimination;
examples with a unique solution, an infinite number or no solutions.

[Matrices:] Addition and multiplication; matrix inversion; simple determinants.

[Functions:] graphs and functions; polynomial and algebraic functions; curve-fitting;
least-squares approximation (formula only); exponential and logarithm; inverse
function.

[Derivative and applications:] basic concepts: slope as rate of change;
differentiation of sum, product, quotient; chain rule; derivative of standard functions;
tangent and normal; higher derivatives; maxima and minima; applications to
optimisation in science.

MA4603 - SCIENCE MATHEMATICS 3
ECTS Credits: 6

Mathematics & Statistics

Rationale and Purpose of the Module: *To introduce students to the fundamental ideas of uncertainty through probability.*
To introduce students to the most widely used statistical distributions and applications thereof.
To lay a good foundation for the stream of statistically oriented modules in the fourth year.
To introduce statistical inference through the concepts of estimation and hypothesis testing.
To introduce students to a modern statistical software

package (e.g. MINITAB), and motivate the practice of statistics through the analysis of real data and case studies.

Syllabus: Variables:continuous and discrete; Representation of variables: frequency tables, histograms, bar charts, etc; Reduction of variables: measures of location and dispersion, mean, variance, range, median, quartiles, etc; Introduction to the fundamentals of probability; Experiments, sample spaces, events; Laws of probability: addition and multiplication, conditional probability (sensitivity and specificity); Introduction to random variables; probability density functions; Special distributions:binomial, normal; Statistical inference: point and interval estimates, standard error of an estimator, hypothesis testing, one and two-tailed tests; One and two sample problems for the mean, variance and proportion; Relationships between quantitative variables:PearsonÆs correlation coefficient; Regression analysis.

MA4605 - CHEMOMETRICS
ECTS Credits: 6

Mathematics & Statistics

Rationale and Purpose of the Module: *To give students a clear understanding of the importance of statistical methods in their work.*

To introduce students to the most widely used statistical techniques in the chemical process industries.

To develop skills in the use of these techniques through actual case studies using statistical software packages

Syllabus: Hypothesis testing - type I and type II error, one and two-tailed tests, oc curves.
Statistical process control - various charts, mean/range, individuals/moving range, cusum charts.
Capability studies - capability indices.
Correlation and Regression - method of least squares, multiple regression, linear and non-linear models, regression analysis, analysis of residuals.
Importance of plotting data.
Design of experiments and analysis of variance - one and two way ANOVA, interaction, factorial designs, responses and factors, Plackett-Burman design, response surface methodology.

Prerequisites: MA4603

MA4617 - INTRODUCTION TO FLUID MECHANICS
ECTS Credits: 6

Mathematics & Statistics

Rationale and Purpose of the Module: *Change of title for existing module MA4607 INTRODUCTION TO APPLIED MATHEMATICAL MODELLING IN CONTINUUM MECHANICS. Content remains the same. Update of prerequisite module and lab hour added.*

To provide an introduction to the basic concepts of the mathematical modelling of fluid mechanics.

Syllabus: Continuum theory, balance of momenta, constitutive laws, elementary viscous flow, aerofoil theory, vortex motion, Navier-Stokes equations, very viscous flow, thin film flow, boundary layer theory.

Prerequisites: MS4404

MA4701 - TECHNOLOGICAL MATHEMATICS 1
ECTS Credits: 6

Mathematics & Statistics

Rationale and Purpose of the Module: *To introduce students to the fundamental concepts of calculus and linear algebra.*
To develop and integrate the basic mathematical skills relevant to technology.

Syllabus: Functions: graphs and functions, linear, quadratic and polynomial functions, exponential and logarithm, inverse function, limits and continuity; Trigonometry:basic ideas, definitions, formulae and identities, sine and cosine rules, applications, circular functions; the Derivative and its applications: basic concept, rate of change, differentiation of sum product, quotient, chain rule, derivative of standard functions, simple applications, tangent and normal; Experimental Laws:curve-fitting, graphical techniques, expressions reducible to linear form, least-square approximation (formula only); Linear equations:solution of systems of linear equations by Gaussian elimination, examples with a unique solution, an infinite number or no solutions;Vectors:definition, addition, components, resultant, position vector, scalar product, dot product and angle between vectors. Complex Numbers:necessity, examples, definition, properties, equality, conjugate, modulus, geometric representations, Argand diagram, polar form: argument, exponential form, de Moivres theorem, powers and roots.

MA6011 - CRYPTOGRAPHIC MATHEMATICS
ECTS Credits: 6

Mathematics & Statistics

Rationale and Purpose of the Module: *To introduce the concepts of Number Theory that underpin cryptographic algorithm techniques and cryptanalysis and to develop skill in deductive reasoning. At the conclusion of the module a student should have the knowledge to handle the mathematics involved in public key cryptography and in the analysis of conventional key ciphers.*

Syllabus: Divisibility and Primes. Euclidean algorithm.
Modular arithmetic: linear and polynomial congruences, Chinese remainder theorem.
Euler phi function and Fermat's little theorem.
Primality tests. Pseudoprimes, Carmichael numbers, strong pseudoprimes. Miller-Rabin test. Probabilistic primality testing.
Primitive roots. Discrete logarithm.
Quadratic reciprocity:Legendre symbol, Jacobi symbol.
Square and cube roots mod p.
Elliptic curves modulo p. Group law. Discrete logarithm revisited.

MB4001 - ALGEBRA 1
ECTS Credits: 6

School of Education

Rationale and Purpose of the Module: *To promote understanding of the number systems and their properties.*
To develop an understanding of the fundamental concepts of Linear Algebra.
To promote proficiency in selected techniques and

applications.

Syllabus: Number: basic number concepts, laws, equations;Number systems: extensions from N to Z, Z to Q and Q to R, complex numbers C;Elementary number theory: Peano's axioms, mathematical induction, binomial coefficients, fundamental theorem of arithmetic; Equations: linear, quadratic, polynomial equations, solution by graphical and numerical methods; Matrices: matrix algebra, applications.

MB4005 - ANALYSIS
ECTS Credits: 6

Mathematics & Statistics

Rationale and Purpose of the Module: *To develop an understanding of formal methods of mathematical analysis, as applied to sets, real numbers, and general topology.*

Syllabus: • Set theory: equivalence classes of sets, cardinal numbers, countability and uncountability, including the uncountability of R.
• Functions of a real variable: limits, continuity and differentiability from first principles.
• Multivariate functions: inverse function theorem, implicit function theorem.
• Complex functions: differentiability and Cauchy-Riemann equations.
• The completeness property: Bolzano-Weierstrass theorem, Cauchy sequences and completeness.
• Sequences and series of functions: pointwise and uniform convergence, term-by-term differentiation and integration.
• General topology: Euclidean n-space, metric spaces, connectedness, compactness, fixed point theorem, Hilbert spaces.

Prerequisites: MS4021, MS4022

MB4017 - GEOMETRY
ECTS Credits: 6

School of Education

Rationale and Purpose of the Module: *Recent changes to the Teaching Council requirements means that every teacher on entry to the profession of teaching must study at least 5 credits of Geometry, either Euclidean or non-Euclidean. At present, no such module is available in the University of Limerick and so it is critical that we provide this option for students so that they can complete their entire undergraduate, pre - service mathematics programme in - house.*
Geometry is a core part of mathematics education and provides the basis for an introduction to rigorous mathematical reasoning. The study of geometry allows for student improvement in the area of logic, deductive reasoning and problem solving - all of which are skills that will benefit students in a range of other mathematical strands. Geometry is unlike pure mathematics modules in the sense that it has a wide range of practical applications. It is used, for example, in art, engineering, sport, construction, architecture, to name but a few. The literal translation of the word Geometry ("Earth Measure") serves to further highlight its applicability and this module will seek to highlight the relevance of the subject to all students undertaking it. As such, this module will share with students key mathematical concepts that underpin a lot of objects they see and use on a daily basis.
Finally, Geometry and Trigonometry now makes up one - fifth of the junior and senior cycle mathematics curricula which the majority of students who study this module will end up teaching. As such, it is critical that they are equipped with the skills needed to teach this topic for understanding. IN order to do this they themselves need a solid grounding in the subject and need to understand the rationale behind the theorems and constructions that they will encounter in the mathematics classroom. This module seeks to provide them with this knowledge.

Syllabus: The syllabus will be broke up into 8 sections/chapter. These 8 sections are:

- Pythagoras
- Congruences and Similarity
- Circles and Angles
- Trigonometry
- Co-ordinates
- Vectors and Symmetry
- Spherical Trigonometry
- Non Euclidean Geometry

Prerequisites: MS4131

MD2001 - REFLECTIVE PRACTICE PORTFOLIO
ECTS Credits: 6

Humanities

ACADEMIC CONTENT IS NOT CURRENTLY AVAILABLE FOR THIS MODULE – UPDATES ARE IN PROGRESS

MD4046 - IMPROVISATION AND COMPOSITION (VOICE / MUSIC / DANCE)
ECTS Credits: 6

Humanities

Rationale and Purpose of the Module: *This module will introduce students to creative processes, using improvisational and compositional exercises. Students will investigate the use of movement, instrumental and vocal concepts as motives for creative practice.*

Syllabus: Students taking this module will engage a number of different improvisatory and compositional practices from western and `world music and dance traditions as well as their own genres. They will understand these practices in context but also engage them in the context of their own performance practices. Students will develop performances that will be produced from an engagement and development of these practices in a meaningful and creative manner. Students will be provided with written feedback according to BA Irish Music and Dance policy.

MD4047 - PERFORMANCE STUDIES 5: INTERCULTURALISM AND PERFORMANCE / FYP
ECTS Credits: 6

Humanities

Rationale and Purpose of the Module: *To introduce students to the discourse of global and intercultural performance including current research perspectives, ethical issues and performance practice as political engagement.*

Syllabus: An introduction to theory and practice in global and intercultural performance including performance and globalisation, cultural appropriations and impositions, colonial mimicry, tourist performances, leisure globalisation, vertical transculturalism, horizontal interculturalism, terrorism and performance, integrative intercultural performance.

MD4057 - SOMATICS AND RITUAL PERFORMANCE 5
ECTS Credits: 6

Humanities

Rationale and Purpose of the Module: *This module will provide each student with the opportunity to continue to develop skills to research and develop an informed and intelligent approach to own specific technical needs so they can develop healthy and sustainable practices in preparation for performance; it will also provide the opportunity to develop skills and confidence to create innovative new models for ritualising performance; students will specialise in creating a project within a specific context and begin to focus on their preferred options for professional practice.*

Syllabus: This module will provide each student with the opportunity to continue the study and practice of Authentic Movement, Feldenkrais and Alexander techniques to develop skills to research and develop an informed and intelligent approach to own specific technical needs and also so they can develop healthy and sustainable practices in preparation for professional practice; students will specialise in creating a project within a specific context and begin to focus on their preferred options for professional practice.

MD4067 - VOICE AND DANCE SKILLS FOR PERFORMANCE 5
ECTS Credits: 6

Humanities

Rationale and Purpose of the Module: *The ability to select and design a programme which shows an understanding of technique principles and practices and their application to a specific context will prepare student to develop an informed and intelligent method to sustain their on-going and evolving practice. This will support students to develop a sustainable practice in professional performance based contexts.*

Syllabus: Students will be required to specialise in voice or dance, and through regular technique classes and workshops they will continue to study and practice the basic technical principles of both western and world dance and voice traditions and to further study methods of analysing movement and sound and methods of reflective practice in order to develop critical awareness of technique training; they will also complement the reading/singing skills through the learning of musical analytical and early notational systems; also, each student will be required to design a technique-training programme to reflect their own specific technical needs and interests.

MD4081 - Irish Music and Dance Studies
ECTS Credits: 6

Humanities

Rationale and Purpose of the Module: *The purpose of this module is to more deeply engage issues in Irish traditional music and dance studies and, in this context, to apply cultural theory to Irish music and dance Studies in a deeper and more creative way. These issues will be in the interactive contexts of Irish traditional music, song and dance, interrogating themes of difference and identity as relevant to traditional musicians in the past and present.*

Syllabus: Specific issues will be focused on in the areas of Irish and English Language Song; the multitude of Irish dance styles as well as instrumental practice. These are to be addressed using a thematic approach which will engage theoretical areas such as identity, ethnicity,globalisation and the meaning of tradition. As such this is a research led module and themes and approaches will be developed by the course leader in association with fellow faculty.

MD4087 - ADVANCED ENSEMBLE
ECTS Credits: 6

Humanities

Rationale and Purpose of the Module: *This is a module for fourth year BA Irish Music and Dance Students who wish to develop their ensemble skills further and who show a propensity to do so in their assessment for module MD4016.*

Syllabus: Students in this module will concentrate on developing their knowledge of ensemble skills taken from a number of musical contexts. These skills will be developed in the context of their own performance practices.
Students will attend a number of lectures that engage a systematic examination of the musical processes involved in the creation of ensemble. Such processes will then be utilised in performance laboratory classes, which will result in a public performance, developed in the context of a reflective journal.

MD4091 - Irish World Academy Practicum C1
ECTS Credits: 6

Humanities

Rationale and Purpose of the Module: *This module focuses on students developing their artistic practice in an collaborative context while gaining embodied experience of other arts practices outside of their own genre and disciplinary specialties. The rationale for including a defined space for the engagement with performance practices unfamiliar to the student is to show the student different creativities structured by unfamiliar aesthetics, cultural context and modes of embodiment. The title of the module reflects the Irish World Academy tradition of presenting modules with an wide performance skills focus as 'practicum'. Such an approach is enabled by an embodied methodology that is critically engaged. The 'C' of the title is a reflection of the cross-genre content of the module.*

Syllabus: This module is split into two parts. In the first the student will engage other students in a laboratory pace within their own discipline, mentored by faculty and tutors, to develop creative, collaborative work within and extending from their own disciplines and genre practices. The second half of this module is designed to facilitate 'cross-arts' exploration of creative practice as a core dimension of every Academy undergraduate's educational experience at the Irish Academy. Each student will chose a performance course, from a genre or approach outside of their disciplinary and genre focused stream, selecting from a pool of courses covering instrumental / dance tuition, music/dance ensemble, dance/music ensemble, dance/music composition and

other available performing arts practices.

MD4092 - Irish World Academy Practicum C3
ECTS Credits: 6

Humanities

Rationale and Purpose of the Module: *This module will continue to focus on students developing their artistic practice in an collaborative context while gaining embodied experience of other arts practices outside of their own genre and disciplinary specialties. The rationale for including a defined space for the engagement with performance practices unfamiliar to the student is to show the student different creativities structured by unfamiliar aesthetics, cultural context and modes of embodiment. Students will have the option to build on cross-genre skills acquired in Practicum C1 in certain contexts. The title of the module reflects the Irish World Academy tradition of presenting modules with an wide performance skills focus as 'practicum'. Such an approach is enabled by an embodied methodology that is critically engaged. The 'C' of the title is a reflection of the cross-genre content of the module.*

Syllabus: This module is split into two parts. In the first the student will engage other students in a laboratory space within their own discipline, mentored by faculty and tutors, to develop creative, collaborative work within and extending from their own disciplines and genre practices. The second half of this module is designed to facilitate 'cross-arts' exploration of creative practice as a core dimension of every Academy undergraduate's educational experience. Each student will chose a performance course, from a genre or approach outside of their disciplinary and genre focused stream, selecting from a pool of courses covering instrumental / dance tuition, music/dance ensemble, dance/music ensemble, dance/music composition and other available performing arts practices. Students will have the option to build on cross-genre skills acquired in Practicum C1 and/or C2 in certain contexts.

MD4097 - COMPOSITION AND ARRANGEMENT IN IRISH TRADITIONAL MUSIC 1
ECTS Credits: 6

Humanities

Rationale and Purpose of the Module: *To develop the students skills and knowledge of composition and arrangement in the idiom of Irish traditional music as it is performed contemporarily.*

Syllabus: Students will examine the various ensemble practices in Irish traditional music in currency today. These practices will include`traditional as well as more contemporary and fusion based styles of composition and arrangement. This examination will engage ethnomusicological issues of origin and creation as well as practices of record, transcription and reproduction. Students will also develop and synthesize their own arrangement and composition practices from those studied.
Students will be provided with written feedback according to BA Irish Music and Dance policy.

MD4101 - PERFORMANCE 1A
ECTS Credits: 6

Humanities

Rationale and Purpose of the Module: *Development of the student's primary performance interest, whether instrumental, vocal or dance. Students will be encouraged to engage in a dynamic self-critical process conducive to development and related to the principle of 'reflective practice'. Also the development of musicianship and body-awareness skills.*

Syllabus: This module is divided into two parts. The first is the development of the students' performance practice and will occur in the stylistic context most common to the performance practice of the student. The second part of this module will be related to performance skills pertinent to the specific music, song or dance practices of the student.

MD4103 - PERFORMANCE 3A
ECTS Credits: 6

Humanities

Rationale and Purpose of the Module: *Further development of the student's primary performance interest, whether instrumental, vocal or dance. Students will be encouraged to engage in a dynamic self-critical process conducive to development and related to the principle of 'reflective practice'. Also the development of musicianship and body-awareness skills.*

Syllabus: This module is a development of the semester first year Performance 1A and 2A modules and as such divided into two parts. The first is the development of the student's performance practice and will occur in the stylistic context most common to the performance practice of the student. The second part of this module will be related to performance skills pertinent to the specific music, song or dance practices of the student.

MD4104 - MUSIC THEORY AND PRACTICE SKILLS 1
ECTS Credits: 6

Humanities

Rationale and Purpose of the Module: *This is an elective module intended for undergraduate students with dance as a first area who wish to have more instruction in music theory, ear and notation practice and keyboard skills in order to further develop skills introduced to the student from first semester of first year, increasing his/her employability as a music teacher.*

Syllabus: Piano skills including sight-reading, accompaniment technique, basic arrangements, right hand ornamentation; music theory and practice, including dictation (melodic, rhythmic and harmonic) understanding modes and scales and their operations in Western harmony and in Irish contexts; tune composition; basic modulation and chordal accompaniment; music analysis.

Prerequisites: MD4001, MD4002, MD4003

MD4108 - CHOREOGRAPHIC SKILLS 1
ECTS Credits: 6

Humanities

Rationale and Purpose of the Module: *This is an elective module intended for undergraduate students with dance as a first area who wish to further develop and deepen their choreography and notation skills.*

Syllabus: This module has two elements creating and documenting solo and /or duet dance works. Students in this module will concentrate on further developing their choreographic abilities drawing on choreographic tools and techniques from a multitude of dance genres and contexts. The students will create and perform new solo and/or duet works. They will also be taught a variety of skills to assist with the development of strategies to record and document their creative processes. A number of notation systems including Labanotation, Newcastle notation, a variety of journal reflections as well as video and audio recordings will all inform the choreographic practice.

MD4113 - PERFORMING ARTS TECHNOLOGY
ECTS Credits: 6

Humanities

Rationale and Purpose of the Module: *This module will introduce students to professional audio and visual technologies relevant to performers in their field. The professional world around performance practice, performance education, media and other career paths open to students on this programme will be explored. Students will use such technologies in professional contexts generating project work out of the day-to-day life of the Academy, recording concerts, providing technical support to a wide range of performances and generating media appropriate to the world of performing arts.*

Syllabus: Students in this module will learn practical technological applications relevant to their performance practice. Students will learn to use and manipulate PAs and lighting rigs, led by professionals in the field and applied in real-world situations. Students will also be introduced to media generating software such as Final-Cut Pro and Logic to produce high level audio and video outputs.

MD4114 - CRITICAL ENCOUNTERS WITH GLOBAL POP
ECTS Credits: 6

Humanities

Rationale and Purpose of the Module: *This module is a further engagement with the study of popular music, emphasising its internationality as a domain for the circulation of many varied genres with origins around the world. "Irish trad," as it is commonly called, is a significant idiom within this field and here is placed in its international context as but one example of local-global-local, sometimes called glocal (or occasionally Lobal), interaction. Global Pop is a field of musical production with which our students are likely to interact as musicians and dancers; this module prepares them to act as critical thinkers about its practices and their engagement with these.*

Syllabus: The module content focuses on understanding the volatile dynamics of this field of cultural production through the study of particular examples. Some of the most important, and well documented, in this regard have been musics from Black America, South America, the Caribbean, North Africa, Sub-Saharan Africa, South Africa, Southeast Asia, Native North America, and the Northern Circumpolar regions. Particular issues and concepts key for an understanding of this phenomenon will be addressed in the context of these examples. Using an arts practice research perspective students will be asked to reflect on their own experience, most often in Irish music, in this domain.

MD4117 - PROFESSIONAL SKILLS / FINAL YEAR VOCATIONAL PROJECT
ECTS Credits: 6

Humanities

ACADEMIC CONTENT IS NOT CURRENTLY AVAILABLE FOR THIS MODULE – UPDATES ARE IN PROGRESS

MD4121 - INTRODUCTION TO VERTICAL DANCE AND WALL RUNNING
ECTS Credits: 6

Humanities

Rationale and Purpose of the Module: *The aim of this module is to introduce students to this core aspect of aerial dance. This module forms part of a suite of aerial modules designed to create an aerial dance strand within the MA Festive Arts programme. This responds to the demand for third level training in the field, combined with the management and research elements of the MA Festive Arts programme. The class combines the use of sit-harness and abseil equipment both against a wall and free-flying. The class begins with basic kit familiarisation and core stability, strengthening and preparation. It then progresses to basic orientation on different planes, building towards a more dynamic vocabulary. Students will also be taught repertoire from established company performances, as well as allowing student time for creative input.*

Syllabus: The class combines the use of sit-harness and abseil equipment both against a wall and free-flying. The class begins with basic kit familiarisation and core stability, strengthening and preparation. It then progresses to basic orientation on different planes, building towards a more dynamic vocabulary. Students will also be taught repertoire from established company performances, as well as allowing student time for creative input.

MD4123 - DANCE STUDIES 1
ECTS Credits: 6

Humanities

Rationale and Purpose of the Module: *This module will introduce students to the history of modern dance, from its roots in the classical forms of the eighteenth and nineteenth centuries as well as popular forms of the twentieth. Students will be encouraged to see such development in a wider aesthetic, social and cultural context. Embracing the principles of arts practice, students will be given the opportunity to engage contemporary approaches to modern dance.*

Syllabus: This module aims to develop knowledge of social and historical influences in the development of modern dance over the past 300 years and to develop

understanding of anatomy in relation to the dancing body. The module also aims to raise awareness of the social construction of dance knowledge, dance practices and their historical contexts and a critical approach to source material. The main focus of the course will be on Romanticism, Classicism, Neo-Classicism, Modernism, Post-Modernism and the twentieth century history of Irish theatre dance. The module will develop students' independent research, library research/source location skills and critical thinking.

MD4131 - HIP-HOP-DANCE ELECTIVE 1
ECTS Credits: 6

Humanities

Rationale and Purpose of the Module: *To provide students with the opportunity to become competent in hip hop dance so that they can develop the skills and confidence to work towards the creation of Hip-Hop compositions in a range of performance contexts, which will broaden their career options in Dance.*

Syllabus: Over this elective, students will learn, in studio, the roots of Hip-Hop and its evolution from the streets of New York city in the 1970s. Emphasis will be placed on learning about roots of Hip-Hop through class participation and learning the choreography of these dances and origins. By utilizing contemporary chorographic techniques, dancers will create new works for performance.

MD4141 - IRISH DANCE PERFORMANCE SKILLS
ECTS Credits: 6

Humanities

Rationale and Purpose of the Module: *This elective will be offered to musicians and dancers whose performance practice is outside of the Irish dance tradition. It will add to their performance skill set and increase their versatility and dance competence. It also reflects the strengths of Academy faculty.*

Syllabus: Development of good basics in Irish dance technique. Students will continue to develop basic Irish dance steps and movement patterns. Music /dance connection will also be explored. The following tune types will be among those used to teach Irish dance rhythm: Reel, jig, hornpipe, waltz and polka. Posture, turnout and footwork will be emphasised to give students a basic dance vocabulary which they can draw on. They will learn motifs suitable for soft shoe and more rhythmic hard shoe dancing.

MD4207 - HIGH LONESOME: SOUNDS AND NARRATIVES OF COUNTRY MUSIC
ECTS Credits: 6

Humanities

Rationale and Purpose of the Module: *This is an elective module for second, third or fourth year BA Irish Music and Dance Students interested in issues of ethnicity and identity as imagined, expressed, and performed through the genre of Country music in Ireland and in the US. Understanding this genre as a vernacular tradition in its particular regional/national contexts will shed light on what is at stake for those who perform and consume country music.*

Syllabus: Students will look at the phenomenon of country music, placing particular emphasis on connections between Ireland and America as manifest in the sounds and narratives of this genre. The course will involve gaining a greater understanding of the vernacular tradition(s) of country music (i.e. country music in Ireland), as well as more generally concerned with definitions of the genre and how and where these definitions hold up or break down under scrutiny. Focusing on `narratives of country music will involve looking at song themes and topics (such as loss and desire, myth of the West, the open road, etc), as well as inviting a greater understanding of the genre itself and the kinds of musical/historical/political/cultural pathways it has and continues to follows (spiritual dimension, ethnic profile, national characteristics, gender roles, song construction). Ultimately, students will concern themselves with the questions of how identity is imagined, constructed, maintained, and negotiated though sound, sentiment, and narrative song performance and its subsequent reception in historical and current contexts.

ME4001 - INTRODUCTION TO ENGINEERING 1
ECTS Credits: 3

School of Engineering

Rationale and Purpose of the Module: *To introduce the profession of engineering, develop non-technical skills such as report writing, encourage a spirit of research and self-study, develop students knowledge of the use of engineering units*

Syllabus: Overview of the engineering disciplines currently being offered by the Mechanical and Aeronautical Engineering department: The profession (Mechanical, Aeronautical, Biomedical, Design), real-life engineering examples, skills required, career opportunities and career progression. Materials used in engineering products, alloys of iron, steel and aluminium, ceramics, polymers, composites; materials specific to biomedical and aeronautical applications. Ethics in engineering; report writing including information sources, plagiarism; units and error analysis; problem solving techniques; time management; sustainability; intellectual property rights and the patent process.

ME4037 - ADVANCED MECHANICS OF SOLIDS
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: *To analyse stresses and strains in 2D and 3D in an elastic body subjected to various loading conditions. To analyse stresses and strains in uniaxial, biaxial and axisymmetric stress fields for elastomers. To understand how to apply stress functions to problems in bending, contact stress and pure shear. To use numerical techniques combined with experimental analysis for the solution of complex problems.*

Syllabus: Stress at a point in 3D. Strain at a point in 3D (including finite strain). Theory of 3D strain rosettes and Morie grids. Constitutive relations for finite strain analysis of elastomers. Theory of elasticity: Equilibrium and compatibility, stress functions (various applications). Hertzian contact theory. Photoelasticity. Holography. Curved bars and struts.

ME4057 - AEROSPACE METALLIC MATERIALS
ECTS Credits: 6

School of Engineering

ACADEMIC CONTENT IS NOT CURRENTLY AVAILABLE FOR THIS MODULE – UPDATES ARE IN PROGRESS

ME4112 - ENGINEERING MECHANICS 2
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: *The overall objective of the course is to enable students to apply Newtons Laws of Motion (in particular the second law) to objects in motion with non-zero acceleration. The course thus goes beyond the topic of statics, which was examined in Engineering Mechanics 1 (ME4111), and analyses the kinematics of bodies in motion, the rules used to describe the motion of bodies in space, and the kinetics, which relates the motion of bodies to the forces which give rise to the motion. The study of accelerating bodies is often referred to as Dynamics, as opposed to the study of bodies in equilibrium, which is referred to as Statics.*

Syllabus: Application of Newtons Laws to particles and rigid bodies not in equilibrium (Dynamics)
Kinematics of particles, rectilinear and curvilinear motion, Cartesian, polar, normal and tangential co-ordinates; relative motion.
Kinetics of particles, work, kinetic energy and potential energy, impulse and momentum.
Collections of particles, moment of inertia.
Kinematics of rigid bodies in plane motion, rolling wheels, mechanisms.
Kinetics of rigid bodies in plane motion, translation of rigid bodies, rotation about a fixed point and general plane motion

Prerequisites: ME4111

ME4121 - ENGINEERING SCIENCE 1
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: *To provide students with a basic knowledge of the fundamental principles underlying engineering mechanics.*

Syllabus: Units, Newton's Laws, Statics - condition for equilibrium, resolution of forces (polygon and components of forces), free body diagrams, friction on an inclined plane, Varignon's Theorem, Moments, Bending Moment Diagrams, Introductory stress (direct, shear, strain, Young's Modulus, principle of superposition, torque), Frameworks. Dynamics - linear motion angular motion, relative motion, Work, Energy, Newton's law of impact.

ME4128 - AIRCRAFT FLIGHT DYNAMICS AND SIMULATION
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: * *To provide the theoretical knowledge required to predict an aircraft's flight dynamical behaviour, given the vehicle geometry, configuration, and flight conditions.*
* *To develop the students' ability to implement such theoretical prediction methods via computer programming of numerical analysis methods.*
* *To develop an understanding of the link between aircraft design and flight dynamics response.*
* *To give a brief introduction to the theoretical foundations behind aircraft flight simulation software*

Syllabus: * Equations of motion for a rigid body aircraft
* Physical effects behind longitudinal and lateral stability derivatives
* DATCOM methodology for stability derivative calculation
* Use/development of customised MATLAB scripts for analysing flight dynamics and plotting results
* Solution of the equations for controls-fixed longitudinal motions, phugoid and short period modes
* Solution of the equations for controls-fixed lateral motions, rolling convergence, spiral and Dutch roll modes
* Variation of flight dynamics with vehicle design, configuration and flight condition
* Flying and handling qualities
* Introduction to flight simulation

ME4213 - MECHANICS OF SOLID 1
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: *To analyse stresses and strains in a uniaxial stress field and stresses in a bi-axial stress field.*
To understand how to evaluate stresses in a cylindrical beam subjected to point loads, uniformly distributed loads, couples and torques.
As (2) for beams of symmetrical section without torsion.
To understand the significance of the connection between the elastic constants.
To understand the approach to the analysis of statically indeterminate problems.

Syllabus: Uniaxial stress and biaxial strain fields. Constitutive relations. Shear force and bending moment diagrams, Bending of beams, Transverse shear stress in beams, Composite beams, Thermal stress, Torsion of cylindrical sections, Analysis of stress at a point in 2D, Principal stress and Mohr's stress circle, Thin cylinders and thin spherical vessels.

ME4227 - AIRCRAFT STRUCTURES
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: *Module builds on the Mechanics of Solids 2 module by providing further skills in the analysis of stress, strain and deformation of aircraft structures.*

Syllabus: Theory of elasticity; Airy stress function. Energy methods for structural analysis. Shear and torsion of open and closed thin walled sections, single and multicell sections. Bending and twisting of thin plates. Structural instability; inelastic buckling, buckling of thin plates. Laminated composite structures; stress analysis, failure criteria. Stress analysis of aircraft components; fuselages, wings. Application of proprietary structural analysis software packages and the application of Finite Element Analysis to aircraft structures. Experiments on tapered wing spars, c-and z-section beams.

Prerequisites: ME4616, ME4226

ME4307 - BIOMATERIALS 1
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: *Review understanding of biological systems;*
To gain appreciation for soft tissue replacement materials in current use;
To enable the student to understand materials selection and design requirements for soft tissue replacement applications.

Syllabus: Materials for soft tissue replacement. Survey of applications, haemocompatible materials, materials for vascular grafts, stents and heart valves, artificial skin, tendon ligament. Materials for cosmetic implants. Opthalmic materials. Active implanatable devices, extracorporeal artificial organs. Dressings, sutures, drug delivery materials/systems.

ME4417 - BOUNDARY LAYER THEORY
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: *To advance the knowledge of the students of fluid flow, aerodynamics and convective heat transfer*

Syllabus: The Derivation of the Three-Dimensional Viscous, Steady, Compressible Equations of the Conservation of Mass, Momentum and Energy.
The Distinction between Differential and Integral Solutions.
Differential Solutions for Simple Pipe Flow with Heat Transfer and Couette Flow.
The Von-Karmen Integral Solution of Flat Plate Flow with Heat Transfer.
Dimensional Analysis for Free and Forced Convection: the Non-dimensionalised Differential Equations.
Shear Stress Drag and the Reynolds Colburn Analogy.
Theories of Turbulence: The Prandtl - Mixing Layer Theory, the K-E Model.
The Effect of Turbulence on Drag and Heat Transfer: The Elements of a Turbulent Boundary Layer

Prerequisites: ME4412

ME4424 - AERODYNAMICS 1
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: *To give the student a comprehensive understanding of incompressible flow together with an introduction to compressible flow with application to aircraft.*

Syllabus: Review of governing equations, application of equations to fluid flow processes
Thin aerofoil theory, aerodynamic coefficients
Finite span wings, lifting line theory, vortex flow, induced drag, downwash, lift distribution
Boundary layer separation and control
Compressible flow, normal and oblique shock waves, aerofoils in compressible flow
Introduction to experimental techniques

Prerequisites: ME4412

ME4438 - COMPUTATIONAL FLUID DYNAMICS
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: *1. To provide the students with a fundamental understanding of the theory and application of computational fluid dynamics (CFD) as implemented by the finite volume technique.*
2. To provide the students with a working knowledge of a commercial CFD code via practical computer laboratory sessions.

Syllabus: The philosophy of CFD; fundamentals of vector fluid dynamics; fundamentals of viscous fluid deformations; the governing equations of fluid dynamics; basic discretisation and grid generation techniques; the finite volume method; application to convection-diffusion problems; pressure-velocity coupling; implementation of boundary conditions; fundamentals of turbulence modelling.

ME4517 - ENERGY MANAGEMENT
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: *To provide an understanding of; the requirements for, and the methods of, energy management as applied to a variety of engineering systems.*

Syllabus: Fossil fuel reserves and rates of consumption. Energy situation in Ireland , trends and issues, present and future. Energy and the environment. Energy tariffs and their significance in industry. Energy conservation technologies for industry. Energy Management Systems. Combined Heat and Power. Renewable Energy Sources. Modelling thermal equipment. Heat exchanger effectiveness and number of transfer units. Advanced steam and gas turbine cycles

Prerequisites: ME4526, ME4516

ME4523 - THERMODYMANICS 1
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: *To introduce the First and Second Laws of Thermodynamics and to apply these laws in the analysis of basic engine cycles*

Syllabus: First law of Thermodynamics with applications to non-flow and to steady flow processes.
General Thermodynamic relationships and properties.
Statements of the Second Law of Thermodynamics including Carnot efficiency.
Corollaries of the Second Law of Thermodynamics including the Clausius inequality and concepts of irreversibility.
Otto, Diesel and Dual reciprocating engine cycles.
Joule cycle with applications to simple gas turbine engines.

ME4818 - MECHANICAL DESIGN
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: *To expose the student to the practical application of design, materials, mechanics and strength of materials theory. The work will focus on the appropriate use of Standards, Charts and Design Guides illustrating the oft times empirical nature of applied engineering tasks. Underpinning each topic will be constant reference to the evolution of the practices and their relationship to current theory. In particular, there will be constant reference to the life and reliability to be expected from solutions.*

Syllabus: [Integration of machine elements into design.] Overview of common engineering materials and their functional properties. Review of steels and heat treatment processes relevant to transmission design. Practical aspects of stress analysis as used in industrial applications. Stability of design elements. Aspects of component life, cost and reliability.
Introduction to bearings, types and selection criteria. Rolling Contact Bearing selection using catalogue data. Shaft
design as an example of a simple component. Shaft couplings and keys. Flat, V, Wedge and Polyvee belts and chain
drives. Review of the history of gear design showing the relationship to fatigue theory. Advantages of helical and spiral bevel gears in relation to noise, wear and strength. Clutches and brakes - selection considerations. Electric motors - types
and control options. Starters and protection devices. [Design for Fatigue Life] Use of fatigue data, load and environment
factors in design and selection.
[Pressure vessel design.] Use of standards. Materials and life considerations. Corrosion
protection. Safety and the work environment. Testing and certification.
[Hydrostatic Transmission Systems.] Design of circuits for simple tasks. Linear and rotary actuation devices. Pump and motor types and selection, Circuit safety and calculation considerations. Control and speed circuits and devices.

ME6001 - FUNDAMENTALS OF CONTINUUM MECHANICS
ECTS Credits: 6

School of Engineering

Basic concepts and definitions: Concept of a continuum, continuity, homogeneity and isotropy; Elements of vector and tensor algebra.
Deformation and flow: Length and angle changes: Strain tensor; Material and Eulerian description; Deformation rate tensor
Stresses: Body and surface forces; Stress tensor; Principal stresses, Stress invariants, Hydrostatic and deviatoric stresses.
Fundamental laws of continuum mechanics: Mass conservation, Newtons laws, Conservation of energy.
Constitutive relations: Ideal materials; Constitutive relations and equations of state; Elastic solids; Newtonian fluids
Mathematical models: Linear elastic solids; Newtonian fluids; Initial and boundary conditions.
Introduction to the Finite Element method: Principle of virtual work; Finite element discretisation; Linear elastic finite-element model; Shape functions; Numerical quadrature; Mapping of elements; Solution of the finite-element equations.

ME6051 - ADVANCED TECHNICAL COMMUNICATION FOR ENGINEERS
ECTS Credits: 3

School of Engineering

This module builds a foundation for the dissemination of research results by preparing engineering students for publishing/writing as a part of their professional careers and/or further postgraduate studies. Students in this module examine the communicative, metacognitive, affective and social strategies that they employ as they negotiate their way through their writing, research and publishing processes. Students develop criteria for measuring the effectiveness of the strategies they employ as they go through these three processes and develop strategies for developing alternatives to ineffective strategies. Students also learn to assess the context into which they write in order to better inform their lexical, grammatical, rhetorical and ethical choices. Such choices take audience and purpose into account as well as genre: industrially focused conferences/seminars, academic conferences and academic journal articles. Students learn the transferable value of skills employed for contextual assessment to other professional writing contexts and develop and begin exercising a long-term writing-for-publication strategy.

ME6061 - COMPOSITE AIRCRAFT STRUCTURES
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: - *To give students a good understanding of design practice in composite aircraft*
structures
- To provide understanding of composite manufacturing processes -material and
structural performance relationships
- To give a broad understanding of principles and techniques of composite stress
analysis, strength and service durability predictions of composite aircraft structures
- To develop knowledge of the basics of impact damage, damage tolerance in
composite aircraft structures

Syllabus: - Polymer composite materials- basic description of structure and characteristics; comparison with traditional metals
- Mechanical characterisation techniques for basic property measurement
- Mechanics of fibre reinforced laminates- stress analysis; prediction of stiffness and strength- calculation techniques
- Impact damage on polymer composites and compression after impact strength
- Damage initiation and growth in composites - damage tolerance of composite
aircraft structures
- Design issues in composite aircraft structures- Examples from recent large civil and military aircraft
- Composite aircraft structure inspection and repair
- Certification approaches and continued airworthiness in composite aircraft

---

ME6141 - HEAT AND MASS TRANSFER
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: *The rationale of this module is to augment the choice of electives on the one year MSc in Mechanical Engineering and in year 5 of the integrated BE/ME in Mechanical Engineering with a module that covers heat and mass transfer phenomena of relevance to a wide range of engineering applications - energy systems, buildings, human comfort, chemical processes, and transport (automotive / aerospace).*

The purpose of the module is to cover the physical principles and engineering science associated with heat and mass transfer, encompassing conduction, convection, radiation, phase change, and diffusive and convective mass transfer.

Syllabus: Overview of heat and mass transfer; modes of heat transfer; thermal resistance; conductive heat transfer; thermal conductivity; Fourier's Law and multi-dimensional steady-state conduction; transient conduction - the lumped capacity approximation and exact methods; analytical and numerical techniques for conduction; Newton's Law and the heat transfer coefficient; thermophysical properties of fluids; boundary layers and dimensionless groups; correlations for forced convection including external and internal forced convection, and natural convection, for laminar and turbulent flows; mass transfer analogies; diffusive and convective mass transfer; boiling heat transfer, condensation and evaporation; interfacial phenomena; humidity; heat exchangers - the overall heat transfer coefficient and the log-mean temperature difference, and the effectiveness Number of Transfer Units (NTU) method; principles of radiation - blackbody radiation and Planck's distribution; surface properties - emissivity, absorbtivity, reflectivity and transmissivity; Kirchoff's Law; view factors and radiation networks; solar and environmental radiation; radiation shields; and an overview of measurement techniques for temperature, flow, pressure, humidity and concentration.

MG4031 - MANAGEMENT PRINCIPLES
ECTS Credits: 6

Management and Marketing

Rationale and Purpose of the Module: *This module is designed to provide a comprehensive introduction to the area of management. It introduces students to key managerial issues and wider environmental factors affecting organisations.*

Syllabus: Management concepts and evolution, the development of Irish business, the global business environment, functions of management, planning, decision making, organising, staffing, leading, motivating, controlling.

MG4035 - INTERNATIONAL MANAGEMENT
ECTS Credits: 6

Management and Marketing

Rationale and Purpose of the Module: *The rationale for this module is to provide students with a thorough appreciation of managing organisations internationally, along with an understanding of the different trajectories of current International Management thinking. The module is dedicated to answering four core questions which focus on developing skills for operating in an international environment;*

1). What is international management and what complexities arise when operating at the international level?
2.) How do we understand differences between countries when managing internationally, and what are the implications of these differences for international managers?
3.) What is the most appropriate way for firms to internationalise, and to manage and structure their activities?
4.) How can we develop the managerial talents and capabilities to ensure that managers can be a success internationally

Syllabus: Introduction to International Management-definitions and key concepts; Country Competitiveness, Globalisation & the MNC; Political and Legal Determinants of International Management; Cultural Determinants of International Management and cross cultural perspectives of management practice, convergence, divergence and cross vergence; Firm Internationslisation - Entry Strategies, Structures and the role of alliances and joint ventures; Global Leadershio competences; International Assignment Cycle and repatriation.

MG4045 - CHANGE MANAGEMENT
ECTS Credits: 6

Management and Marketing

Rationale and Purpose of the Module: *1. To enable students to gain a deeper understanding of organisational reality through the different levels and perspectives of change inside and outside the organisation.*
2. To develop a deep appreciation of the inter-relationship between routines and change in terms of structure, culture management intervention and modes of reinforcement.
3. To actively engage students to develop skills in proven approaches to managing change and crises in both for-profit and not-for-profit organisations.
4. To enable students to gain a deeper understanding of the challenges and complexity of international change management.
5. To give students a deep appreciation of the organisational and environmental roadmap of change.

Syllabus: Nature of organisational change, resistance to change, understanding attitudes and behaviours towards change, managerial skills of change agents, problems facing change agents, levels of organisational change, formation of implementation paths, mobilising for change, change levers and interventions, strategic change frameworks, monitoring, control and resourcing change, evaluating change, crisis management, management of stakeholders in change and crisis management.

MI4007 - BUSINESS INFORMATION MANAGEMENT
ECTS Credits: 6

Management and Marketing

Rationale and Purpose of the Module: *To illustrate the implications of viewing the organization as an information processing entity*

To enable students to create and manipulate data and information for managerial reporting.

To highlight the social and economic theories underlying the development and use of information and knowledge in modern business.

To make students aware of the challenges of the opportunities and challenges of information in a global context.

Syllabus: This course will introduce the student to information as a corporate resource; to the firm as an information processing entity; to the types of business systems platforms in support of- managerial and executive-level decision making and the coordination of business processes. It will show information management in the functional areas of business: accounting, marketing, human resources, operation. It will provide an economic and social framework for understanding the nature and interaction of information, technology, people, and organizational components; the role of the Internet and networking technology in modern organization; the evolution of e-business and the transformation of organizations and markets; business systems as both constraining and enabling organizations; the relationship between business systems and an organizations social structure; information and knowledge as a strategic resource in organizations.

MK4005 - MARKETING INTELLIGENCE
ECTS Credits: 6

Management and Marketing

Rationale and Purpose of the Module: *This course is about gathering, analyzing, and interpreting data about markets and customers, so as to make informed marketing decisions. Students will learn how to determine what information is required to make the decision, how to acquire trustworthy and relevant data, how to assess its appropriateness, and how to analyze the data to make key types of marketing decisions. The module is focused on utilising marketing data, and transforming them into actionable marketing insights, that aids in the development of effective strategy.*

Syllabus: Sources and Use of Marketing Intelligence, The Role of Research and Intelligence in the Marketing Organisation, Typologies of Marketing Data (Interaction, Attitudinal, Descriptive, & Behavioural Data), Research for Marketing Decision Making, Marketing Databases, Marketing Segmentation & Targeting, Loyalty Cards, New Product Development &Test Marketing, International Market Analysis, Advertising Research, Media Research, Sales Forecasting, Salesforce Automation, Marketing Automation, CRM Systems, Category Management, Store Location Techniques, Pricing Research, Customer Feedback, Key Performance Indicators Used in Marketing, Marketing Metrics, Appropriateness of Research Methods - (Survey, Questionnaire, Interviews & Observation), Social Media Intelligence, Social CRM, Data Mining & Big Data, Customer Privacy & Ethics.

MK4027 - STRATEGIC BRAND MANAGEMENT
ECTS Credits: 6

Management and Marketing

Rationale and Purpose of the Module: *The purpose of this module is to equip students with the fundamental concepts and theories of strategic brand management and enable them to critically engage with and apply key brand management theories and strategies to a range of relevant sectors and contexts. This level 8 marketing module provides students with specialised strategic brand management knowledge and skills, while engaging students in a range of current branding issues including the role of ethics and CSR and global branding.*

Syllabus: The module firstly presents the history and origin of branding before focusing on brand building theories and models. It then explores the nature and role of brand image and corporate identity and corporate brand management. Brand equity from a consumer and financial perspective is introduced and compared. Brand building strategies are explored in a range of contexts including services, retailing, B2B and online. Strategic brand building is explored with strong emphasis on developing valuable, sustainable and ethical brands and managing successful brands in an increasingly globalised and digitalised context.

Prerequisites: MK4002

MK4035 - MARKETING RESEARCH
ECTS Credits: 6

Management and Marketing

Rationale and Purpose of the Module: *The module specifically focuses upon the development of applied research skills which are fundamental to understanding and undertaking marketing activities. The purpose of the module is:*
** To expose students to different methodologies used by marketers.*
** To develop marketing research skills that can be applied to a range of marketing contexts (e.g. sales, advertising, NPD, customer satisfaction).*
** To equip students with the skills necessary to; develop research instruments, conduct fieldwork and data analysis/interpretation and present research findings.*
** To encourage and support effective team work and project management.*
The module is thus designed to enhance students' applied skills (and integration of theory and practice) before they embark on their coop placement.
** To promote critical reflection on the nature of information, the integrity of it and the application of a systematic and disciplined approach to information gathering.*

Syllabus: The marketing research skills will be fostered through management of an extensive student project: Developing research objectives (e.g. problem definition); Research design and creation of a research proposal; Consideration of the ethical implications of the research; Collection, analysis and interpretation of secondary data; Collection, analysis and interpretation of primary data; Research presentation.

Prerequisites: MK4002

MK4045 - DIGITAL MARKETING
ECTS Credits: 6

Management and Marketing

Rationale and Purpose of the Module: *Digital marketing platforms have changed how businesses connect and communicate with customers. The technology now available to consumers has radically altered their consumption patterns. These new behaviour patterns have created significant challenges and opportunities for marketers. This module gives a background of the rapidly changing marketing practice within the context of digital marketing and online social networks. Students will understand the magnitude of digital and social media and how to apply it to within Business-to-Consumer (B2C) and Business-to-Business (B2B) markets. Students will learn about cutting-edge digital marketing concepts, techniques and strategies used within industry. Furthermore students will understand how to leverage mobile and location-based technology for marketing purposes. After this module, from a practical perspective the student will be capable of developing and managing digital marketing campaigns.*

Syllabus: Introduction to Digital Marketing Theory; Consumer Behaviour and Digital Media; Online Identities; Evolution of Digital Marketing Landscape; Understanding Business-to-Consumer (B2C) and Business-to-Business (B2B) marketing in this new landscape; Social Media & Content Marketing Platforms (Social Networks, Discussion Boards, Blogging, Micro-Blogging, Widgets, Crowd Sourced Content, Social Curation, Social Marketplaces, Wikis, Social Bookmarking); Search Engine Marketing; PPC Advertising; Search Engine Optimisation; Email Marketing Campaigns; Website Analytics; Building a Digital Brand; Typologies of Online Brands; Digital Products & Freemium Business Model; Online Communities Creation and Curation; User Generated Content & Co-Creation; Mobile and Location-based Marketing; Content Marketing Development, Online PR & Reputation Management; Planning a Social Media Campaign; Impact of Gamification; Word of Mouth and Viral Marketing; Social Media Metrics; Monitoring, Measuring and Management of Social Media Campaigns; Omni-channel - Integration of Digital Marketing with Traditional Marketing Activities; Digital Privacy and Protection; Ethical Digital Marketing Practice, Trends in Digital Marketing.

MK4603 - MARKETING
ECTS Credits: 6

Management and Marketing

Rationale and Purpose of the Module: *The purpose of this module is to introduce students to marketing as a business philosophy and as a management function and to examine the role of marketing in contemporary organisations. This focuses on the need to understand and connect with customers and to develop and deliver products and services that customers value.*

Syllabus: Marketing scope; marketing concept; marketing internal and external environment; understanding customer behaviour; segmentation, targeting and positioning; product and brand management; marketing communications; pricing; distribution; marketing of services; marketing and corporate social responsibility.

MN4007 - PROJECT MANAGEMENT THEORY AND PRACTICE
ECTS Credits: 6

Management and Marketing

Rationale and Purpose of the Module: *The primary objective of this module is to provide students with the knowledge, skills and understanding necessary to apply Project Management principles, tools and techniques to help initiate changes to achieve specific pre-determined project objectives in line with organisational goals and strategies. The module will prepare students for the workplace by developing their understanding of Project Management knowledge areas and Project Management processes. The student will benefit from understanding how projects are initiated, implemented, monitored and controlled and closed within a change environment.*

Syllabus: Project management organisational strategy and change, project portfolio management, programme management, project lifecycles, project processes, project management strategies and approaches, projects, operations and change, project human resource management, role of the project manager-change agent, project leadership, role of the project team, projects and organisational structures, implementing change though project initiation, project selection, project integration management and project implementation. Developing the project charter, developing the project plan, project communications management, project risk management, project scope management, project estimates, top down estimating, bottom up estimating, project budgets and project baselines, project time management, activity scheduling, resource allocation, project monitoring and control, earned value - monitoring change, cost and schedule variance, cost and schedule performance indices, project change management, project quality management, project computer applications, project closure.

MS4008 - MATHEMATICAL METHODS 2: Numerical Methods for Partial Differential Equations
ECTS Credits: 6

Mathematics & Statistics

Rationale and Purpose of the Module: *Having completed this module, the students should understand and be able to apply the standard finite difference methods for the numerical solution of two-dimensional linear partial differential equations; they should also understand how the finite element method is used to solve similar problems.*

Syllabus: Finite difference methods: Elliptic problems: stability, consistency and convergence; parabolic problems; explicit and implicit methods, Von Neumann stability analysis; hyperbolic problems; method of characteristics.

Finite element method: Introduction to FEM for elliptic problems: analysis of Galerkin FEM for a model self-adjoin two point boundary value problem, weak solutions, linear basis functions, matrix assembly; extension of method to two dimensions, triangular and quadrilateral elements.

Prerequisites: MS4404

MS4021 - CALCULUS 1
ECTS Credits: 6

Mathematics & Statistics

Rationale and Purpose of the Module: *This module introduces differential calculus and analysis. It develops problem solving skills and introduces concepts such as*

definition, lemma, theorem, proof and different methods of proof, including direct, contrapositive and induction.

Syllabus: • Basic properties of the real numbers: Important subsets (natural, integers, rationals), open and closed intervals, neighbourhoods, supremum, infinimum,
boundedness, compactness.
• Algebra of Complex numbers: modulus, phase, Argand diagrams, de Moivre's
theorem and roots of complex numbers.
• Real valued functions: Definition of function, properties of functions: one-to-one, onto, inverse function, composition of functions, parametric functions.
• Limits and continuity: Definition of limit, limit theorems, limit points,
definition and meaning of continuity, examples of discontinuous functions
(e.g. Heaviside step function), Squeezing Theorem, Intermediate Value Theorem, Bisection Method.
• The derivative and differentiation techniques: Differentiation from first
principles, derivative of sums, products, quotients, inverse of a
function, chain rule, smoothness of a function, Rolle's theorem,
Mean Value Theorem.
• Properties of transcendental functions: Including trigonometric, exponential logarithmic and hyperbolic functions; derivatives and inverse functions.
• Applications of differentiation: Finding roots of equations (Newton's method),
Indeterminate forms (L'Hopital's rule); implicit differentiation; optimisation applications, the Second Derivative Test.
• Curve sketching: Domain and range, roots of equations, increasing and decreasing, maxima and minima, concavity, points of inflection, symmetry, asymptotes.

MS4027 - FUNDAMENTALS OF FINANCIAL MATHEMATICS
ECTS Credits: 6

Mathematics & Statistics

Rationale and Purpose of the Module: *This course is an introduction to financial mathematics.*
Using discrete-time stochastic models, the pricing and hedging of financial derivatives in arbitrage-free markets is studied.

Syllabus: Introduction to Derivative Securities: Futures, Forwards, European,
path-dependent, and American stock options.
Introduction to Interest Rate Derivatives,
with a focus on bonds and Forward Rate Agreements.

Using arbitrage arguments to prove properties of options, inequalities, as well as the put-call parity.
Introduction to binomial trees and risk-neutral valuation of options via replication arguments (delta-hedging).

Probability theory on finite sample spaces: conditional expectations, martingales,
risk-neutral pricing. Use the concept of conditional expectation
to formulate and prove the Fundamental Theorems of Asset Pricing I and II.

Value and super-replication of American put options.

Simple time-series models (ARMA(p,q)) for modelling and trading trends
and mean-reversion.

Prerequisites: MS4035

MS4035 - PROBABILITY MODELS
ECTS Credits: 6

Mathematics & Statistics

Rationale and Purpose of the Module: *This module replaces module MS4213 Probability Theory.*
It is being created as part of major changes to LM058/LM060, brought about in part by Project Maths.
The new first year module MS4222 now contains some probability and this module builds on and extends that knowledge.
The intention in this module is to firmly establish the connections between probability theory and its role in statistical applications.

Syllabus: Continuous Random Variables: expectation and variance;
uniform, normal, exponential, gamma, beta, Cauchy, Weibull,
distribution of a function of a random variable.

Jointly Distributed Random Variables: joint distribution functions, sums of
independent random variables, conditional densities, functions of jointly distributed
random variables, (sum, difference, product, and quotient of two random variables).

Properties of Expectation: computing probabilities and expectations by conditioning,
conditional variance, conditional expectation and prediction.

Sampling Distributions: the central limit theorem, the t-, chi-squared
and F distributions and their use as sampling distributions; joint distribution of order statistics, distribution of sample range.

Estimation: method-of-moments, fitting standard distributions to discrete
and continuous data, pivotal quantities, confidence intervals.

Simulation: Monte Carlo methods, variance reduction techniques,
applications of simulation.

Prerequisites: MS4222

MS4043 - METHODS OF LINEAR ANALYSIS
ECTS Credits: 6

Mathematics & Statistics

ACADEMIC CONTENT IS NOT CURRENTLY AVAILABLE FOR THIS MODULE – UPDATES ARE IN PROGRESS

MS4045 - COMPLEX ANALYSIS
ECTS Credits: 6

Mathematics & Statistics

Rationale and Purpose of the Module: *To introduce the concept of an analytic function of a complex variable and integration on the complex plane.*

Syllabus: Single- and multi-valued functions, branch

points and branch cuts; analytic functions, the Cauchy-Riemann equations; Laurent series, poles and essential singularities; Cauchy's Integral Theorem, Cauchy's Integral Formula; the Residue Theorem, the Estimation Lemma, Jordan's Lemma, integration of functions with branch points; conformal mappings; analytic continuation.

Prerequisites: MS4022

MS4101 - MATHEMATICAL LABORATORY
ECTS Credits: 6

Mathematics & Statistics

Rationale and Purpose of the Module: *To introduce students to a symbolic algebra package (Maple) as a mathematical problem-solving tool.*

Syllabus: [Using a symbolic algebra package (MAPLE) for the analysis and solution of simple mathematical models.] Systematic approach to scientific problem-solving.
Extensive use will be made of case studies and assessment will be largely project based.

MS4105 - LINEAR ALGEBRA 2
ECTS Credits: 6

Mathematics & Statistics

Rationale and Purpose of the Module: *The aim of this module is to introduce some more advanced concepts in Linear Algebra and Numerical Linear Algebra*

Syllabus: Complex vector Spaces: Review of real vector and innner product spaces. Complex inner product spaces. Gram-Schmidt process. Unitary, normal and Hermitian matrices. Eigenvectors and eigenvalues. Diagonalisability. Schur's Lemma. Jordan Canonical form. Singular value decomposition.
Introduction to Function spaces. Normed spaces and Banach spaces. Standard examples such as C([a,b]) and sequence spaces. Bounded linear operators and continuous linear functionals. Operator norms. Hilbert space and Riesz representation theorem.
Numerical Linear algebra. Krylov subspace methods. Foundations of Conjugate Gradient method. Other iterative methods for solutions of systems of equations. Application of Krylov subspace methods to finding eigenvalues. Lanczos algorithm.
QR factorization.

Prerequisites: MS4102

MS4111 - DISCRETE MATHEMATICS 1
ECTS Credits: 6

Mathematics & Statistics

Rationale and Purpose of the Module: *The aim of this module is to introduce students to some of the language of Discrete Mathematics, and to show its relevance, particularly in the context of Computer Science. It is taught at a level that is appropriate to first year students, i.e. without an excess of formality. The module should re-inforce the development of the students "thinking" skills, and should enable them to undertake further study in the various applied areas of Discrete Mathematics (coding, graphs, logic and formal systems etc)*

Syllabus: Review of sets and operations on sets, power sets.

Propositional logic, truth tables, propositional calculus, equivalence.

Predicate logic, quantifiers, equivalence, application to (mathematical) proof.

Cartesian product of sets, relations, equivalence relations, matrix representation of relations, composition of relations, functions, types of functions.

Number systems, natural numbers, integers, rationals, reals, axioms for N, proof by induction, recursive definitions and algorithms, recurrence relations.

Representations of N (binary, octal, etc), other number "fields".

Introductory combinatorics, permutations, combinations.

MS4117 - DISCRETE MATHEMATICS 2
ECTS Credits: 6

Mathematics & Statistics

Rationale and Purpose of the Module: *To give the student an understanding of the mathematics and apllications of Graph Theory. The applications to networks and to algorithms in Computer Science will be emphasised.*

Syllabus: Graphs, directed graphs and their computer representation.
Planar, Hamiltonian and Eulerian graphs.
Graph algorithms (Kruskal, Dijkstra, DFS, BFS etc)
Graph coluring with applications to scheduling.
Network flows and matchings.
Other topics will be covered from time to time: Ramsey Theory, random graphs, Huffman codes, graph drawing, Petri nets.

Prerequisites: MS4111

MS4131 - LINEAR ALGEBRA 1
ECTS Credits: 6

Mathematics & Statistics

Rationale and Purpose of the Module: *The aim of this module is to introduce students to the main ideas of Linear Algebra
and its many applications. The emphasis is on developing the student's ability
to perform calculations on and with matrices, particularly 2x2 and 3x3 matrices,
and on and with vectors in 2 and 3 dimensions.
These ideas are then extended to higher dimensions.*

Syllabus: Matrices: introduction to matrices, matrix algebra, transpose of a matrix, symmetric matrices, invertible matrices and their inverses, determinants.

Vectors in 2 and 3 dimensions: geometric interpretation of vectors, vector arithmetic, Euclidean norm, Euclidean scalar product, angle, orthogonality, projections, cross product and its uses in the study of lines and planes in 3 dimensions.

Lines and planes in 3-dimensional space: parametric equation of a line,
distance between a point and a line, point-normal form

and general form
of the equation of a plane, distance between a point and a plane.

Extension to vectors in n dimensions;

Systems of linear equations and their solution: Gaussian elimination methods
(Gauss, Gauss-Jordan) and inverse matrix method;

Matrices acting on vectors: eigenvalues and eigenvectors particularly
in 2 and 3 dimensions.

Applications: least squares fit, rotation matrices.

MS4214 - STATISTICAL INFERENCE
ECTS Credits: 6

Mathematics & Statistics

Rationale and Purpose of the Module: *This course introduces students to the formalities of statistical inference with special emphasis on problems of estimation, confidence intervals, and hypothesis testing.*

Syllabus: The notion of a probability model : examples, the need for estimation, confidence intervals and hypothesis tests.

Inference for normal data : chi-squared, t, F, confidence intervals, hypothesis tests, two means, two variances.

Central Limit Theorem : normal approximation to the binomial, application to inference for a single proportion and the difference between two proportions, the chi-squared test for independence.

The likelihood function : the maximum likelihood estimate (MLE), iterative methods for calculating MLE.

Repeated sampling properties : bias, variance, mean squared error, Cramer-Rao theorem, efficiency, the large sample behaviour of maximum likelihood estimates.

Interval estimation : pivotal quantities, confidence intervals, approximate confidence intervals based on the MLE.

Hypothesis testing : test statistic, Type 1 and Type 2 errors, power function, the likelihood ratio test.

Prerequisites: MS4213

MS4215 - ADVANCED DATA ANALYSIS
ECTS Credits: 6

Mathematics & Statistics

Rationale and Purpose of the Module: *Applies the theory developed in MS4213 and MS4214 to the development of advanced data analytic methods with particular emphasis on linear models. Students are introduced to a range of statistical packages.*

Syllabus: Simple Linear Regression : calibration, reverse prediction, regression through the origin, analysis of residuals, regression diagnostics, leverage and influence.
Matrix formulation of the linear model : Multiple regression, partial correlation, polynomial regression.
Analysis of Variance : One-way ANOVA, multiple comparisons, Two-way ANOVA, interactions, Analysis of covariance.
Introduction to Generalized Linear Models including nonlinear regression, logistic regression and log-linear models.

Prerequisites: MS4213, MS4214

MS4217 - STOCHASTIC PROCESSES
ECTS Credits: 6

Mathematics & Statistics

Rationale and Purpose of the Module: *The purpose of this module is introduce the students to the mathematical statistical analysis of probabilistic processes which develop over time.*

Syllabus: 1. Recap on probability (copies, expectation, MGF, PGF)
2. Random Walks (differences equations & their solutions)
3.Markov Chains (discrete state space, discrete time)
4. Markov Processes (discrete state space, continuous time)
5. Queues (multi-sever queues, steady state solutions)
6. Survival Analysis (basic objects, covariates, MLE)

Prerequisites: MS4213

MS4315 - OPERATIONS RESEARCH 2
ECTS Credits: 6

Mathematics & Statistics

Rationale and Purpose of the Module: *This module introduces further OR techniques for decision-making. The student will be able to apply these techniques to real life problems.*

Syllabus: Integer programming - pure integer programming algorithms, branch & bound solutions to mixed integer programming.

Deterministic dynamic programming - forward and backward recurrence formulations.

Probabalistic dynamic programming - finite and infinite stage problems.

Game Theory - Concepts of equilibrium, matrix games, extensive form games and repeated games.

Applications of game theory - models of economic competition (Cornot, Bertrand), evolutionary game theory.

Prerequisites: MS4303

MS4403 - ORDINARY DIFFERENTIAL EQUATIONS
ECTS Credits: 6

Mathematics & Statistics

Rationale and Purpose of the Module: *To introduce and consolidate the concepts and techniques necessary for solving ordinary differential equations(including non-linear ordinary differential equations and phase plane techniques).*

Syllabus: Classification, initial and boundary value problems.

Review of first order equations: separable equations, linear and nonlinear equations, integrating factors, exact

equations, homogeneous equations; existence and uniqueness; applications e.g., in mechanics, population dynamics.

Second order linear equations, homogeneous with constant coefficients, linear independence and Wronskian, inhomogeneous equations, variation of parameters, applications in oscillators, higher order linear equations, systems of equations.

Series solution of second order linear equations, regular and singular points, BesselÆs equation.

Sturm-Liouville theory

Nonlinear ODEs: ad-hoc solution techniques, introduction to the concepts of stability and phase plane techniques.

Prerequisites: MS4022

MS4407 - PERTURBATION TECHNIQUES AND ASYMPTOTICS
ECTS Credits: 6

Mathematics & Statistics

Rationale and Purpose of the Module: *To learn the basic concepts and techniques of asymptotic and perturbation methods.*

Syllabus: Non-dimensionalisation, scaling, ordering, definition of asymptotic series, algebraic equations, integrals, LaplaceÆs method, method of steepest descent, regular and singular perturbations, multiple scales, strained coordinates, boundary layer techniques.

Prerequisites: MS4403, MS4404

MS4613 - VECTOR ANALYSIS
ECTS Credits: 6

Mathematics & Statistics

Rationale and Purpose of the Module: * *To review the basic tools of linear algebra.*
* *To introduce the student to the laws of physics in vector form.*
* *To give the student a solid grounding in vector analysis.*

Syllabus: [Vectorial Mechanics:] rotation of axes, index notation, review of vector and scalar algebra (scalar vector and triple scalar products); vector functions of a real variable, functions of time; differentiation of vectors, derivative of dot and cross products, tangent to a curve, arclength, smoothness, curvature, applications in mechanics.
[Fields:] scalar and vector fields; functions of several variables, maxima/minima,contour maps, directional derivative and gradient vector of scalar fields; divergence and curl of vector field; applications in electromagnetism and fluid mechanics; vector identities; cylindrical and spherical coordinates.
[Line, surface and volume integrals] line integrals and work; conservation of energy and potential function; applications to planetary dynamics, area, surface and volume integrals; Gauss's GreenÆs and Stoke's theorems. Multiple integrals in radial, cylindrical and spherical coordinates, scalar and vector potentials, HelmholtzÆs theorem.
[Tensor Algebra and Calculus:] Review of matrix algebra introducing suffix notation; definition of determinant; evaluation of determinants by row and column expansions; eigenvalues and eigenvectors, introduction to Cartesian tensors.

Prerequisites: MS4602, MS4022

MS4627 - MATHEMATICS OF NATURAL PHENOMENA
ECTS Credits: 6

Mathematics & Statistics

Rationale and Purpose of the Module: *To introduce the concepts of modelling natural phenomena (biological and geophysical systems)*

Syllabus: Evolutionary game theory: populations, strategies, evolutionary success

Dimensional analysis: scaling, similarity.

Fractals

Waves: frequency, wave vector, phase velocity, group velocity

Stability: steady solution of PDEs and small perturbations, harmonic disturbances, normal modes

Boundary layer theory: flow near a plate, the Blasius problem

Prerequisites: MA4607, MS4404

MS6041 - QUALITY SCIENCE INTRODUCTION
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: *This module is being introduced to replace MS5441 and is a title change only to reflect Programme Modifications approved in the 2016/17 academic year. It will introduce Quality Science methodologies to industry based students on the SDIP in Six Sigma and MSc in Quality Management*

Syllabus: Introduce methods of Statistical Process Control, SPC for short run production, Cusum charts, multivari charts, individual/moving range charts.
Introduce Six Sigma Statistics, Process capability indices - Cp, Cpk etc., R&R studies, machine capability.
Design of Experiments Fractional and factorial designs, Taguchi methods, EVOP (evolutionary operation) experimentation.
Multiple Regression, two way analysis of variance.
Introduction to Reliability Theory.

MT4101 - INTRODUCTION TO MATERIALS
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: *To put the subject of Materials Science into historical and modern perspective*
To acquaint students with the range of materials available and their classification
To explain the origins of materials, their processing, properties and applications

Syllabus: [Historical background to development of

materials and] of the subject of [Materials Science].
[Classes of modern materials]:
- [metals] and alloys
- [polymers] and rubbers.
- [ceramics and glasses
- [composites] including concrete, wood, fibre-reinforced plastics and metal matrix
composites.
[Origin of these materials]:
- brief outline of extraction of metals from ores and of processing by casting and
mechanical treatment.
- introduction to polymerisation reactions and processing techniques of `plastics'
- overview of manufacture of ceramics, refractories and glasses.

[Properties] of the different classes [and standard testing techniques]
- mechanical properties
- physical properties
- chemical properties.

[Applications] of different materials [related to] their [properties]
Effects of temperature on polymers and metals.
Mechanical and thermal treatments and properties of alloys.

MT4105 - QUALITY SYSTEMS
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: *This course provides a concise introduction to quality management systems such as ISO 9001 and shows how these are integral to the success of Irish industry. Other management system including environment and health and safety are also introduced.*

Syllabus: Introduction
What is quality
Quality Assurance Vs Quality Control.
Interface between quality and other business functions
Inter-relationships between quality, reliability, price and delivery.
Quality Management Systems (QMS)
Historical development of ISO 9000
Introduction to ISO 19011
An outline of the elements of ISO 9001
Quality documentation - the purpose of the quality manual, procedures and work instructions.
Organising for quality -the importance of management commitment and leadership and the role of the quality function within the company.
Control of vendors - purchasing criteria and the control of raw materials and service suppliers; vendor assessment.
Auditing and registration - how to conduct audits, auditor criteria, how to apply for registration and what are the requirements.
Product testing and ISO 9001
Introduction to ISO 14001 and OHSAS 18001

MT4205 - FAILURE PROCESSES
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: *The aim of this module is to enable students to develop their understanding of the mechanisms by which materials undergo failure and enable them to evaluate critical values of stress and time at which failure occurs. Two further aims of this module are (i) to enable the students to be able to perform calculations relating to life prediction, (i) to enable the students to select materials and protection systems for use in corrosive environments.*

Syllabus: [Fracture] - chronological development of fracture theories; [linear elastic fracture mechanics]+ application to design etc.; dislocation theories of fracture - transition temperatures; theories of ductile fracture; [fatigue - life prediction] laws & relationships (S-N, Basquin etc.); Initiation of fatigue cracks; fatigue crack growth - Paris law; fatigue crack growth rates - effect of K on striation morphology; effect of surface finish & treatment; [stress corrosion cracking] - elementary corrosion science (up to over potential vs. i curves); relationship between stored strain energy , chemical energy & crack propagation; crack growth rates & life prediction techniques; corrosion - cathodic reactions; [corrosion mechanisms; protection processes]; creep - [creep Mechanisms] - primary, secondary, tertiary, dddislocation, diffusion, e.g. sliding; crack initiation & growth; life prediction techniques - rupture strength, creep strength, Larson-Miller, theta projection.

Prerequisites: MT4103

MU4001 - CRITICAL ENCOUNTERS WITH IRISH MUSIC AND DANCE
ECTS Credits: 6

Humanities

Rationale and Purpose of the Module: *This module is an introduction to the growing field of traditional music and dance studies and will give the student an overview of some of the important features of these traditions as well as current areas and modes of research in this context. The investigations presented in these modules will be particularly informed by the international disciplines of Arts practice research, ethnomusicology and ethnochoreology. Students here will also be introduced to responsible and accountable academic and research practices.*

Syllabus: Issues addressed in this module will be taken from current research engagements with the native Irish music and dance traditions. These will critically engage historical naratives, conceptual structuring and evolving identities of the traditions in question. A particular Arts practice lens will be engaged so students can experience the aesthetic and structure of the tradition per formatively. Students will be develop writing and presentation skills associated with such academic engagement and be introduced to concepts of research as a creative, scholarly practice.

MU4011 - CRITICAL ENCOUNTERS WITH WORLD MUSIC AND DANCE
ECTS Credits: 6

Humanities

Rationale and Purpose of the Module: *This module is an introduction to the growing field of world music and dance studies and will introduce the student to a critical engagement with the category and how it is imagined in a number of cultural contexts as well as current areas and modes of research. Students will be exposed to a selection of world music practices in an academic and peformative context, providing them with an insight into some of the diversity of music and dance practices on this planet. The investigations presented in this module will be particularly informed by the international*

disciplines of Arts practice research, ethnomusicology and ethnochoreology. Students here will also be introduced to responsible and accountable academic and research practices.

Syllabus: Issues addressed in this module will be taken from current research engagements with the concept of world music and dance and will examine a selection of diverse practices that are seen to constitute and sometimes challenge this category. These will critically engage historical narratives, conceptual structuring and evolving identities of the concepts and traditions in question. A particular Arts practice lens will be engaged so students can experience the aesthetic and structure of the tradition per formatively. Students will be develop writing and presentation skills associated with such academic engagement and be introduced to concepts of research as a creative, scholarly practice.

MU4017 - SECOND INSTRUMENT STUDIES ONE
ECTS Credits: 6

Humanities

Rationale and Purpose of the Module: *This module allows students on the BA Performing Arts to develop performance skills in a second instrument. Students will have the opportunity to critically engage embodied expressions of performance practice on an instrument and or practice other than that in their core Practicum A module. Students will engage these studies in a environment informed by recent principles in arts practice research. This module will give students invaluable new perspectives on their creative and artistic potential. This is an elective module to be offered throughout the BA in Performing Arts programme and is subject to the Irish World Academy being able to source appropriate expertise and resources.*

Syllabus: Students in this module will develop a second instrumental performance area in small group and one-on-one contexts. No previous experience of the adopted instrumental practice is necessary. Students will develop and document an appropriate practice regime as well as use reflective tools such as auto-ethnographic journals.

MU4021 - INTRODUCTION TO SONGWRITING
ECTS Credits: 6

Humanities

Rationale and Purpose of the Module: *The purpose of this module is to introduce students to the relevant skills and basic creative processes entailed in songwriting. By creating new work in a collaborative environment, students will develop as reflective artists and composers, engaging in meaningful self and peer-to-peer critique.*

Syllabus: Through weekly workshops, students will experiment with different methods of developing original songs, considering simple elements of melody, lyrics and structure of song.Through weekly lectures and engagement with post-graduate students of MA Songwriting, students will be exposed to a range of different songwriters of varying genres and styles. They will be encouraged to locate their own creative practice within the wider experience of songwriting, engaging in reflective practice through group discussion, and individual journaling and self-evaluation.

MU4023 - VOICE STUDIES: HISTORICAL AND CROSS CULTURAL PERSPECTIVES
ECTS Credits: 6

Humanities

Rationale and Purpose of the Module: *This module is an introduction to the field of voice studies and will provide the student with historical and cross-cultural perspectives on singing and voice training. Informed by a transdisciplinary understanding of singing across music cultures, the student will engage with important sources and current research in areas of vocal pedagogy, ethnomusicology and arts practice research.*

Syllabus: This module will offer a critical engagement with historical, contemporary and cross-cultural perspectives on singing and voice training, introducing the student to contextual theories and ideologies related to their primary field of practical study.

MU4033 - WORLD MUSIC AND DANCE SURVEY 1
ECTS Credits: 6

Humanities

Rationale and Purpose of the Module: *This module will introduce students to aspects of sound and movement from around the world, questioning the nature of what is 'World Music and Dance' in the 21st century digital age.*

Syllabus: This module will examine a selection of music and dance expressions from diverse places round the globe. Students will study the music and dance in the context of 'world music' with a specific focus on India, England, Scandinavia , West Africa, Scotland, Brittany, Galicia, North America and Indonesia .This module will be assessed through course-work and exam.

MU4135 - IRISH TRADITIONAL MUSIC 1
ECTS Credits: 6

Humanities

Rationale and Purpose of the Module: *This module is an introduction to the growing field of traditional music and dance studies and will give the student an overview of some of the important features of these traditions.*

Syllabus:
Issues addressed in this module will be dance tune types and structure, English language song tradition, instrumentation, traditional music and dance in America in the first half of the twentieth century, the harp tradition to 1800, modern step dancing, ceili dancing.

MU5033 - MUSIC THERAPY PRACTICE 2
ECTS Credits: 12

Humanities

Rationale and Purpose of the Module: *This module is focussed on psychodynamic and psychosocial approaches within music therapy practice including the following areas: adults in mental health contexts, medical contexts and community work, music therapy in addressing the needs of medical patients.*

Syllabus: Through a series of expert lectures and self study, students will develop an understanding of psychodynamic and psychosocial approaches within music therapy practice. Core theoretical frames to inform family work, and work with adults in mental health contexts, medical contexts and community work will be presented. Adult mental disorders û major diagnostic categories eg Schizophrenia, Depression and Bi-Polar disorder û will be covered. The role of music therapy in addressing the needs of medical patients will be presented. Students will attend a weekly experiential group. Clinical improvisation skills will be extended.

Prerequisites: MU5211

MU5043 - MUSIC THERAPY PROJECT 1
ECTS Credits: 6

Humanities

Rationale and Purpose of the Module: *For students to develop a music therapy research from idea to ethical clearance stage.*

Syllabus: Development of research from idea through to ethical clearance. Students will examine issues in research design including choice of data collection methods and methods to analyse data. Students will consider issues around ethics in research, including informed consent, management of sensitive materials, and the role of the researcher in managing participation.

Prerequisites: MU5071

MU5053 - ENSEMBLE 3
ECTS Credits: 12

Humanities

Rationale and Purpose of the Module: *The module involves progressive training in String Chamber Ensemble and String Chamber Orchestra according to the framework outlined in Ensemble 1 & 2.*

Goals of the module include public performances and periodic interaction with professional members of the Irish Chamber Orchestra.

The ultimate goal of the module is to improve the quality of the music making and artistry demonstrated by the student within ensemble playing and to prepare for public performances aiming towards professional level and quality.

Syllabus: Contact time in the form of coaching with individual teachers and group projects will focus on an increased development of the repertoire and ensemble skills learned in Ensemble 1 & 2, as well as new and more advanced repertoire. Ensemble 3 will be built upon the consolidation of skills learned in Ensemble 1 & 2, as well as the development of more advanced skills and performance projects.

The materials and repertoire of this module and the balance of the two key segments within each semester will be at the discretion of the programme director and studio teachers based on the distribution of instrumentalists within the student body and the available periods within the work schedules of the Irish Chamber Orchestra.

MU5061 - ARTS IN HEALTH
ECTS Credits: 6

Humanities

Rationale and Purpose of the Module: *The aim of this module is for students to discover and learn about the history and contemporary practices of Arts in Health*
As objectives, students will have the opportunity to develop knowledge of the contemporary application of creative arts therapies in healthcare including drama therapy, art therapy, music therapy, and dance therapy, and arts applications in healing through history and the use of arts in healthcare contexts.

Syllabus: Students will develop their knowledge of a range of arts practices in health care so as to be able to discuss, describe and critically reflect on the ways theorists and researchers have considered social, behavioural and therapeutic aspects of these art forms in relation to individual experience and the context of use of the arts in a range of healthcare settings.

MU5101 - HISTORY OF ETHNOMUSICOLOGY
ECTS Credits: 12

Humanities

Rationale and Purpose of the Module: *The aim of this module is to provide an overview of the history and the theory of ethnomusicology since the 19th century and to understand its close connections to social and cultural anthropology in order to equip the students with knowledge of the principle theories that have been propounded by ethnomusicologists and with issues currently under debate.*

Syllabus: Readings include both exemplary original texts drawn from the history of the field and more recent historical and theoretical overviews. Students are also asked to read and review two book-length musical ethnographies selected from a recommended list of recent works. A 5000 word essay will address a particular topic of the student's choice, designed in consultation with the course director.

MU5211 - CLINICAL ORIENTATION
ECTS Credits: 12

Humanities

Rationale and Purpose of the Module: *Introduction to Music Therapy concepts and methods as they relate to clinical practice.*

Syllabus: The module is focused on the development of practical music making skills related to music therapy practice, observational skills and assessment and treatment planning skills.

MU5361 - RITUAL CHANT AND SONG PRACTICUM 1
ECTS Credits: 12

Humanities

Rationale and Purpose of the Module: *- the provision of specialist training towards the development of idiomatic performance across a range of vocal repertoires including Western plainchant, Irish traditional religious song, the Western choral tradition and world ritual vocal repertoires.*
- the development of skills pertinent to choral / schola

singing and conducting / facilitation
- the development of skills pertinent to vocal accompaniment, as appropriate to specialist repertoires.
- the provision of training in sight-singing, aural training and transcription from oral dictation
- the development of a contextual approach to ritual vocal performance

Syllabus: This module will provide specialist vocal training, appropriate to the idiomatic performance of a range of vocal repertoires including Western plainchant, Irish traditional religious song, aspects of the Western choral tradition and selected world ritual vocal repertoires; tuition will include solo vocal technique and repertoire classes; instruction in schola and ensemble singing; conducting and facilitating ensemble performance; vocal accompaniment as appropriate to specialist repertoires; sight-signing and aural training within a contextual approach to vocal repertoires and performance techniques.

MU5401 - TECHNIQUE, REPERTOIRE AND STYLE - 1
ECTS Credits: 12

Humanities

Rationale and Purpose of the Module: *The module focuses on the individual instrument. The purpose of the module is the facilitation of performance tuition to the highest standard.*

The ultimate goal of the module is to improve the quality of the music making and artistry demonstrated by the student and to prepare for public performances aiming towards professional level.

Syllabus: This module takes the student from his/her point of entry and expands on technical mastery and repertoire knowledge with the view of gaining insight into performance styles relevant to musical history and tradition in the classical genre.

The module is based on skill and competency of execution. The student may have to begin the module with extensive revisions in technique and a somewhat different approach to the instrument owing to the pedagogy of the professor involved.

The knowledge is structured within three key areas:

1. Instrumental skills aiming towards technical fluency and mastery
2. Repertoire knowledge relevant to the instrument
3. Stylistic knowledge working towards informed choices of interpretation

The materials and pedagogical direction of this module, because of its one-to-one tuition and highly individualistic approach is open to the teacherÆs interpretation and revision in actual practice.

MU5411 - ENSEMBLE I
ECTS Credits: 12

Humanities

Rationale and Purpose of the Module: *This module features training the genre of string chamber ensemble and string chamber orchestra.*

An inherent part of any string playerÆs milieu is the art of ensemble playing. It must be constantly explored and used to be value as an artistic form and musical expression.

Solo playing brings to bear the focus of individual decisions on the music itself. Ensemble playing requires a specialised skill and a particularly developed musical intelligence based on the ability to weigh musical options in the light of other individuals playing in the same continuum.

Goals of the module include public performances and periodic interaction with professional members of the Irish Chamber Orchestra.

Syllabus: The module is structured around two key elements / segments:
1. String Chamber Ensemble
2. String Chamber Orchestra

The String Chamber Ensemble segment aims to develop and hone skills relative to the genre of string quartets, trios, quintets or larger ensemble pieces. Students are expected to work constructively in groups and take responsibility for their individual preparation and the organisation of group rehearsal times. The chamber groups are taught and coached in the context of laboratory work in forms of studio master classes with their respective teachers.

The String Chamber Orchestra segment involves periodic interaction with members of the Irish Chamber Orchestra. The presence of the Irish Chamber Orchestra on the university campus gives young string players an insight into the professional world and working experience of an internationally acclaimed chamber ensemble.

The materials and repertoire of this module and the balance of the two key segments within each semester will be at the discretion of the programme director and studio teachers based on the distribution of instrumentalists within the student body and the available periods within the work schedules of the Irish Chamber Orchestra.

MU5501 - COMMUNITY MUSIC IN CONTEXT
ECTS Credits: 12

Humanities

Rationale and Purpose of the Module: *To provide instruction in foundations, history and principles of community, to offer students a brief and broad experience of the field; to combine practical and academic perspectives on Community Music; to offer this programme within an environment sensitive to an ethnomusicological and performance perspective and which encourages cross-platform performance and learning.*

Syllabus: History, culture and political developments and issues in Community Music: gender considerations, shifting demographics, models and functions of community music and community arts, diverse learners and community contexts, case studies.

MU5511 - COMMUNITY MUSIC SKILLS I
ECTS Credits: 12

Humanities

Rationale and Purpose of the Module: *In this module, students will begin to develop the observation, evaluation, communication and teaching techniques and skills necessary for work in community music. While the*

student's musical competencies are assumed, this course provides further musical work in ensemble skills.

Syllabus: Teaching and communication skills including role play, modelling, lecture, interactive workshop skills, generative brainstorming; Observation and evaluation techniques including structuring questionnaires, analysing interaction on video, models for documenting and reflecting musical skills including song teaching, basic conducting, ensemble percussion work, harmony, composition, arranging, improvisation and songwriting.

MU5611 - TRADITIONAL IRISH MUSIC PRACTICUM 1
ECTS Credits: 12

Humanities

Rationale and Purpose of the Module: *To encourage creativity and individuality in performance practice; to develop performing skills in the context of individual and group classes; to allow the student under supervision to design and follow a specially prepared music performance programme tailored to his/her musical ambitions and educational needs; to develop ensemble skills.*

Syllabus: In this module the student will create and design their own performance programme under the supervision of the course director. Also, students will take tutorials with or tutors on the programme to facilitate their work-in-progress and to provide support for the successful realisation of individual performance projects. This module is in preparation for a public performance

---

MU6003 - PRACTICAL SKILLS OF MUSIC 3
ECTS Credits: 3

Humanities

Rationale and Purpose of the Module: *To provide further practical guidance in the area of school and classroom music. To develop extra skills specifically related to the facilitation of music learning, teaching, direction and performance.*
To further develop an awareness in the student of his/her position as a music educator and as a community musician within the entire school community. To further facilitate competency in essential aural, compositional and performance skills.

Syllabus: Students will acquire further skills related to the facilitation and production of music technology in an educational context including sequencing, the use of notational software, and recording, editing and sound production. Students will develop skills in advanced conducting in a variety of contexts.
Students will increase their competence specifically in vocal skills, vocal health and in keyboard skills. Students will further develop their skills in relation to musical accompaniment with specific reference to accompanying in a classroom context, in an examination context and in relation to extracurricular contexts in the school.
Students will further their skills in relation to musical composition and arranging in a variety of contexts and musical genres. Students will further their competence in their performance of one or more musical instruments appropriate to post-primary education.

MU6031 - PRACTICAL SKILLS OF MUSIC 1
ECTS Credits: 6

Humanities

Rationale and Purpose of the Module: *To provide practical guidance in the area of classroom music. To develop skills specifically related to the facilitation of music learning, teaching and performance. To develop an awareness in the student of his/her position as a music facilitator in the school at large. To facilitate competency in essential aural, compositional and performance skills.*

Syllabus: This module explores and utilises students' own performing skills and creative music making abilities in order to address the facilitation and production in the school setting of a variety of music making possibilities. Students will research and explore ensemble music, choral singing, school bands, orchestras, percussion and recorder groups, singing including vocal health, traditional Irish, popular and world musics. Dance, theatre, improvisation, accompaniment, conducting, harmony, counterpoint, composition, melodic and rhythmic writing and recognition will be central in the music lesson. The use of music technology as a teaching and learning tool, and the concept of literacy and numeracy will also provide a focus in practicum. Varieties of teaching and learning styles, classroom, laboratory, performing platforms, the use of ICT and of music technology in the classroom, international perspectives, cultural issues and cross-curriculum aspects are explored in ab sessions.

MU6041 - MUSIC PEDAGOGY
ECTS Credits: 6

Humanities

Rationale and Purpose of the Module: *To consider topics of pedagogy from the perspectives of specific teaching of music so as to enhance the quality of teaching practice experience. To enable students to undertake structured observation in the classroom. To develop the ability to reflect critically on one's own teaching and one's role within the school. To examine aspects of curriculum, methodology and assessment as they relate to music education. To apply current research to practice.*

Syllabus: This module facilitates the student teacher's initial experiences in the school and in the school music department. Junior and Leaving Certificate cycle music syllabi are reviewed, critiqued and addressed in relation to issues of implementation. Transition year music programmes are explored and designed through research and reflection. Structures of subject knowledge, innovation in the classroom, practice room and concert hall/performing platform are addressed. Curriculum development, mixed ability teaching, alternative approaches to assessment and reflective evaluation, and current research are discussed and presented in a variety of national and international contexts. Varieties of teaching and learning styles, classroom, laboratory, concert hall organisation, the use of ICT and of music technology in the classroom, international perspectives, cultural issues and cross-curriculum aspects are explored in lecture and lab sessions.

MU6051 - ARTS INFORMED RESEARCH 1
ECTS Credits: 6

Humanities

Rationale and Purpose of the Module: *This course is an introduction to research in the context of music therapy as an arts-dependent practice and covers arts-based research methodology, the research process, skill-development in critical thinking, and research scholarship including writing, presenting and/or discussing research*

outcomes and current issues in research. As a prerequisite for MU5043, it introduces the beginner researcher to the tools, knowledge and critical thinking required to conduct research in their clinical area of interest.

Syllabus: The study of research methods pertains to an investigation of music therapy as an arts-dependent practice and covers contexts for arts-based research, the research process, skill-development in critical analysis, and research scholarship including writing and/or discussing research outcomes and current issues in research. This course is a prerequisite for MU5043 and introduces the beginner researcher to the tools, knowledge and critical thinking required to conduct research in their preferred clinical area of interest.

MU6061 - MUSIC ETHNOGRAPHY
ECTS Credits: 6

Humanities

Rationale and Purpose of the Module: *This module trains students in the epistemology, methodology, methods and techniques for sustained ethnographic inquiry.*

MU6071 - BEGINNERS' ECCLESIASTICAL LATIN FOR THE STUDY OF PLAINCHANT
ECTS Credits: 3

Humanities

Rationale and Purpose of the Module: *This module will introduce students to the basic grammar and vocabulary of medieval Ecclesiastical Latin, in order to facilitate their study and performance of Western plainchant and Latin song encountered in the Practicum (MD6151 and MD6142) and Methods (MD5361 and MD5362) modules. Latin is the primary language of the repertoire studied in the MA Ritual Chant and Song, and being able to understand the repertoire is essential to studying it academically and vocally. This module will give students the tools to decode the Latin they encounter in the Practicum and Methods modules, enabling them to create their own translations of Latin chants/songs. They will also become familiar with the key vocabulary used in Gregorian chant. The course is targeted at students who have not previously studied Latin.*

Syllabus: This module aims to introduce students to ecclesiastical Latin and gradually develop their ability to read and translate chant texts. Each class will examine an element of Latin grammar, begin a translation exercise to be completed as homework, and review the previous translation. The grammar covered will include: nouns, verbs (active/passive, indicative/subjunctive), adjectives, participles, infinitives, adverbs, pronouns and conjunctions. The translation exercises will be drawn from Western plainchant, and will support the grammar element covered in that week while reinforcing the elements learnt in previous weeks.

NM4011 - PRINCIPLES FOR CONTEMPORARY NURSING STUDIES
ECTS Credits: 6

Nursing & Midwifery

Rationale and Purpose of the Module: *This module explores the contemporary issues influencing and informing practice and the evolving role of contemporary nursing in meeting health care needs globally.*

Syllabus: Global perspectives on healthcare structures and services. Opportunities and challenges facing developments in contemporary practice. Scope of practice, accountability, advocacy, empowerment and autonomy. Global challenges facing practice development. Caring as a philosophy in practice a global perspective; person centred care. Introduction to intercultural nursing and intercultural care. Contemporary issues informing practice. Professional values and issues as they relate to the role of the nurse. Introduction to different ways of knowing: becoming a reflective practitioner. Professional performance as a lifelong endeavour.

NM4087 - PERSON CENTRED NURSING IN ACUTE COMPLEX CARE
ECTS Credits: 6

Nursing & Midwifery

Rationale and Purpose of the Module: *This module builds on previous learning of the foundations and principles of person centred nursing in providing final year undergraduate students with an understanding and consolidation of key nursing responsibilities and contributions in supporting adults with acute complex care needs.*

Syllabus: Biopsychosocial cultural impacts of acute and complex illness on wellbeing for persons and their families. Nursing assessment tools, techniques and technologies, interventions in supporting safe and compassionate care for persons with acute complex needs. Prioritising and risk reduction. Therapeutic relationships and support for individuals and families in crisis. Collaborating across care teams in monitoring persons with escalating and deteriorating conditions. Principles of maintaining homeostasis utilising exemplars for example advanced airway management, head and multiple trauma, heart failure, shock, diabetic ketoacidosis. Acute pain in complex care and complexities of wound management.
Clinical skills
Assessment and monitoring techniques technologies and tools including EWS
Airway and tracheostomy management
Multiple trauma assessment
Respiratory cardiac and neurological, monitoring
Complex wound management
Blood transfusion
Venepuncture
Cannulation

NM4091 - PHILOSOPHIES UNDERPINNING PERSON CENTRED NURSING
ECTS Credits: 3

Nursing & Midwifery

Rationale and Purpose of the Module: *This module aims to introduce students to philosophies, principles and values underpinning person centred general nursing practice.*

Syllabus: Development of general nursing. Introduction to nursing values and philosophy; code of conduct; confidentiality; scope of practice; legal; professional and ethical practice. The role of the nurse in supporting individuals and families; caring and compassion as foundation for nursing; respect, choice and dignity; person centred nursing. Introduction to the role of the nurse in relation to social justice and cultural sensitivity. Models and theories of nursing; assessment frameworks; care planning documentation; evidence based practice.

Introduction to nursing metrics and audit.

NM4103 - INTELLECTUAL DISABILITY EARLY CHILDHOOD NURSING
ECTS Credits: 6

Nursing & Midwifery

Rationale and Purpose of the Module: *Building on previous knowledge this module addresses nursing aspects related to early childhood and specific support and intervention strategies required to assist children with an intellectual disability and their families in promoting health and wellbeing from birth to twelve years of age.*

Syllabus: Pre, peri and post natal development, screening tests at birth and premature reflexes. Knowledge of specific intellectual disability conditions. Early intervention services, family centred care, respite care, foster/shared care schemes. Promoting independence within social and self-help skill development. Communication and language needs of the child, valuing play, music and creative interventions as developmentally appropriate. Rights of the child in; health, education, learning and integration into mainstream services. Child care policies; concept of child protection; recognition and consequence of child abuse, procedures and guidelines for reporting abuse. Management of; sleep, postural care, continence, contractors, restrictions of movement and medications. Person centred nursing skills
The nursing process and family centred approaches; care plan and documentation
Nutritional assessment and support of the child
Mobility and posture care (active and passive limb exercises, sleep hygiene and positioning supports)
Respiratory care (oxygen and nebuliser therapy, inhaler techniques and suctioning technique)
Facilitating communication, health and wellbeing through creative medium e.g. play, music

---

NM4121 - FOUNDATIONS FOR ENGAGED LEARNING
ECTS Credits: 3

Nursing & Midwifery

Rationale and Purpose of the Module: *The aim of this module is to provide students with a foundation for becoming a lifelong reflective learner and critical thinking practitioner. It will support student's integration into third level environment and assist in learning how to balance university commitments and life.*

Syllabus: Transition to third level learning and scholarship. Maximising learning styles and taking a proactive approach to individual learning, developing emotional intelligence and managing self and wellbeing. Developing verbal, digital and academic writing skills. Library, information and communication technology. Study and time management skills. Academic integrity. Searching and finding appropriate evidence, developing critical thinking skills, using evidence in practice, database, information and reference management. Collaborative learning. Reflective practice as a strategy for personal and professional development.

NM4137 - ENVISIONING THE FUTURE ROLE AND PRACTICE OF THE RNID
ECTS Credits: 6

Nursing & Midwifery

Rationale and Purpose of the Module: *Building on previous knowledge this module addresses the consolidation of nursing aspects related to intellectual disability care and service provision.*

Syllabus: Current and proposed issues, trends and developments in national and international intellectual disability nursing: person-centred planning (empowerment, personal development), evidence based care, quality improvement measures, health assessments (physical, mental, behavioural), transitioning (school, work, life/relationships), community living and support, criminal justice system, respite, collaborative working, medication management, management and leadership in care provision, standards, advancing intellectual disability nursing practice (clinical focus, education, consultancy, advocacy, audit and research). Enablement and disabling barriers to participation in society. Effective collaborative working.

Person centred nursing skills: case management and review, assessments, observations, needs and outcomes, plans, evaluations. Medication management review. Venepuncture.

NM4147 - MENTAL HEALTH NURSING AND COMPLEX CARE NEEDS
ECTS Credits: 6

Nursing & Midwifery

Rationale and Purpose of the Module: *This module will develop students' knowledge, understanding and nursing management of individuals experiencing a range of contemporary issues and complex mental health difficulties. The module also aims to build upon the skills and knowledge gained to date in the programme, enabling the student to address complex care management issues in accordance with best practice guidelines and policy.*

Syllabus: Evidence based nursing assessment and management of individuals with complex needs. Substance misuse with a focus on dual diagnosis (Substance misuse and Mental disorder). Eating disorders. Sexual health and psychosexual problems. Forensic nursing, personality disorders. Family work principles of best practice as it relates to the module focus, engaging families in care and treatment. Specialised interventions e.g. harm reduction, relapse prevention, cognitive behaviour therapy, medication management (detoxification, maintenance), dialectic behaviour therapy. Related pharmacology. Mental Health legislation and ethical issues. Selfcare and reflection. Cannulation and venepuncture. Management of seizures. National and international policies and guidelines for best nursing practice.

NM4151 - BIOLOGICAL SCIENCES APPLIED TO NURSING AND MIDWIFERY 1
ECTS Credits: 6

Nursing & Midwifery

Rationale and Purpose of the Module: *To provide the foundation for understanding cell biology and tissues leading to anatomy and physiological functioning of the human system to assist in the study of the effects of illness and disease on the individual.*

Syllabus: Introduction to the body as a whole, tissues, organs and systems. Biochemistry of the cell including: cell structure, the cell surface, the cell cytoplasm, and the biochemical mechanisms controlling the movement of substances into and out of the cell. Tissue structure and function including; epithelial, connective, muscle and

nervous tissue.
The integumentary system, skeletal system, and joints. Muscles: structure and function. Structure and function of the circulatory system, respiratory system, lymphatic system. Anatomy, physiology and biochemistry of the innate and adaptive immune system. Contribution of each system to the maintenance of homeostasis.

NM4153 - PERSON CENTRED SURGICAL NURSING
ECTS Credits: 6

Nursing & Midwifery

Rationale and Purpose of the Module: *This module connects the principles and fundamentals of previous learning and provides students with an understanding of person centred surgical nursing from a theoretical and practice perspective.*

Syllabus: Person centred surgical nursing; pre and postoperative assessment and care for planned, emergency and day surgery through exemplars: laparoscopic and open surgery for example, bowel surgery; breast surgery, fracture assessment and management. Body image. Patient education and promoting recovery. Minimising risk of surgical complications (thromboembolism, sepsis and shock). Acute pain management and wound care. Post anaesthetic care-topical, local, regional and general.
Clinical skills
Pre and postoperative assessment tools
Wound assessment and management strategies
Management of skin closure and wound drainage devices
Management of immobilisation
Management of nausea and vomiting
Naso -gastric drainage
Stoma care

NM4161 - COMMUNICATION AND INTERPERSONAL RELATIONSHIPS IN NURSING AND MIDWIFERY
ECTS Credits: 6

Nursing & Midwifery

Rationale and Purpose of the Module: *This module will introduce skills and knowledge necessary for the development of respectful, equitable and effective communication in nursing and midwifery practice. The development of students' communication and interpersonal skills will be facilitated so as to enhance professional and therapeutic relationships.*

Syllabus: Communication theories, models. Person-centred communication principles. Therapeutic and professional relationships. Self-awareness and therapeutic use of self. Bridges and barriers in the development and maintenance of therapeutic relationships. Assertive communication. Communicating in challenging and difficult circumstances.
Communicating information: recording clinical practice; communicating with colleagues; social media, email. Group communication. Interprofessional communication. Intercultural communication. Introduction to communicating with persons with impairments/disabilities including physical, sensory, cognitive, affective and intellectual. Self -care strategies including relaxation skills.
Communication skills: verbal and non-verbal: listening; interviewing; breaking bad news; conflict situations; group communication and group dynamics; documentation; relaxation skills.

NM4163 - NUTRITION FOR NURSING PRACTICE
ECTS Credits: 6

Nursing & Midwifery

Rationale and Purpose of the Module: *This module connects previous learning providing undergraduate students with an understanding of key nursing contributions to person centred care in relation to nutrition, hydration and elimination.*

Syllabus: Physiology of digestion, metabolism and utilisation of nutrient components for the promotion and maintenance of health and prevention of disease. Biopsychosocial and culture dimensions to the fundamentals of promoting healthy nutrition, hydration and elimination. Assessment, interventions and management for persons experiencing dehydration, undernutrition, malnutrition and obesity. Person centred practices at mealtime. Diabetes, osteoporosis, anaemia, inflammatory bowel disease, promoting continence and preventing constipation.
Clinical skills:
Nutritional assessment
Assisting individuals with eating drinking and swallowing difficulties
Enteral and parenteral management of nutrition (PEG feeding)
Blood glucose monitoring
Insulin administration techniques
Continence assessment
Urinary catheterisation care

NM4173 - BIOLOGICAL SCIENCES APPLIED TO NURSING & MIDWIFERY 3
ECTS Credits: 6

Nursing & Midwifery

Rationale and Purpose of the Module: *The aim of this module is to provide students with a foundation for understanding the digestive and urinary systems, human genetics, inheritance, embryology and development considered essential for the study of reproductive health and genetic disorders.*

Syllabus: Anatomy and physiology of the urinary system, digestive system and reproductive system. Gamete formation, fertilisation. Embryology: pre-embryonic, embryonic and foetal development and growth. The nature of DNA, genes, alleles, chromosomes, biological basis of heredity. Biological basis of genetic mutations and inherited conditions; genetic disorders, dominant and recessive conditions. New born screening. Genetic screening and counselling. Chromosomal disorders including autosomal abnormalities, sex chromosomal abnormalities, changes in chromosome structure. Implications for the person, their family and nursing and midwifery practice.

NM4183 - PRINCIPLES OF INFECTION PREVENTION AND CONTROL FOR NURSES AND MIDWIVES
ECTS Credits: 6

Nursing & Midwifery

Rationale and Purpose of the Module: *The aim of this module is to provide the student with knowledge and understanding of microbiology, immunology, infection prevention and control with application to nursing and midwifery practice in all healthcare settings.*

Syllabus: Basic understanding of bacteria, fungi, viruses, cultivation and identification of pathogens; pathogenesis e.g. HIV, STIs, Clostridium difficile, TB, MRSA; key stages/cycle of infection, transmission through populations, epidemiology and surveillance;

infection prevention and control (hospital, community), healthcare associated infections, carrier status, isolation precautions; cleaning, disinfection and sterilisation; immuno-suppressed individuals; Antibiotics: action/ resistance, efficacy, stewardship; the immune response, antibodies, allergy and anaphylactic shock, immunisation; sepsis/septic shock and management.
Clinical skills:
Standard precautions
Transmission based precautions
Hand hygiene techniques
Aseptic non touch technique
Wound management/dressing techniques
Care and management of skin closures
Specimen collection and urinalysis.

NM4191 - INTRODUCTION TO MIDWIFERY
ECTS Credits: 3

Nursing & Midwifery

Rationale and Purpose of the Module: *The aim of this module is to introduce students to the philosophy, values and knowledge underpinning professional midwifery practice.*

Syllabus: Philosophy history and regulation of midwifery practice, professional identity, accountability and conduct. The midwife in contemporary midwifery practice and the provision of maternity services. The role of the midwife in providing individualised woman centred care within the multidisciplinary team. The social context of pregnancy and childbirth for women and their families. Principles of care in the assessment, planning, implementation, evaluation of care in pregnancy, birth and postnatal period. Introduction to care of the new-born and infant feeding practices. Introduction to perinatal bereavement. Reflection on values underpinning midwifery practice.
Clinical skills:
Standard precautions relevant to maternity care
Application of maternal observation and assessment skills: blood pressure temperature and respiration and urine testing
Introduction to midwifery care during labour and the early postnatal period
Introduction to infant observation and assessment skills
Introduction to the skills of documentation including charting of IMEWS
Communication and use of ISBAR in the maternity setting
Parenting skills and infant care practices
Developing skills to support successful breastfeeding.

NM4192 - MIDWIFERY CARE IN CHILDBIRTH
ECTS Credits: 6

Nursing & Midwifery

Rationale and Purpose of the Module: *The aim of this module is to explore the provision of midwifery care within the parameters of normal childbirth.*

Syllabus: Normal labour and birth and the role and responsibilities of the midwife in providing woman-centred care and promoting normal birth. Anatomy and physiology and how they inform care provision in the first, second, third stage of labour and in the early puerperium. Onset, process and progress of labour. Monitoring maternal and fetal wellbeing in labour supporting women and their partners in the birth of their babies. The physiology of pain; working with pain in labour. Immediate care of the newborn including skin to skin contact. Documentation specific to birth.
Clinical skills:
Skills to promote normal birth
Mechanism of labour
Principles of intrapartum skills; first, second and third stage including assessment of progress
Principles of drug administration in childbirth
Management of the third stage of labour
Examination of the placenta and membranes
Assessment and care of a woman and her baby in the immediate postnatal period
Female urinary catheterisation
Introduction to fetal monitoring and Cardiotocography (K2 Medical Systems Fetal Monitoring Training Systems)
Documentation to include partograph.

NM4231 - MIDWIFERY CARE IN PREGNANCY
ECTS Credits: 6

Nursing & Midwifery

Rationale and Purpose of the Module: *The aim of the module is to facilitate students to acquire a thorough understanding of the anatomy and physiology of pregnancy, maternal adaptations and the care needed for women during pregnancy.*

Syllabus: Anatomy and physiology of pregnancy. Fertilisation and early development; placental development, fetal and maternal adaptations. The female pelvis and the reproductive organs. Preconception care. Initial antenatal assessment and on-going antenatal assessment and care. Antenatal screening and investigations of the woman and fetus. Common problems associated with early and advanced pregnancy. Transition to parenthood in the antenatal period. This module will incorporate the equivalent of one week clinical placement.
Clinical skills:
Landmarks and diameters of female pelvis and fetal skull and their application to midwifery practice
Initial antenatal visit
Abdominal examination
Antenatal assessment, monitoring and investigations throughout pregnancy
Fetal assessment, fetal auscultation and use of pinnard; application of cardiotocograph.

NM4241 - UNDERSTANDING INTELLECTUAL DISABILITY
ECTS Credits: 3

Nursing & Midwifery

Rationale and Purpose of the Module: *This is the first module in which students are introduced to the concept of intellectual disability and person centred approaches underpinning the professional values and conduct of the nurse. The implications of living with impairments and classification of disability by society for the person, their family and peers will be explored.*

Syllabus: Theories and models of disability; concepts of impairment, enabling and disabling environments. Prevalence, incidence, causation and manifestations of intellectual disability.
Classification criteria and terminology; awareness, stigma and life opportunities.
Effects of disability on the nuclear, extended family and society. Theory and application of the principles of normalisation and personalisation, empowerment, advocacy and person-centeredness. Nurse-client relationship and communication

---

NM4242 - MATERNAL AND INFANT NUTRITION
ECTS Credits: 6

Nursing & Midwifery

Rationale and Purpose of the Module: *The aim of this module is to enable the student to critically consider the factors that promote and support maternal and infant nutritional wellbeing.*

Syllabus: Physiology of digestion, metabolism and utilisation of nutrient components for the promotion and maintenance of health and prevention of disease. Nutritional needs during pregnancy and lactation. Impact of nutritional status on the woman, fetus and infant. Nutrition and selected conditions. Healthy weight management before, during and after pregnancy. Nutritional requirements of the neonate; social - cultural context of infant feeding; informed choice; national and international breastfeeding policies. Anatomy and physiology of lactation. Biochemistry of human milk. Health care practices that support breastfeeding and formula feeding including signs of effective feeding. Breastfeeding management under difficult circumstances: breastfeeding management when the mother is ill; drug therapy and breastfeeding. Principles of safe formula preparation and feeding. Hospital and community promoting, supporting and protecting breastfeeding.
Clinical skills:
Brief interventions for nutrition for the perinatal period
Brief interventions for weight management
Counselling skills to support breastfeeding including correct positioning for skin to skin
Key principles for positioning and attachment
Hand expression, pump expression, cup feeding/finger feeding, breast milk storage
Key principles for safe formula feeding.

NM4253 - MIDWIFERY CARE FOR THE POSTNATAL MOTHER, BABY AND FAMILY
ECTS Credits: 6

Nursing & Midwifery

Rationale and Purpose of the Module: *The aim of this module is to explore the provision of midwifery care in the postnatal period for the mother, baby and family.*

Syllabus: Physiology of the puerperium, monitoring postnatal progress including postnatal examination and assessment, care required post- operative birth, urinary bladder management. Transition to extrauterine life, thermoregulation. Initial steps of neonatal resuscitation. Monitoring progress of the neonate including examination. Meeting the safety needs of mother and baby. Registration of birth. Physiological jaundice. Newborn screening. Vaccinations and immunisations. Parenting and attachment. Promoting a healthy psychological adaptation to motherhood and fatherhood. Discharge planning for the woman and infant. Care of women and families experiencing a perinatal loss.
Clinical skills:
Postnatal examination of the mother
Examinations of the baby
Neonatal vital signs including pulse oximetry
Skin care and hygiene of the baby
Newborn bloodspot screening technique
Documentation and administration of medication to the mother and baby
Perinatal mental health assessment tools
Parenting skills
Discharge planning for mother and baby
Initial steps of resuscitation of newborn
Bereavement and perinatal loss workshop.

NM4261 - INTRODUCTION TO MENTAL HEALTH NURSING
ECTS Credits: 3

Nursing & Midwifery

Rationale and Purpose of the Module: *To introduce the student to the philosophical and theoretical foundations underpinning mental health nursing practice that offer ways of understanding the nature of mental health and recovery.*

Syllabus: Introduction to the history, philosophy, theories and models underpinning mental health nursing; Conceptualisation of the role of the mental health nurse in a variety of health care settings; mental health service/ structure. Scope of nursing practice, legal, professional and ethical practice. Introduction to the role of the nurse in psychosocial and pharmacological interventions and evidence base approaches to care. Practising as part of the MDT collaborative engagement and partnership working in mental health care. Compassionate person centred nursing. Promoting recovery, enhancing resilience, cultivating hope and relationship building; values and principles underpinning recovery, strengths based approaches. Citizenship, personhood, social inclusion, addressing discrimination and stigma. Maintaining a safe environment and supporting services users to respond to health and safety situations in the home e.g. getting help, managing minor accidents e.g. burns. Global and technological healthcare contexts. The role of the service user movement, working with diverse cultures.

NM4263 - INTELLECTUAL DISABILITY ADOLESCENT NURSING
ECTS Credits: 6

Nursing & Midwifery

Rationale and Purpose of the Module: *Building on previous knowledge this module addresses nursing aspects related to young and middle childhood and specific support and intervention strategies required assisting in health and wellbeing of children from twelve to 18 years of age.*

Syllabus: Theories related to adolescence. Challenges for the adolescent with sensory physical and verbal impairments. Transitioning from childhood; rights of the adolescent with an intellectual disability; communication, promotion of choice, decision making, risk taking, empowerment, lifestyle and health well-being, behavioural health choices, smoking alcohol and diet. Health promotion and therapeutic and creative activities including leisure and recreational provision for adolescents in developing interpersonal relationships, friendships. Sexuality, sexual development, sexual health, relationship skills, recognising and responding to abuse.
Person centred nursing skills
Care planning underpinned by principles of person centred care
Personal care (assisted independent hygiene programmes)
Nutritional assessment and support of the adolescent
Facilitating communication, health and wellbeing (sexuality and relationship development)
Health promotion skills (body awareness, sexuality and relationships development, testicular awareness, breast awareness)

NM4273 - INTRODUCTION TO PSYCHOSOCIAL INTERVENTIONS
ECTS Credits: 6

Nursing & Midwifery

Rationale and Purpose of the Module: *The aim of this module is to build upon the skills and knowledge attained in year 1 of the programme and to lay the foundations of Mental Health Nursing practice. The student will develop their knowledge and skills to facilitate psychosocial interventions with service users and families.*

Syllabus: Exploration and application of the core concepts of therapeutic engagement in nursing practice (trust, empathy, congruence, unconditional positive regard, respect, hope, enhancing resilience and collaborative working). Introduction to models and theories of counselling. The counselling process in nursing practice, application of counselling skill in one to one and group settings. Ethical considerations Theoretical assumptions and principles and core elements underpinning a range of psychotherapeutic interventions including for example person centered approach, cognitive behaviour therapy, dialectic behaviour therapy, strengths based approach, family psychoeducation interventions.

Clinical Skills:
Facilitation of group therapy
Counselling skills and processes
Motivational interviewing,
Self-management approaches
Solution-Focused Approaches,
Problem-solving,
Mindfulness

NM4283 - PROMOTING RECOVERY IN PERSON EXPERIENCING MOOD AND EMOTIONAL DISORDERS
ECTS Credits: 6

Nursing & Midwifery

Rationale and Purpose of the Module: *The purpose of this module is to introduce the student to mood, anxiety and somatform disorders and the consequent impact of these disorders on individuals' biopsychosocial well-being and functioning. The module will build on the knowledge from year one exploring the role of the nurse in delivering evidenced based interventions that facilitate recovery.*

Syllabus: Mood (affective) disorders (depression, bio-polar disorder, perinatal mood disorders). Anxiety and somatoform disorders. Assessment, care planning and evidenced-based approaches that promote recovery including pharmacological, psychosocial (eg CBT, psychoeducation, relapse prevention) and physical (e.g. ECT) interventions. Introduction to cognitive and behavioural therapy.

Clinical Skills
Therapeutic engagement skills
Clinical assessment skills
Use of objective measurers
Cognitive Behavioural Therapy skills: activity scheduling, cognitive restructuring anxiety management approaches (individual and group), Relaxation therapy
Care of a person undergoing ECT
Care plan documentation and evaluation

NS4024 - INTRO. TO THE PRINCIPLES AND NATURE OF TEACHING AND LEARNING FOR NURSES AND MIDWIVES
ECTS Credits: 9

Nursing & Midwifery

Rationale and Purpose of the Module: *The aim of this module is to provide the students with the teaching skills necessary to facilitate teaching and learning within the nurse practice/learning environment.*

Syllabus: Group facilitating, microteaching. The nature of teaching and learning with particular reference to the nursing environment. Approaches to adult learning. Planning and preparation. Presentation skills. Using questions. Group work. Independent studies. Lesson management. Concept of andragogy and pedagogy. Techniques of assessment, reflection, self-evaluation.

Clinical Skills
Microteaching in a clinical setting
Microteaching in a classroom setting
Clinical competencies:
assessment/documentation/feedback

NS4037 - PROMOTING SUPPORTING AND PROTECTING BREASTFEEDING
ECTS Credits: 6

Nursing & Midwifery

Rationale and Purpose of the Module: *To enable the student to critically consider the promotion, support and protection of breastfeeding. Fulfil the requirements of the Baby Friendly Hospital Initiative including the provision of safe artificial feeding*

Syllabus: Theoretical content: Social, cultural, psychological and political influences on aspects of breastfeeding, infant feeding; National and International Breastfeeding policies and their management, health benefits including BFHI; The importance of breast-feeding to mother and baby, Health care practices that support breastfeeding and artificial feeding; Counselling skills to support breastfeeding,; Anatomy and physiology of lactation, Biochemistry of human milk, Impact of birthing practices on breastfeeding; Breastfeeding facilitation for healthy mothers and newborns,; Breastfeeding management under difficult circumstances,; breastfeeding management when the mother is ill; Infants with special needs; Alternative methods of infant feeding when breastfeeding is not possible; infant nutrition and weaning practices; Hospital and community support; Drug therapy and breastfeeding, maternal nutrition during lactation, maternal employment and breastfeeding.
Clinical skills Facilitating an antenatal workshop on positioning and attachment for breastfeeding babies. Use of support mechanisms for successful breastfeeding. Breastfeeding under special circumstances (breastfeeding the preterm baby, twins, baby with cleft lip and palate). Facilitating a postnatal breastfeeding clinic. Lactation Consultants role and challenges in protecting breastfeeding. Promoting, supporting and protecting breastfeeding in the community setting

Clinical skills

Communication skills
Positioning and attachment workshop
Breastfeeding under special circumstances (breastfeeding the preterm baby, multiple births, baby with cleft lip and palate)
Facilitating a postnatal breastfeeding clinic
Hand expression, pump expression, cup feeding, breast milk storage; safe formula feeding

---

NS4047 - PREPARATION FOR PARENTHOOD
ECTS Credits: 6

Nursing & Midwifery

Rationale and Purpose of the Module: *To enable provide students with the student to design knowledge and implement a programme ofskills to work in partnership with parents to support them in their adaptation to parenthood education for childbirth*

Syllabus: Philosophy and historical development of childbirth education, Principles of adult education, teaching and learning strategies for pregnancy childbirth and transition to parenthood, health promotion strategies, sexuality and cultural perspectives on childbearing and using, culturally connected teaching strategies, childbirth education for specific social groups e.g. teenagers, travellers. Teaching relaxation in parent education classes,. Curriculum development for parenthood education Clinical . Tutorials: micro teaching, presentation strategies and skills Micro teaching Presentation skills Giving feedback, class planning, evaluation of teaching, giving feedback, relaxation techniques

---

NS4205 - MATERNITY, PEADIATRIC AND OLDER PERSON NURSING
ECTS Credits: 6

Nursing & Midwifery

Rationale and Purpose of the Module: *The aim of this module is to facilitate students understanding of maternity, paediatric, and older person nursing so that they may provide appropriate care to individuals and families.*

Syllabus: Introduction to the principles of peri-natal care; effects of pregnancy upon maternal health. Nursing care and management of mother and baby introduction to the nursing principles to the care and management of children experiencing acute and chronic illness their experiences of hospitalisation; family centred care; child protection. Dignity, advocacy and protection of the older adult; introduction to the principles of nursing the older person and family/carer across the care continuum. Attitudes towards ageing, and the normal process of aging, age related disorders, e.g. confusion, polypharmacy, falls, dignity, advocacy and restraint. Applied pharmacology.

Clinical Skills
Abdominal palpation
Fetal heart monitoring
Mechanisms of labour
Examination of the baby and child
Bathing a baby
Bottle and breastfeeding
Assessment of the older person - and use of assessment tools
Communication and therapeutic strategies to support the older person with cognitive impairment
End of life care
Last offices

NS4215 - SPECIALISED NURSING CARE
ECTS Credits: 6

Nursing & Midwifery

Rationale and Purpose of the Module: *The aim is to facilitate the student understanding of oncology, palliative care, mental health, and intellectual disability so that they may provide appropriate care to these groups of individuals. In order to prepare general nurses to support patients/clients with specific and complex needs the process of identifying needs, planning, prioritising, implementing and evaluating nursing care will be considered.*

Syllabus: Cancer cell biology, nursing care and management in oncology. Treatment modalities, Palliative care. Introduction to intellectual disability and nursing care and management Institutionalisation, normalisation, individualisation and philosophy of an 'ordinary life'. Introduction to the concept of mental health. Nursing care of individuals with mental health illness in a range of settings. Applied pharmacology.

NS4218 - COGNITIVE - BEHAVIOUR THERAPY
ECTS Credits: 6

Nursing & Midwifery

Rationale and Purpose of the Module: *This purpose of this module is to provide students with a knowledge and understanding of the principles of cognitive behavioural therapy and its application within nursing practice.*

Syllabus: Key concepts of cognitive behavioural therapy. Classical and Operant conditioning. Definition of behaviour; objective/subjective interpretation of behaviour, increasing behaviour, positive and negative reinforcement. Response cost. Extinction. Role of Cognition. Cognitive distortions. Characteristics of cognitive behavioural therapy. Contingency contracting. Cognitive behavioural assessment: observation, interviewing, measurement and problem definition. Functional behavioural analysis. Treatment strategy groups. Relaxation techniques. Cognitive restructuring: e.g. monitoring thoughts and feelings, questioning evidence, examining alternatives, thought stopping. Learning new behaviour: e.g. modelling, shaping, token economy, role-playing, and social skills training. Cognitive behavioural therapy in nursing.

NS4228 - PAIN MANAGEMENT
ECTS Credits: 6

Nursing & Midwifery

Rationale and Purpose of the Module: *This module offers the student an opportunity to further develop knowledge and understanding of the complexities and challenges of pain management in order to provide additional theoretical support to underpin their practice. The module also aims to build upon the knowledge gained in years one, two and three of the programme enabling the student to address complex care management issues.*

Syllabus: The multidimensional nature of pain; The physiology of nociceptive and neuropathic pain. The effects of pain physical, psychological social and spiritual aspects individual reactions and manifestations; Pain tolerance and pain responses; Barriers to effective pain management.; Interventions to alter sensory input and reduce pain perception. The role of the nurse as a member of the healthcare team e.g. Assessment and measurement of pain planning and implementing pain management interventions and evaluating outcomes. Pain management of groups with specials needs, e.g. child, older person. Applied pharmacology.

NS4305 - NURSING THE CHILD AND ADULT WITH BEHAVIOURAL DISORDE
ECTS Credits: 6

Nursing & Midwifery

Rationale and Purpose of the Module: *The aim of the module is to critically evaluate current attitudes policies and practices that support persons with an intellectual disability and associated behavioural or mental health difficulties*

Syllabus: Human behaviour, adaptive and maladaptive responses Role of the RNID in supporting and assisting the individual with an intellectual disability and associated behaviour problems for e.g. self-injurious behaviour, aggressive and violent behaviours. Behavioural and cognitive therapies and the nursing process. Mental health difficulties across the life span. Concept of dual diagnosis in intellectual disability. Nursing care and management of the child and adult with an intellectual disability experiencing mental health difficulties, e.g. phobias, eating disorders, stereotypical, aggressive and violent behaviours; anxiety disorders; psychosexual disorders; perceptual and mood disorders, schizophrenia, depression. Habit and conduct disorders, attention deficit disorders with or without hyperactivity. Applied pharmacology

Clinical skills
Risk assessment skills of observation and monitoring behavioural management strategies
Relaxation techniques and arts in the management of anxiety, anger management.
De-escalation techniques
Cognitive behavioural therapy

NS4315 - NURSING AND ALLIED THERAPIES
ECTS Credits: 6

Nursing & Midwifery

Rationale and Purpose of the Module: *The purpose of this module is to apply and analyse creative mediums which support the development of life skills for persons with an intellectual disability.*

Syllabus: The role of the nurse in facilitating and processing diversional and recreational activities for persons with an intellectual physical/sensory disability. The role of creative mediums in health promotion, inclusion, choice and empowerment and reflection for people with intellectual disabilities. The use of drama to promote education, skill development and advocacy in the lives of people with an intellectual disability. Occupational and recreational social and self-help skills, for example swimming. Introduction to movement as an educational medium; expressive and creative movement skills for example drama, dance and mime, Creative games in group work. Strategies and techniques for implementing creative sessions for persons with an intellectual disability for example arts and crafts, puppetry.

Clinical Skills
Arts and crafts
Drama
Dance
Mime
Puppetry skills

NS4405 - MENTAL HLTH NURSING AND SPECIAL CLIENT GROUPS DISORD
ECTS Credits: 6

Nursing & Midwifery

Rationale and Purpose of the Module: *To aim of this module is to develop students' knowledge, understanding and nursing management of individuals experiencing physical and/or emotional distress as a result of chemical substance misuse/addiction, disordered eating, self-harming/suicidal behaviour and abuse (physical, emotional, sexual). The module also aims to build upon the skills and knowledge gained in years one and two of the programme enabling the student to address complex care management issues in accordance with best practice guidelines*

Syllabus: Problems/disorders related to behaviour(s) resulting in physical and/or emotional distress e.g. eating disorders, suicidal behaviour, self-mutilation, violent aggressive behaviour, and sexual, physical, emotional abuse. Dual diagnosis (substance misuse and mental illness), chemical substances of misuse. Theories relating to the module focus disorders epidemiology and predisposing and precipitating factors, nursing care management and prevention. Specialised interventions e.g. risk assessment, harm reduction, relapse prevention, cognitive behaviour therapy, medication management (detoxification, maintenance), restraint, seclusion, special observation and legal requirements according to the Mental Health Act (2001). National and international policies and guidelines for best nursing practice. Contemporary research findings. Family work and theory as it relates to the module focus. Introduction to forensic mental health nursing

Clinical Skills
Communication skills
Observation
Motivational interviewing
Problem solving
Crisis prevention strategies. such as risk assessment and management
End of life care and last offices

PA4001 - INTRODUCTION TO PUBLIC ADMINISTRATION 1
ECTS Credits: 6

Politics and Public Admin

Rationale and Purpose of the Module: *This module will introduce students to the study of Public Administration. It will identify the characteristics of Public Administration as an academic study and a practitioner focus. It will present the main ideas and concepts in the traditional model of public administration - bureaucracy, politics-administration dichotomy, scientific management - and their application. The module will then explore the rationale for contemporary ideas about public management and governance, reforming public sector organisations and attempts to deliver public services efficiently and effectively.*

This module will be offered on the new BA Arts programme

Syllabus: Part 1 Introduction:
What is Public Administration?
Differences between 'public' and 'private'
Characteristics of public goods
The role and functions of government

Part 2 - Traditional Model of Public Administration
Patronage and spoils to the Northcote-Trevelyan reforms
Max Weber and bureaucracy
Woodrow Wilson and the politics-administration dichotomy
Public choice critique

Part 3 - Reforming Public Administration

Managerialism
New Public Management
E-government
Accountability: theory and practice
Street level bureaucracy
New Public Governance

PA4003 - ISSUES AND CONCEPTS IN DEVELOPMENT
ECTS Credits: 6

Politics and Public Admin

Rationale and Purpose of the Module: *Foundations of Development aims to provide students with an understanding of the key theories, concepts and methods that inform thinking about international, national, regional and local development.*

The module will explore some of the historical experience of international development, as well as some of the most significant contemporary policy debates.
A conception of development as the outcome of rapid national economic growth and industrialization on a universal model emerged in the wake of the Second World War. Development doctrine has since been shaped by neoliberal globalization, but also by concerns about the need for sustainable, participatory and gender sensitive processes at all levels of governance. The module charts these shifts in thinking about development as well as the tensions between approaches in the mainstream. It draws on varied critiques of development and its effects to evaluate its possibilities and limitations. It takes account of the challenge presented by environmentalism and considers alternative ideas on how to address global inequality.

This module will be offered on the new BA Arts programme.

Syllabus: The module will consist of the following topics:
1: What is development?
2: Modernisation theories
3: Dependency theories
4: The Washington Consensus
5: Good governance
6: Human development
7: Social movements and NGOs: Development from Below?
8: Gender and development
9: Sustainable development
10: Post-development

PA4012 - PARA-GOVERNMENTAL ORGANISATIONS
ECTS Credits: 6

Politics and Public Admin

Rationale and Purpose of the Module: *To analyse and explore the role and functions of Paragovernmental Organisations (PGO) as instruments of 'indirect' public administration generally and within the context of the politico-administrative system in Ireland.*

Syllabus: Part A:Paragovernmental Organisations as instruments of indirect administration; State-sponsored Bodies (SSBs) as manifestation of the PGO type in Ireland;commercial (public enterprise) and non-commercial (administrative agency) SSBs;legal,structural and financial characteristics of SSBs; roles of minister,board ,management and Houses of the Oireachtas in the structure of accountability of SSBs. The evolving regulatory environment of SSBs.
Part B:Economic rationale for government intervention in the economy and the role of public enterprise;review and performance evaluation of public enterprise in Ireland since the foundation of the state; major concepts and trends in the regulation of public enterprise,privatisation and public private partnerships generally and in Ireland

---

PA4017 - SUB NATIONAL GOV. IN EUROPE:CHALLENGE AND CHANGE
ECTS Credits: 6

Politics and Public Admin

Rationale and Purpose of the Module: *Using a comparative and thematic approach (within a Joint European Module subscribed to by 11 European universities) this course aims to explore various systems of subnational government, the changing relationships between the different levels of government and to examine the origin, nature and implications of the challenges facing sub-national governments in Europe.*

Syllabus: The salience of sub-national government; evolution of different forms of subnational government; differences between supra-national, national and subnational government and relationships between the different levels of government; theoretical perspectives on the study of sub-national government; state, region and locality in the Anglo, French, Germanic and Scandinavian traditions; recent developments in Central and Eastern Europe; the European dimension of sub-national government; comparative trends in reform; the current challenges and future prospects confronting sub-national governments

---

PD4003 - ERGONOMICS FOUNDATION
ECTS Credits: 6

School of Design

Rationale and Purpose of the Module: *Upon completion of this module students will be able to;*
Explain the ergonomics approach.
Compute basic statistical metrics to describe inter individual differences in physical and cognitive abilities.
Apply statistical data describing populations abilities in the design of products or work systems.
Explain the physiological basis of energy liberation in the cardiovascular system.
Understand the basis for human motor control and be able to explain and apply Fitts equation.
Derive an expression to explain information processing rates in humans and apply the theory in the design of displays and controls.

Syllabus: History of Ergonomics
Domains of specialisation in ergonomics.
Human variability and user fit, anthropometry, conducting anthropometric surveys, fitting trials, the normal distribution and statistical aspect of variability, standards in anthropometry.
Minority groups, needs of older and younger people, user centred design, inclusive design, design for all.
Biomechanics of body forces, hand tool design, internal and external forces of the upper limb, muscle fatigue, endurance models, modelling fatigue. Psychophysical studies of user physical interaction, theories of comfort and discomfort, repetitive strain injuries, conducting studies, Ethics and user studies.

PD4005 - ADVANCED MODELLING OF FORM
ECTS Credits: 6

School of Design

Rationale and Purpose of the Module: *The module aims to develop students skills in expression of organic form in a 3 dimensional digital environment. Enhancing these skills will further augment the learners appreciation of complex 3D form and downstream uses of Computer Aided Design in manufacturing, rapid prototyping & digital representation & visualisation.*

Syllabus: Organic complex form: appreciation & expression.
Advanced CAD tools in various CAD packages.
Preparation of digital models for manufacture and rapid prototyping.
Design Visualisation and graphic presentation of digital models.

PD4015 - USABILITY ENGINEERING
ECTS Credits: 6

School of Design

Rationale and Purpose of the Module: *Upon completion of this module students will be able to;*
Plan and conduct usability evaluations of products
Critically evaluate the quality of their ergonomics research skills
Determine and apply relevant ISO standards for usability evaluation
Appreciate the principles of inclusively in design
Appreciate the implications of the psychology of individual differences on product design
Test and apply theories of user experience in product design
Use human factors methods to inform the design process to achieve high levels of user satisfaction.

Syllabus: The user and product interaction, introduction to usability, generations of user interfaces, human factors methods to study user interaction, models of usability, usability engineering lifecycles, principles of usable design, designing for usability, methods for usability evaluation, planning and conducting usability evaluations, analysing usability data, reporting on user studies, usability informing design, heuristics, standards and usability, systems analysis of user products, product experience, product attachment, designing for comfort, affective meaning, Kansei methods, observing the user experience, measuring user experience.

PD4024 - DESIGN FOR ENVIRONMENTAL SUSTAINABILITY
ECTS Credits: 6

School of Design

Rationale and Purpose of the Module: *To familiarise students with issues relating to energy consumption, and the realisation of current exhaustible engineering activities which is essential for a change towards sustainable production.*
To present environmental impact assessment and ecological foot-printing of products and processes used in the critical realisation of current unsustainable engineering trends.
To equip students with abilities to perform environmental audits on products and processes.
To outline all relevant legislative requirements relating to environmental aspects of products and processes, which is a key component of an environmental audit.
To provide an understanding and realisation of how sustainable design begins with the concept stages of a product.

Syllabus: Fossil fuels and global warming. Ecological impact of materials and processes. Land use and environmental impact. Optimisation of the lifetime of products û shifting towards a cradle-to-cradle concept, combined with a Product Lifecycle Analysis (PLCA). Packaging design and analysis. Redesign and reengineering to minimise parts and fasteners. Transport, distribution and reverse logistics. Renewable materials and energy, repair, reuse and recycling. Materials selection for sustainability.
Irish Legislation covering packaging, extended producer responsibility, waste, and EU directives covering, accumulators, waste electrical and electronic equipment (WEEE), Energy using Products (EuP). Environmental Management Systems (EMS), product considerations in EMSs, and Environmental Auditing, all as outlined in the ISO 14000 family of environmental standards.Case studies of EMS and Environmental auditing

---

PD4105 - DESIGN STUDIO 5 (INDUSTRY)
ECTS Credits: 6

School of Design

Rationale and Purpose of the Module: *The aim of this module is to build on the design skills developed through the previous Design Studio modules through a series of industry focused projects. These projects, conducted with Industry partners will bring the students through the entire design process from early research and conceptualisation to final design and design for manufacture. The real-world problems will focus on professional practice, current industry requirements and emerging technological trends.*
To equip students with the skills and capacities to creatively solve real world problems across a wide variety of fields.
To introduce tools, techniques and methods applicable to innovation and industrial demands.
To practically apply the design process to develop and realise design ideas to a professional standard.
To develop and advance design skills in emerging market areas including medical devices, consumer products and electronics.
To expand student knowledge and practical application of mechanical reasoning, manufacturing and materials, and design detailing.
To develop critical thinking skills and complex problem solving abilities.
To develop advanced design skills, including real-world research, ethnography, sketching, model-making, design visualisation, professional practice, communication, prototyping and user testing, advanced human factors.
The teaching model will predominantly be a `learning by doing process, where a mix of lectures, projects, workshops and design projects will blend to provide students with a mix of practical and applicable professional skills. This approach will teach students core skills needed to identify new opportunities, abstract problems, generate and develop a wide range of solutions, as well as building and realising the most appropriate solutions.

Syllabus: Project based studio classes.
Integration and practical application of various different design processes.
Advanced Design skills: Sketching, Rendering, Ideation, Concept development, Design Detailing, Manufacturing and Materials, Technology, Design Visualisation, Modelling, Rapid Manufacture, Marketing, Human Factors.
Design Research Skills: Ethnography, User Experience,

Real-world research, synthesis of information, Research synthesis and analysis.
Creativity, brainstorming, design thinking.
New Product Innovation, Project Planning.
User centred Design, Interaction.
Design for Sustainability.
Aesthetics, Understanding of form, Design Acuity,
Emerging markets and trends.
Technological trends.
Design for Manufacture.
Product Marketing for design.
Communication, visual and verbal.
Problem solving and Innovation.
Design for Professional Practice.

PD4115 - DESIGN STUDIO 6 (COMMUNITY)
ECTS Credits: 6

School of Design

Rationale and Purpose of the Module: *This module facilitates students to see the impact their work will have on individual users and society as a whole. Focusing on team projects and collaborative work, students will work through design issues and complex problems to develop solutions that improve the lives of users and community (both local and international).*

To introduce tools, techniques and methods applicable to innovation and effective problem solving.
To develop the skills and capacities for effective team working.
To demonstrate to students the link between design and user behaviour.
To advance design skills, including research skills, sketching, model-making & prototyping, design visualisation, presentation, communication and user testing.
To explore and implement complex real-world research techniques to gather information, and then to apply tools to synthesise, analyse and transform the information into usable design guides.
To allow students to integrate all stages of the design process.
To introduce students to the tools, concepts and techniques underpinning Service Design, Universal/ Inclusive Design and Design for Social Innovation.
To introduce students to responsible design practice (ethics, social & cultural inclusion, diversity of practice).
To develop skills in systems thinking and critical analysis.

Learning by doing is the predominant teaching model with a combination of projects, workshops, field trips and lectures to introduce students to the complex topics behind understanding and designing for user and societal needs. The practical approach encourages students to address problems from different and holistic perspectives as well as generating and realising the most appropriate solutions to current contemporary problems.

Syllabus: Project based studio classes.
Advanced design skills.
Integration and practical application of various different design processes.
Design thinking: Tools and processes of design
Collaboration: Collaborative Work, Team work, Project Planning and management skills. Interdisciplinary and Multi-disciplinary teams. Team Dynamics and Group work.
Advanced aesthetics and form understanding.
Emerging Design Trends: Service Design, Transformative Design, Product Service Systems, Universal/ Inclusive Design.
Design for Society: Social Design, Social Innovation.
Research: User Understanding and User Experience, Human Factors, Testing and Prototyping, Emotional Engagement, Behaviour Analysis, Empathy tools.
Information Gathering, synthesis and delivery
Strategy: human centred approach, Systems Thinking.
Integrative thinking, First Principles.
Critical Thinking, Reflection. Decision-making. Dialogue, Holistic perspectives.
Communication: Professional presentations skills.
Sketching, Idea Representation, Low fidelity modelling, Visual Communication, Verbal Presentations.

PH4003 - MECHANICAL ENERGY
ECTS Credits: 6

Physics

Mechanical vibrations, simple harmonic and damped simple harmonic motion, quality factor, forced oscillations, coupled oscillations. Waves, transverse and longitudinal waves, phase and group velocity, energy transported by waves, reflection and transmission of waves. Review of the principles orf mechanics: inertial frames, Newtons laws of motion, kinetic and potential energy. Rigid bodies: rotation and moments of inertia, angular momentum and kinetic energy, torque.
Fluid dynamics: Bernoulli equation, equations of motion in integral form, equations of motion in differential form, kinematics, vorticity, potential flow, dimensional analysis, viscous flows, exact solutions, pipe flow, laminar boundary layers, boundary layer solution methods, turbulence. Fluid heat transfer and a thorough understanding of how these disciplines apply to the design and analysis of complex thermal fluid systems.

Applications to Ocean, Hydro and Wind renewable energy systems

---

PH4005 - INTRODUCTION TO COMPUTATIONAL PHYSICS
ECTS Credits: 6

Physics

Rationale and Purpose of the Module: *Physicists at undergraduate level regularly deal with systems that have analytical solutions. However, in many instances analytical solutions are not possible and so these systems require numerical solution. In addition, physicists frequently encounter large data-sets that require analysis that is unfeasible to analyse manually and is beyond the capabilities of a spreadsheet. A physicist should be able to identify these difficulties and implement the appropriate computational methods as necessary.*

This module allows students:
- to develop programming skills appropriate to physics.
- to recognise and solve problems from physics that require numerical techniques rather than analytical approaches.
- to develop skills in the application of numerical techniques to physical problems and data analysis.
- to enhance competency in the creation of electronically prepared scientific reports and the associated presentation of data.

Syllabus: [Introduction to computation in physics:] The necessity of numerical techniques in physics; How computers store and manipulate data; storage of numbers and roundoff error; comparison of common programming languages used in physics.
[Introduction to Programming:] Basic syntax and structures in a programming language; functions; file reading/writing; data visualisation.
[Software for writing physics reports:] Mathematical typesetting; Labels and references; citations; including figures and captions.

[Basic numerical techniques:] Root solving; matrix manipulations; curve fitting and interpolation; numerical integration and differentiation.
[Advanced numerical techniques:] Solving ordinary differential equations; solving for eigenvectors and eigenvalues; the fast Fourier transform.

PH4011 - PHYSICS FOR ENGINEERS 1
ECTS Credits: 6

Physics

Rationale and Purpose of the Module: *The module is an introductory physics course covering Mechanics, Heat, Electricity and Magnetism for engineering students.*

Syllabus: Linear motion: vectors, projectiles, circular motion, relative velocity. NewtonÆs laws: force, work, power, momentum, friction, gravitation. Conservation of energy. Linear and angular momentum: conservation of momentum, collisions. Rotation of a rigid body: moments of inertia, kinetic energy, angular momentum. The laws of thermodynamics. Equilibrium and temperature, heat and internal energy, heat capacities and latent heat. The ideal gas, isotherms and adiabats. The Carnot engine: efficiency. Classical and microscopic entropy. Electricity: charge, electric field, Coulomb's law, Gauss's law. Electric potential, capacitance, Ohm's law, KirchhoffÆs Laws, dc circuit analysis, Joule heating. RC circuits. Magnetism: magnetic field, magnetic force and torque, the galvanometer. Ampere's law. Electromagnetic Induction: inductance. Faraday's law,Lenz's law, the generator and motor, back emf

---

PH4013 - EARTH SCIENCE
ECTS Credits: 6

Physics

The origin of the universe, formation of hydrogen and heavier atoms, formation of rocks and minerals.Quantification of resources: minerals, oil, gas, coal, wind, biomass, marine energy. Theory of Peak Oil and the Hubbert Curve. The Solar System: the Earths relationship to the Sun, Moon and other bodies of the solar system. Earth, air and water interactions: The structure and composition of the atmosphere. The effects of atmospheric convection, atmospheric dust and cloud cover, rotation of the Earth on global climates and season. The radiation, conduction and convection and their effects on weather and climate. Transer of heat energy to the patterns of wind belts. Moisture, clouds and precipitation. Running water and groundwater. Oceans past and present: Transfer of solar energy to ocean currents and waves. Climate modelling: Collection and use of data to predict the weather. Climate changes that have occurred over the millennia.

PH4021 - PHYSICS OF SOLIDS
ECTS Credits: 6

Physics

Rationale and Purpose of the Module: *The purpose of the module is to introduce the student to the structure and properties of solid materials. The objectives are to discuss the major classes of solids and their properties and applications, and to present the physical principles needed for an understanding of the observations.*

Syllabus: Structure & bonding: atomic structure; primary & secondary bonds, bonding forces & energies. Structures of metals, ceramics & polymers: crystal structures, Miller indices & reciprocal lattice, X-ray diffraction, non-crystalline solids, polymer molecules & configurations, thermoplastic & thermosetting polymers. Imperfections: point defects, dislocations.
Diffusion: diffusion mechanisms, steady and non-steady state diffusion.
Mechanical properties: elastic deformation, mechanical behaviour of metals, ceramics & polymers.
Deformation & strengthening: dislocations in metals & ceramics, hardness twinning, Hall-Petch effect, deformation & strengthening of polymers.
Failure: fracture & toughness, fatigue, creep, wear.
Phase diagrams: Gibbs phase rule, binary & ternary phase diagrams, interpretation of phase diagrams.
Phase transformations: homogeneous & heterogeneous nucleation, growth, metastable & equilibrium states.
Applications of materials: ferrous & non-ferrous alloys, glasses & ceramics, plastics & elastomers.

Prerequisites: PH4171, PH4042

PH4031 - PHYSICS FOR GENERAL SCIENCE 1
ECTS Credits: 6

Physics

Rationale and Purpose of the Module: *An understanding of physics is essential in describing and understanding many processes and phenomena associated with chemical and life-science related disciplines. This one semester course is specifically designed to provide such students with a firm grounding in basic physics illustrated and reinforced with chemical, life and sports science related examples and applications.*

Syllabus: Mechanics: units; kinematics; dynamics; motion in a circle; statics; the standard human; energy; momentum; simple harmonic motion; waves; sound and hearing.
Materials: elasticity; pressure; buoyancy; surface tension; fluid dynamics.
Heat: temperature; gases; phases; heat transfer; thermodynamics and the body, thermal conductivity.
Electricity: static electricity; electric force and fields; electric potential and energy; dc circuits; radio frequency radiation; physiological effects of electricity.
Magnetism: nmr, focus on medical imaging. Generator and motor.
Optics: light; geometrical optics; physical optics; electromagnetic spectrum; Lasers; the eye and vision.
Radiation: atoms; nucleus; ionising radiation; biological effects.

PH4041 - OPTICS
ECTS Credits: 6

Physics

Rationale and Purpose of the Module: *The aim of this course is to develop and extend the students knowledge of the principles of physical optics and introduce the students to contemporary optics.*

Syllabus: Waves: wave description, wave equation, plane waves. Electromagnetic energy transport: EM waves, Poynting vector. Light in a dielectric: electron-oscillator model, refraction, absorption. Light at an interface: refraction, reflection, Fresnel equations. Polarization: polarisation states, Maluss law, birefringence, wave plates and compensators, optical activity, photoelasticity. Interferometry: wavefront splitting interferometers, amplitude splitting

interferometers, multiple beam interference, applications. Diffraction: Frauhofer diffraction, Fresnel diffraction, Kirchoffs scalar diffraction theory. Fourier optics: Fourier transforms, optical applications. Coherence: visibility and mutual coherence. Contemporary optics: lasers, fibre optics, holography, nonlinear optics.

Prerequisites: PH4102

PH4051 - MEASUREMENT AND PROPERTIES OF MATTER
ECTS Credits: 6

Physics

Rationale and Purpose of the Module: *The purpose of this module is to first introduce fundamental principles of physical measurement and data analysis which are important throughout the course and to introduce the mechanical and thermal properties of solids, liquids and gases.*

Syllabus: Physics and Measurement: standards of length, mass, and time. Matter and model building. Density and atomic mass. Quantities, variables and relationships, dimensions and dimensional analysis, scientific notation, orders of magnitude and their estimation, problem solving. Experimental error: accuracy and precision, systematic and random errors, combination and propagation of error, significant figures. Elementary statistical treatment of random errors: standard deviation and standard error, the standard and Gaussian distributions, the method of least squares. Static equilibrium and elasticity: the conditions for equilibrium. Elastic and thermal properties of solids: stress and strain, thermal expansion, Hookes law, Youngs modulus, shear modulus, bulk modulus. Fluid mechanics: pressure, variation of pressure with depth, pressure measurements. Buoyant forces and Archimedes' principle. Fluid dynamics: Bernoulli's equation, other applications of fluid dynamics. The kinetic theory of gases: molecular model of an ideal gas, non-ideal gases, equipartition of energy. Heat transfer: conduction, convection and radiation.

PH4061 - QUANTUM MECHANICS
ECTS Credits: 6

Physics

Rationale and Purpose of the Module: *The pupose of the module is to extend the students understanding of quantum mechanics and to introduce students to applications of quantum mechanics in solid state physics.*

Syllabus: Review of Schrodinger picture: barriers, wavepackets, scattering. Formalism: linear operators, harmonic oscillator, Dirac notation, postulates, the uncertainty principle. Quantum mechanics in three dimensions: the hydrogen atom, angular momentum, spin. Time independent perturbation theory: spin-orbit coupling, the Zeeman effect. The variational principle: the ground state of helium. Bonding: the hydrogen molecule, molecular orbitals. The WKB approximation: tunnelling. Energy bands: Bloch theorem, Kronig-Penney model, nearly free electron model, the tight binding model. Time dependent perturbation theory: two level systems, emission and absorption of radiation, spontaneous emission.

Prerequisites: PH4171, PH4042, PH4132

PH4071 - SEMICONDUCTORS 1
ECTS Credits: 6

Physics

Rationale and Purpose of the Module: *The purpose of this module is introduce students to the fundamentals of semiconductor process technology focusing on silicon technology and integrated circuit processes.*

Syllabus: Semiconductor technology: overview of advances in integrated circuits, the road map, Moores law. General nature of semiconductor materials: elemental materials and their uses in research and industry, compound materials and alloys and their applications, influence of purity on electrical properties of semiconductors. Structure of semiconductors: amorphous, crystalline and polycrystalline solids, unit cells, lattice types, body centred cubic, face centred cubic, the diamond lattice, Si and Ge, Miller indices. Electrical properties: contribution of mobility and free carrier density to resistivity, electrical properties of conductors, semiconductors and insulators. Semiconductors: pure semiconductors, important elements from group 3, group 4 and group 5 of the periodic table, valence electrons, covalent bonding, p-type semiconductors and n-type semiconductors, energy levels for p-type and n-type semiconductors, intrinsic energy level, intrinsic carrier density, thermal equilibrium, carrier lifetime. Doping of silicon: donors and acceptors, majority carriers and minority carriers, hot point probe, 4-point probe sheet resistance, carrier transport.
Lithography: lithography processes (light sources, exposure systems, photoresist), aerial image, latent image, relief image, pattern definition, pattern transfer (etching, deposition, implantation etc.). Optical lithography techniques: optical resists, key resist parameters, positive and negative resist, DNQ system and deep UV system.
Resist processing: priming, spinning, baking, exposing, developing, hard baking, stripping. Exposure: types of exposure (UV light to deep UV, X-rays, electrons, ions), method of exposure, development (positive, negative). Printing: Fresnel system, contact and proximity printing, Fraunhofer system, projection printing, advantages and disadvantages. Advanced lithography]: focused ion beam, electron beam, etc.
Thermal oxidation of silicon: the oxidation process, type of furnaces, wet oxidation,dry oxidation, factors influencing oxidation rates, silica film thickness measurements. Thin film deposition: evaporation, sputtering, chemical vapour deposition. Diffusion: diffusion processes, constant source diffusion, limited source diffusion, solid solubility limits.
Epitaxial silicon deposition: LPCVD amorphous silicon, importance of epitaxy.
Ion implantation: implantation technology, channelling, lattice damage and annealing.

Prerequisites: PH4042, PH4132

PH4081 - NANOTECHNOLOGY 1
ECTS Credits: 6

Physics

Rationale and Purpose of the Module: *The aim of this course is to combine basic science of size effect in materials in the micro to nanoscale dimension leading to various cutting-edge applications. The main objective is to introduce the students about the scientific importance and technological potential of developments in micro- and nano structuring of materials.*

Syllabus: Solid State Physics: Size dependence of properties, Energy bands, Localized particles; Properties of individual particles: Metal nanoclusters, Semiconducting nanoparticles, Rare gas and molecular clusters and methods of synthesis.
Methods of measuring properties: Structure, Microscopy and Spectroscopy.
Carbon nanostructures: Carbon molecule, Carbon clusters, Carbon nanotubes, applications of Carbon nanotubes.
Bulk nanostructured materials: Solid disordered nanostructures, Nanostructured Crystals. Nanostructured ferromagnetism: Basics of ferromagnetism, Effect of bulk nano-structuring of magnetic properties, Dynamics of nanomagnets, Ferrofluids, nanopores containment of magnetic particles, Nanocarbon ferromagnets, Giant and Colossal magnetoresistance.
Quantum Wells, Wires and Dots: Preparation of quantum nanostructures, Size and dimensionality effect, Excitons, Single electron tunnelling.
Applications: Nanomachines and Devices; Microelectromechanical Systems (MEMS), Nanoelectromechanical Systems (NEMS), Molecular and Super molecular switches,
Magnetoelectronics. Applications: memory elements and devices, Nano magnetic sensors and actuators.

Prerequisites: PH4061, PH4021

PH4091 - PHYSICS OF MODERN MEASUREMENT
ECTS Credits: 6

Physics

Rationale and Purpose of the Module: *The purpose of the module is to provide an introduction to the physical principles and applications of advanced surface analytical techniques.*

Syllabus: Microscopy: image formation, resolution, light microscopy, near-field scanning optical microscopy (NSOM), scanning electron microscopy (SEM), transmission electron microscopy (TEM), scanning transmission electron microscopy (STEM), scanning tunnelling microscopy (STM), scanning force microscopy (SFM). Diffraction and scattering: elastic and inelastic scattering, Braggs law, the reciprocal lattice, Laue equations, x-ray diffraction (XRD), neutron diffraction, selected area electron diffraction in the transmission electron microscope (SAD), electron probe x-ray microanalysis (EPMA), extended x-ray absorption fine structure (EXAFS), surface extended x-ray absorption fine structure and near edge x-ray absorption fine structure (SEXAFS/NEXAFS), low-energy electron diffraction (LEED), reflection high-energy electron diffraction (RHEED), particle-induced x-ray emission (PIXE), x-ray fluorescence (XRF). Spectroscopy]: vibrations in molecules and solids, selection rules, energy-dispersive x-ray spectroscopy in the scanning electron microscope (EDS), electron energy-loss spectroscopy in the transmission electron microscope (EELS), x-ray photoelectron spectroscopy (XPS), ultraviolet photoelectron spectroscopy (UPS), Auger electron spectroscopy (AES), Fourier transform infrared spectroscopy (FTIR), Raman spectroscopy, nuclear magnetic resonance (NMR), Rutherford backscattering spectroscopy (RBS), secondary ion mass spectroscopy (SIMS), inductively coupled plasma mass spectroscopy (ICPMS), positron annihilation spectroscopy (PAS).

Prerequisites: PH4132, PH4021

PH4131 - MECHANICS/HEAT/ELECTRICITY/MAGNETISM
ECTS Credits: 6

Physics

Rationale and Purpose of the Module: *This module provides an understanding of the basic concepts of the mechanical, thermal, electrical and magnetic properties of matter, knowledge of which is the foundation of the engineering and technology on which our present society is dependent. The principles covered in this course find application throughout the students degree programme. The principles are a key foundation of the degree programme and are extensively developed in theory and practice in the subsequent years of the programme.*

Syllabus: Linear motion: vectors, projectiles, circular motion, relative velocity. NewtonÆs laws: force, work, power, momentum, friction, gravitation. Conservation of energy. Linear and angular momentum: conservation of momentum, collisions. Rotation of a rigid body: moments of inertia, kinetic energy, angular momentum.

The laws of thermodynamics. Equilibrium and temperature, heat and internal energy, heat capacities and latent heat. The ideal gas, isotherms and adiabats. The Carnot engine: efficiency. Classical and microscopic entropy.

Electricity: charge, electric field, Coulomb's law, Gauss's law. Electric potential, capacitance, Ohm's law, KirchhoffÆs Laws, dc circuit analysis, Joule heating. RC circuits.

Magnetism: magnetic field, magnetic force and torque, the galvanometer. Ampere's law. Electromagnetic Induction: inductance. Faraday's law,Lenz's law, the generator and motor, back emf.

PH4161 - ATOMIC / MOLECULAR / LASER PHYSICS
ECTS Credits: 6

Physics

Rationale and Purpose of the Module: *This module develops the student's knowledge of atomic and molecular physics, particulary where these are relevant to spectra and laser physics. Based on this the module introduces the fundamentals of laser physics and laser applications including holography.*

Syllabus: Atomic structure: the hydrogen atom, energy level diagram and the origin of spectra, many-electron atoms, the influence of external fields, hyperfine structure, isotopic shifts, the shell model, X-ray spectra.
Molecules: diatomic molecules, vibrational and rotational states, complex molecules, vibrational modes.
Molecular emission and absorption spectra in the visible and infrared.
Fundamentals of laser action: cavities, laser media, gain, losses, cavity linewidths, broadening mechanisms.
Spatial and temporal properties: Gaussian beams, cavity modes, mode locking and Q switching, solid state lasers.
Laser Applications: industrial, medical, data storage, holography and holographic techniques, laser safety.

Prerequisites: PH4132, PH4041

PH4171 - MECHANICS
ECTS Credits: 6

Physics

Rationale and Purpose of the Module: *The purpose of this module is to enhance students understanding of key concepts and models associated with classical mechanics, vibrations and waves. The objectives are to develop the mechanics of single particles and of systems of particles including vibrations and waves and rigid bodies, and to introduce Lagrangian and Hamiltonian methods which also provide background for quantum mechanics.*

Syllabus: Mechanical vibrations: simple harmonic and damped simple harmonic motion, quality factor, forced oscillations, coupled oscillations. Waves: transverse and longitudinal waves, phase and group velocity, energy transported by waves, reflection and transmission of waves. Review of the principles of mechanics: inertial frames, Newtons laws of motion. Central forces: gravitation and Keplers laws, orbits, scattering. Systems of particles: centre of mass, linear momentum, rocket propulsion, kinetic energy. Rigid bodies: rotation and moments of inertia, angular momentum and kinetic energy, torque, principal axes, Eulers equations, gyroscopic motion. Noninertial reference systems: angular velocity vector, inertial forces, dynamics of a particle in a rotating coordinate system. Lagrangian mechanics: Hamiltons principle, generalised coordinates, Lagranges equations for conservative systems, Hamiltons equations.

Prerequisites: PH4131

PH4607 - SOLID STATE PHYSICS 1
ECTS Credits: 6

Physics

Rationale and Purpose of the Module: *The purpose of this module is to enhance the students' understanding of key concepts in solid state physics and the quantum theory of solids.*

Syllabus: Crystal dynamics: sound waves, the one dimensional crystal, normal modes, lattice vibrations and phonons, Bloch waves. Semiconductors: electrons and holes, intrinsic and extrinsic behaviour, Fermi energy, band structure, effective mass, excitons and plasmonics. Transport properties and electrodynamics of metals: conductivity, Hall effect, cyclotron resonance, Debye model of specific heat. Dielectric properties: Drude model, polarons and hopping conduction. Non-equilibrium carrier densities: continuity equations, neutrality. Photonic devices: photodiodes, LEDs, homojunction and heterojunction LASERs, photonic crystals. Optical Properties: Brillouin scattering, crystal optics, infrared absorption, optical phonons, Raman scattering.

Prerequisites: PH4061

PH4613 - FORCES, POTENTIALS AND FIELDS
ECTS Credits: 6

Physics

Rationale and Purpose of the Module: *The purpose of this module is to enhance students understanding of key concepts and models associated with forces, potentials and fields. The objectives are to introduce and model kinematics, dynamics, planetary dynamics, fluid mechanics and electromagnetism using concepts such as magnitude, direction, rate-of-change, gradient and fields.*

Syllabus: Syllabus:
Kinematics: review of vectors and scalars, displacement, velocity, flux, acceleration, rotation, frequency, angular velocity, planes of reference, rotation of axes, cylindrical and spherical coordinates. Forces: stress, strain, pressure, tension, electricity, Gauss's Law, magnetism, work, potential, conservation of energy. Dynamics: Newton's Laws, forces as a function of time and space; rate of change of forces and other vectors, tangential forces, centripetal and centrifugal forces. and fields: visualisation of scalar and vector fields, maxima/minima, contour maps, smoothness, gradient, curvature, gravity, relativity, electromagnetism, divergence and vortices and their significance for electromagnetism, and fluid mechanics, Maxwell's Equations.

Prerequisites: MA4602, PH4131, PH4102

PH5041 - CONDENSED MATTER PHYSICS 1
ECTS Credits: 6

Physics

Rationale and Purpose of the Module: *The purpose of this module is to enhance the students' understanding of key concepts in solid state physics and the quantum theory of solids.*

Syllabus: Crystal dynamics: sound waves, the one dimensional crystal, normal modes, lattice vibrations and phonons, Bloch waves. Semiconductors: electrons and holes, intrinsic and extrinsic behaviour, Fermi energy, band structure, effective mass, excitons and plasmonics. Transport properties and electrodynamics of metals: conductivity, Hall effect, cyclotron resonance, Debye model of specific heat. Dielectric properties: Drude model, polarons and hopping conduction. Non-equilibrium carrier densities: continuity equations, neutrality. Photonic devices: photodiodes, LEDs, homojunction and heterojunction LASERs, photonic crystals. Optical Properties: Brillouin scattering, crystal optics, infrared absorption, optical phonons, Raman scattering.

PH5091 - PHYSICS OF MATERIALS
ECTS Credits: 6

Physics

Rationale and Purpose of the Module: *The purpose of the module is to introduce the student to the structure and properties of solid materials. The objectives are to discuss the major classes of solids and their properties and applications, and to present the physical principles needed for an understanding of the observations*

Syllabus: Structure & bonding: atomic structure; primary & secondary bonds, bonding forces & energies. Structures of metals, ceramics & polymers: crystal structures, Miller indices & reciprocal lattice, X-ray diffraction, non-crystalline solids, polymer molecules & configurations, thermoplastic & thermosetting polymers. Imperfections: point defects, dislocations.
Diffusion: diffusion mechanisms, steady and non-steady state diffusion.
Mechanical properties: elastic deformation, mechanical behaviour of metals, ceramics & polymers.
Deformation & strengthening: dislocations in metals & ceramics, hardness twinning, Hall-Petch effect,

deformation & strengthening of polymers.
Failure: fracture & toughness, fatigue, creep, wear.
Phase diagrams: Gibbs phase rule, binary & ternary phase diagrams, interpretation of phase diagrams.
Phase transformations: homogeneous & heterogeneous nucleation, growth, metastable & equilibrium states.
Applications of materials: ferrous & non-ferrous alloys, glasses & ceramics, plastics & elastomers.

PH5093 - PHYSICS OF ADVANCED METROLOGY
ECTS Credits: 6

Physics

Rationale and Purpose of the Module: *The purpose of the module is to provide an introduction to the physical principles and applications of advanced surface analytical techniques.*

Syllabus: Microscopy: image formation, resolution, light microscopy, near-field scanning optical microscopy (NSOM), scanning electron microscopy (SEM), transmission electron microscopy (TEM), scanning transmission electron microscopy (STEM), scanning tunnelling microscopy (STM), scanning force microscopy (SFM). Diffraction and scattering: elastic and inelastic scattering, Braggs law, the reciprocal lattice, Laue equations, x-ray diffraction (XRD), neutron diffraction, selected area electron diffraction in the transmission electron microscope (SAD), electron probe x-ray microanalysis (EPMA), extended x-ray absorption fine structure (EXAFS), surface extended x-ray absorption fine structure and near edge x-ray absorption fine structure (SEXAFS/NEXAFS), low-energy electron diffraction (LEED), reflection high-energy electron diffraction (RHEED), particle-induced x-ray emission (PIXE), x-ray fluorescence (XRF). Spectroscopy]: vibrations in molecules and solids, selection rules, energy-dispersive x-ray spectroscopy in the scanning electron microscope (EDS), electron energy-loss spectroscopy in the transmission electron microscope (EELS), x-ray photoelectron spectroscopy (XPS), ultraviolet photoelectron spectroscopy (UPS), Auger electron spectroscopy (AES), Fourier transform infrared spectroscopy (FTIR), Raman spectroscopy, nuclear magnetic resonance (NMR), Rutherford backscattering spectroscopy (RBS), secondary ion mass spectroscopy (SIMS), inductively coupled plasma mass spectroscopy (ICPMS), positron annihilation spectroscopy (PAS).

PH5094 - NANOSCIENCE AND TECHNOLOGY 1
ECTS Credits: 6

Physics

Rationale and Purpose of the Module: *The aim of this course is to apply the basic science of size effects in materials in the micro to nanoscale dimension to various cutting-edge applications. The main objective is to introduce the students to the scientific importance and technological potential of developments in micro- and nano structuring of materials.*

Syllabus: Solid State Physics: Size dependence of properties, Energy bands, Localized particles; Properties of individual particles: Metal nanoclusters, Semiconducting nanoparticles, Rare gas and molecular clusters and methods of synthesis.
Methods of measuring properties: Structure, Microscopy and Spectroscopy;
Carbon nanostructures: Carbon molecule, Carbon clusters, Carbon nanotubes, application of carbon nanotubes;
Bulk nanostructured materials: Solid disordered nanostructures; Nanostructured Crystals, Nanostructured ferromagnetism: Basics of ferromagnetism, Effect of bulk nano-structuring of magnetic properties, Dynamics of nanomagnets, Ferrofluids, nanopores containment of magnetic particles, Nanocarbon ferromagnets, Giant and Colossal magnetoresistance;
Quantum Wells, Wires and Dots: Preparation of quantum nanostructures, Size and dimensionality effect, Excitons, Single electron tunnelling;
Applications: Nanomachines and Devices: Microelectromechanical Systems (MEMS), Nanoelectromechanical Systems (NEMS), Molecular and Super molecular switches,
Magnetoelectronics Applications: memory elements and devices, Nano magnetic sensors and actuators

---

PH5098 - SEMICONDUCTOR PROCESSING 1
ECTS Credits: 6

Physics

Rationale and Purpose of the Module: *The purpose of this module is to introduce students to the fundamentals of semiconductor process technology focusing on silicon technology and integrated circuit processes.*

Syllabus: Semiconductor technology: overview of advances in integrated circuits, the road map, Moores law. General nature of semiconductor materials: elemental materials and their uses in research and industry, compound materials and alloys and their applications, influence of purity on electrical properties of semiconductors. Structure of semiconductors: amorphous, crystalline and polycrystalline solids, unit cells, lattice types, body centred cubic, face centred cubic, the diamond lattice, Si and Ge, Miller indices.
Electrical properties: contribution of mobility and free carrier density to resistivity, electrical properties of conductors, semiconductors and insulators.
Semiconductors: pure semiconductors, important elements from group 3, group 4 and group 5 of the periodic table, valence electrons, covalent bonding, p-type semiconductors and n-type semiconductors, energy levels for p-type and n-type semiconductors, intrinsic energy level, intrinsic carrier density, thermal equilibrium, carrier lifetime. Doping of silicon: donors and acceptors, majority carriers and minority carriers, hot point probe, 4-point probe sheet resistance, carrier transport.
Lithography: lithography processes (light sources, exposure systems, photoresist), aerial image, latent image, relief image, pattern definition, pattern transfer (etching, deposition, implantation etc.). Optical lithography techniques: optical resists, key resist parameters, positive and negative resist, DNQ system and deep UV system.
Resist processing: priming, spinning, baking, exposing, developing, hard baking, stripping. Exposure: types of exposure (UV light to deep UV, X-rays, electrons, ions), method of exposure, development (positive, negative).
Printing: Fresnel system, contact and proximity printing, Fraunhofer system, projection printing, advantages and disadvantages. Advanced lithography]: focused ion beam, electron beam, etc.
Thermal oxidation of silicon: the oxidation process, type of furnaces, wet oxidation,dry oxidation, factors influencing oxidation rates, silica film thickness measurements. Thin film deposition: evaporation, sputtering, chemical vapour deposition. Diffusion: diffusion processes, constant source diffusion, limited source diffusion, solid solubility limits.
Epitaxial silicon deposition: LPCVD amorphous silicon, importance of epitaxy.
Ion implantation: implantation technology, channelling, lattice damage and annealing.

PM4013 - PRINCIPLES OF HUMAN RESOURCE MANAGEMENT
ECTS Credits: 6

Personnel & Employment Relations

Rationale and Purpose of the Module: *This module examines both the role of the HR function in the management of people at work and the importance of managing people in contributing to organisational effectiveness. This module is designed to provide students with an appreciation and understanding of Human Resource Management (HRM) in organisations. There is a strong focus on contextualising HRM within the prevailing macro environment, to demonstrate how this influences the range of HR policies and systems enacted by organisations.*

The syllabus covers core issues surrounding managing people at work. In so doing, the module starts with a consideration of key labour market issues in Ireland and how these affect the nature of HRM in organisations. Core HR activities are next explored including the processes of human resource planning, recruitment and selection. The module then examines critical elements of managing and rewarding performance, career development, and developing people at work. The nature of work is set down and finally, the link between CSR and HRM is highlighted.

Syllabus: The syllabus covers core issues surrounding managing people at work. In so doing, the module starts with a consideration of key labour market issues in Ireland and how these affect the nature of HRM in organisations. Arising from a labour market analysis, core HR activities are next explored including the processes of human resource planning, recruitment and selection. The module next examines critical elements of managing and rewarding performance, designing jobs and developing people at work. The nature of work is set down and finally, the regulatory environment for HRM in Ireland is indicated.

PM4017 - HUMAN RESOURCE PRACTICE
ECTS Credits: 6

Personnel & Employment Relations

Rationale and Purpose of the Module: *This purpose of this module is to develop practical skills/capabilities considered essential for HR practitioners. These skills are primarily in the key areas of selection, appraisal, discipline and grievance and applying regulations governing HR to all processes and activities. Another core purpose of the module is to increase the knowledge and skill and overall capability of the participants in key operational areas of HR such as performance management, health and safety, employment regulation, employee welfare issues.*

Syllabus: Overview of key HR processes; key operational areas: selection, performance management conflict. key regulatory considerations; Key communication skills revisited- active listening, questioning styles, recording information; job analysis; recruitment process- designing job descriptions, person specifications, ; sourcing applicants, interacting with recruitment agencies, application forms; evaluative standards for selection methods: reliability, validity, practicality, integration, interpretability; selection methods: references; selection process- short listing, designing matrices, designing interview assessments, interviewing techniques, applying appropriate communication skills to selection interview; individual characteristics and bias; preparing and setting up interview; regulatory considerations, documentation; performance review- preparation, documentation, conducting the performance review, follow up; workplace counselling; disciplinary interviewing.

Prerequisites: PM4013

PM4027 - SOCIAL PSYCHOLOGY OF ORGANISATIONS
ECTS Credits: 6

Personnel & Employment Relations

Rationale and Purpose of the Module: *This Module seeks to present a broad introduction to social psychology, the scientific study of human social influence and interaction. It provides basic exposure to social psychological issues using the organisation as an operational paradigm for generating understanding and insight. Perspectives from social psychology are drawn upon to examine aspects of contemporary social and organisational life. This module aims to give a critical understanding of current social psychology research and develop a reflective understanding of key organisational developments.*

At the end of the module students should have a sound knowledge of research in social psychology in the organisational context and will be expected to be able to apply these ideas, and use them to understand and address relevant social issues.

Syllabus: The Nature and History of Social Psychology; Approaches to the Study of Social psychology; Personal and Social Identity in Workplaces; Self-awareness and Self-regulation; Social influence, Conformity, Compliance and Obedience; Helping Behaviours and Organisational Citizenship, Pro-social, Anti-social and Withdrawal Behaviour; The
Role of Attribution and Cognitive Dissonance in Organisational Decision-making; Stereotyping and Prejudice in Employment and Workplace Interactions.

Prerequisites: PM4022

PM4035 - THE PSYCHOLOGY OF WORK
ECTS Credits: 6

Personnel & Employment Relations

Rationale and Purpose of the Module: *The module aims to enable students develop knowledge and skills in psychology (both as a discipline and as a professional field) applied to work and organisations.*
It aims to develop knowledge and skills of understanding individuals in context, considering cognitive, emotional, motivational and behavioural responses to varying working environments and contexts.
It aims to develop theoretical and applied knowledge about key psychological concepts and theories concerning, work, the workplace, and working life.

Syllabus: 1 Introduction to Work & Organizational Psychology: Psychology as a Science: The art of thinking critically in an applied field
2 Studying Individuals at Work
Context & Behaviour
Cognition
Motivation
Emotion
3.Taking an Active Approach to Work
Active Behaviour: Adaptive and proactive behaviour
Proactive motivation
Proactive cognition
Actively managing emotions at work
4.Staying Healthy at Work
Health Cognitions: Thinking Healthy

Emotions: Coping with work stress
Behaviour: Fatigue & recovery
Motivation: Work engagement
Environment: Job Demands & Job Control
5.Staying Positive at Work
What is positive psychology?
Behaviour: Flourishing
Environments conducive to human flourishing
Motivation: Psychological Capital
Positive Emotions & the ability to savor
Cognition: Positive Thinking (mindfulness)
6.Creativity and Innovation at Work
Behaviour: Creative and innovative behaviour

Cognition: Creative problem solving
Motivating employees to be creative: Flow
Creative emotions: Broaden & Build

PM4055 - CRITICAL PERSPECTIVES ON EMPLOYMENT RELATIONS
ECTS Credits: 6

Personnel & Employment Relations

Rationale and Purpose of the Module: *To provide an overview of the evolution and contemporary nature of employment relations, with specific focus on Ireland.*

To ensure students are cognisant of the various theoretical perspectives on employment relations.

To enable students to understand and analyse workplace mechanisms for employee voice.

To enable students to analyse case studies on employment relations and to develop report writing skills.

To understand the role and behaviour of various actors in employment relations.

To understand employment relations in an international and comparative context.

Syllabus: Theoretical perspectives on employment relations - unitarism, pluralism, and radical theories. International and comparative employment relations. Employee voice - involvement and participation, collective bargaining, non-union firms. The actors and employment relations - trade unions and employment relations, management approaches to employment relations, state approaches to employment relations.

PM4603 - EMPLOYEE RELATIONS FOR ENGINEERING AND SCIENCE
ECTS Credits: 6

Personnel & Employment Relations

Rationale and Purpose of the Module: *Enable students to understand the nature of employees relations at work.*
Demonstrate familiarity with approaches to managing and motivating employees.
Identify the role and functions of trade unions and employer organizations.
Identify the appreciation of the role of the state in employee relations and in particular the role of the labour court.
Promote a clear understanding of the legal nature of the contract of employment, and.
Provide an overview of the implications of employment law for the management of the employment relationship.
Review the provisions of dismissals, equality, health & safety and other employment legislation.
Allow students to appreciate the role of national and workplace level partnership.

Syllabus: The employment relationship; perspectives on the business enterprise; the individual and work groups; the basics of recruitment and selection; motivation techniques; job design; worker participation; team work and its development; effective supervisory management; discipline and grievance administration; communication in employee relations; management trade unions shop stewards; pay bargaining and negotiation; conflict and its management; the labour court and the labour relations commission; employment law û the contract of employment; unfair dismissal, equality, health and safety their implications for the conduct of employee relations.

PO4018 - INTERNATIONAL RELATIONS
ECTS Credits: 6

Politics and Public Admin

Rationale and Purpose of the Module: *Provides an overview of some of the theoretical debates and issues that have underpinned the study of International Relations (IR). Theoretical perspectives such as Realism, Liberalism and Structuralism will be introduced and this will allow students to apply these to the arena of world politics and to processes such as the interactions of states, the workings of International Organisation and the global economy*

Syllabus: The module provides an introduction to the theoretical perspectives within International Relations (IR) - Realism; Liberalism; Structuralism; Critical Theory; Post-Modernism; Constructivism; Feminism. It then introduces the major aspects of study within IR - Power; Security; War and Peace; Foreign Policy and Diplomacy; International Political Economy; International Organisations

---

PO4023 - COMPARATIVE EUROPEAN POLITICS
ECTS Credits: 6

Politics and Public Admin

Rationale and Purpose of the Module: *This course provides an introduction to the comparative study of European politics. It provides students with the opportunity to study political trends across Europe, to identify similarities and differences within different countries, systems and regions, and to develop their ability to conduct comparative political analysis.*

NB This course will mainly draw on Western and Central European political systems

Syllabus: The basic themes of the course are, first, the commonalties and, secondly, the particularities, of politics and government among West European states û due largely to their similar yet different trajectories of development, and to the way in which they influence each other. We explore, for example, why politics in some West European countries is very stable, even predictable, whereas in other countries politics is highly fractious; why some countries have single-party governments whilst others are (almost always) governed by complex coalitions; why some polities seem to be well-governed whereas governance seems more haphazard in others. Note, too, that an understanding of politics and government in West European states tells us much about what is involved in building democracy in the new states of Eastern and Central Europe, and indicates some of the difficulties entailed in European integration û both of which are areas of study in third-year courses.

Prerequisites: PO4011

PO4027 - INTERNATIONAL ORGANISATIONS AND GLOBAL GOVERNANCE
ECTS Credits: 6

Politics and Public Admin

Rationale and Purpose of the Module: *To examine the range of international organisations that influence global politics, and to assess their role in running the global political economy.*

Syllabus: The origins of international organisations, and their place in liberal internationalist thought; the successes and failures of the League of Nations system; the United Nations system and its internal processes; regional organisations; non-governmental organisations and global governance; international organisations and the search for political and military security; functional-technical cooperation at the regional and global level; global governance and the post-Cold War global political economy.

Prerequisites: PO4004

PO4032 - RUSSIAN POLITICS
ECTS Credits: 6

Politics and Public Admin

Rationale and Purpose of the Module: *The purpose of this module is to help students explore issues in Russian political development over the last century according to their interests. Students have free choice of which topics they study so that the learning outcomes of the module will be individualized.*

In addition to the knowledge gained by students about the USSR and Russia, this module will help students to develop their analytical and research skills. All students, however, will have to search out information on contemporary Russia in their own time and will learn how to locate information in the library and on the WWW, will learn how to judge the merits of different information sources, will learn how to construct arguments from primary materials that they have and how to relate such materials to existing academic literatures. They will also have to learn how to interpret academic literature in changing circumstances, to relate it to a developing polity and judge it against change.

Syllabus: This module is a reading course, students consult over and decide in consultation with the lecturer over the topics in Soviet and Russian politics that they study and write on. These topics include may include, but are not limited to:
Leninism and Bolshevism as political theory
The 1917 revolution
The relationship of Leninism and Stalinism
The development of the Stalinist system
The great terror
Khrushchev and destalinisation
The institutions of the USSR: the party-state system
Theories of the development of the Soviet system
The political economy of the USSR
Soviet foreign policy
The nature of the USSR (various approaches can be studied including totalitarianism, Marxist approaches etc)
The Gorbachev reforms
Why did the USSR collapse?
Soviet legacies and the post-Soviet policy agenda
The theory of economic reform and post-Soviet politics
The post-Soviet struggle for power, 1992-1993
The presidency under Yeltsin
Yeltsin, oligarchy and the corruption of the state
The Putin programme: reform or retrenchment?
The political economy of the new Russia
Russia and the resource curse
The new Russian political system: Elections
The new Russian political system: political parties
The new Russian political system: parliament
The new Russian political system: the development and dysfunctions of federalism
Russian foreign policy
Russia in comparative perspective
State and democracy in the new Russia

PO4033 - POLITICAL THEORY
ECTS Credits: 6

Politics and Public Admin

Rationale and Purpose of the Module: *This module will cover the basic concepts in contemporary political theory, building on the ideas introduced in PO4022 Modern European Political Thought. The goal is to develop a clear understanding and mastery of the main concepts and ideas in political theory.*

Syllabus: PO4022 Modern European Political Thought introduced students to the basic concepts in political theory via a historical narrative that stressed the richness of political thinking. This module takes the key concepts in contemporary political theory, that were introduced in PO4022, and presents a deeper understanding of their role and relevance in the contemporary world. Concepts covered in the module will include: democratic theory; modern political ideologies; tolerance and multiculturalism; national identity and citizenship and political mortality. Students will be introduced to the different approaches within political theory, as well as how the concepts discussed in this module relate to broader issues within political science.

Prerequisites: PO4011, PO4022

PO4043 - INTRODUCTION TO IRISH POLITICS
ECTS Credits: 6

Politics and Public Admin

Rationale and Purpose of the Module: *This course is designed to build on and develop the knowledge gained in earlier politics modules by examining the politics and society of a single country in more depth. The course will apply a range of alternative analytical perspectives from political science and the sub-disciplines of political economy, political sociology, public administration and public policy, to the study of the government and politics of Ireland.*

At a practical level, this course aims to:
Introduce students to the government and politics of Ireland
Develop analytic and evaluative skills for examining the processes of government and politics
Understand the historical and political development of the Irish state, and be able to identify key influences in that development;
Be familiar with key institutions and their workings;

Syllabus: The module will contain three main components: the institutional framework of government and administration the executive, legislature and bureaucracy; political behaviour - including government, parties, party system, electoral behaviour and political culture; and an analysis of the public administration and policy making - looking at territorial administration and sub-national government, economic policy-making and the advent of partnership government; the welfare state

and social policy; plus Irelands role in the EU and beyond.

PO4051 - INTRODUCTION TO POLITICS AND INTERNATIONAL RELATIONS I
ECTS Credits: 6

Politics and Public Admin

Rationale and Purpose of the Module: *This module will introduce studies to the themes and issues that exist in the study of Politics and International Relations. It will provide the first part of an introduction that will look at the basics of the study of Politics and International Relations. In particular, it will address questions about the nature and justification of the state, and its role in both domestic and international politics. The module will be offered on the Evening Degree.*

Syllabus: What is Politics and International Relations?
Power and Authority
State Development
Power in Modern States
Political Obligation in Classical Political Thought
Political Obligation in Contemporary Political Thought
States and Nonstate Actors in International Politics
International Organisations, Globalisation and Regionalism

PO4067 - STUDIES IN POLITICAL THOUGHT
ECTS Credits: 6

Politics and Public Admin

Rationale and Purpose of the Module: *To build on the knowledge gained during earlier modules, especially PO4022 Modern European Political Thought, by exploring the writings of a number of key political thinkers in more depth. This module will be an option in the fourth year, and is intended for those interested in exploring political theory themes in more depth. The class will follow a seminar format.*

Syllabus: The relationship between political action and political philosophy, with particular reference to questions of freedom and virtue, explored through the thought of Plato, Machiavelli, and Foucault; the political thought of Plato as a foundation for Western philosophy; the politics of Machiavelli and his influence on the development of humanism and republicanism; Michel Foucault and the relationship between truth and power.

Prerequisites: PO4022

PO4107 - NATIONALISM, ETHNICITY AND CONFLICT
ECTS Credits: 6

Politics and Public Admin

Rationale and Purpose of the Module: *In this module students will address debates about the causes and nature of nationalist politics and ethnic conflicts. They will explore the ways in which historians and political scientists have sought to explain the capacity for national movements and ethnic identities to mobilise and unite people who may among themselves have sharply contrasting objective interests. A key aim of this module is to enable you to take general theories - in this case those that explain nationalism and ethnicities and to use them critically, testing their validity, and if necessary, introducing your own modifications and qualifications to these theoretical generalizations.*

Syllabus: Introductory: What is a nation?
Nations, nationalism and modernity.
Pre-modern nations.
Case study: Irish nationalism
Case Study: South Africa: Afrikaner and African nationalism
Case Study: Slovak Nationalism
Ethnicity and ethnic conflicts: An introduction
Ethno-nationalist movements and political violence
Ethnic conflicts and peace processes
Gender, nationalism and ethnic conflicts
Case studies: Sri Lanka, Kashmir
Case Studies: Northern Ireland, Former Yugoslavia

PO4117 - POLICY-MAKING IN THE EUROPEAN UNION
ECTS Credits: 6

Politics and Public Admin

Rationale and Purpose of the Module: *The module is being created as an addition to the elective choice for students in semesters 7 and 8 on BA Politics and International Relations and on AHSS programmes where Politics is offered as an option.*

It better reflects the subject expertise of current teaching staff in this area than existing modules.

Syllabus: This module takes a detailed look at the policy-making process of the EU. Few EU policies directly redistribute money, yet even if they sometimes seem to focus on rather arcane technical issues, they often have profound consequences for the legal rights and the welfare of individual citizens, the competitiveness of particular companies or entire industries, and the social, economic, and democratic development of Europe as a whole. If we want to evaluate the functioning of the EU as a democratic political system, we need to know who is involved in the formulation and implementation of those policies, to what extent these actors and the structural characteristics of the process influence the shape and content of those policies, and why different actors and structural characteristics vary in their influence on policy outcomes. These are the types of questions discussed in this module.

Module outline:
- Introduction and historical background
- The institutional framework
- Policies and policy-making
- Theories of European integration and policy-making
- Agenda-setting
- EP decision-making
- Council decision-making
- Bicameral bargaining
- Transposition and implementation
- Enforcement and judicial review
- Evaluation

PO4127 - REGIONALISM IN WORLD POLITICS
ECTS Credits: 6

Politics and Public Admin

Rationale and Purpose of the Module: *The proposed module better reflects the subject expertise of current teaching staff in this area and curriculum in the BA Politics and International Relations.*
It will be scheduled in place of the existing module PL4017 'Regional Development' as a core second year module for BA Politics and International Relations.
The module will be added to the elective choice for students in semesters 7 and 8 on AHSS programmes where Politics is offered as an option.

Syllabus: Week 1: What is Regionalism? How does it facilitate development?
Week 2: New and Old Regionalism: Regionalism and Globalisation
Week 3: Regionalism in Action: Types, Comparisons and Functions
Week 4: The European Union
Week 5: American Regionalism
Week 6: ASEAN and APEC
Week 7: South Asian Regionalism (SAARC)
Week 8: Africa and the African Union
Week 9: Regionalism and the UN
Week 10: Case Study I: European Regional Enlargement
Week 11: Case Study II: South Asian Security
Week 12: Gendered approaches to regionalism and development

PO5014 - MULTI LEVEL GOVERNANCE: CONCEPTS AND PRACTICE
ECTS Credits: 9

Politics and Public Admin

Rationale and Purpose of the Module: *The aim of this module is to enable students to understand the significant changes that have taken place in processes of governing at international, national and local levels. The module explores the manner in which the interaction of various levels and the involvement of diverse actors have impacted on politics, policy and polity. The meanings, origins and various applications of the phenomenon of multi-level governance (MLG) are analysed in order to assess its normative and empirical impact. Particular attention is paid to the emergence of MLG as a significant framework of policy-making in the EU as well as its effects on domestic and global contexts.*

Syllabus: This module explores the distinctions between government and governance and considers the conceptualisations and implications of MLG. Topics include: Government and governance; new modes of governance; MLG, theory or explanation; MLG as compound democracy; MLG in the international policy arena (e.g., climate change, finance, tobacco control); MLG in the EU; MLG in the domestic context.
The topics will be considered from both theoretical and applied perspectives and will direct students to the vast array of interpretations and applications of the MLG phenomenon.

PR4010 - ANATOMY 1
ECTS Credits: 12

School of Allied Health

Rationale and Purpose of the Module: *This module is designed to enable students to understand the structure and function of the musculoskeletal system of the lower extremity, pelvis and spine; abdomen; the cardiovascular system and the respsiratory system. This module forms the basis for understanding the implications of pathophysiological changes within these structures that will be studied in modules during years 2-4.*

The total hours scheduled will be 96 (based on 3 hours lectures, 3 hours labs and 2 hours tutorials over 12 weeks)

Syllabus: Introduction to nomenclature and general concepts of anatomy, classification of bones, joints and muscles; cervical, thoracic and lumbar spine and thorax (sternum, ribs and thoracic vertebrae). The integumentary system (structure & function). Afferent and efferent control of muscle tone and posture; myotomes and dermatomes and reflexes LL; pelvic bones and pelvic floor and perineum ; bony skeleton, muscle attachments, joints, nerve supply of the lower limb, analysis of movements of the lower limb, muscle participation and nature of contraction

---

PS4011 - SOCIAL PSYCHOLOGY 1
ECTS Credits: 6

Psychology

Rationale and Purpose of the Module: *To provide a broad introduction to the field of social psychology which will be built on in future modules. The lectures will provide a framework around a range of topics in social psychology.*

Syllabus: Social psychology is a field of psychology that considers the nature, causes, and consequences of human social behavior. The module will cover theories, models, key concepts and issues related to attitudes and behaviour, social influence, intra and inter group processes, pro-social behaviour, and affiliation, attraction and love.

PS4021 - PSYCHOLOGY: THEORY AND METHOD 1
ECTS Credits: 6

Psychology

Rationale and Purpose of the Module: *This module provides students with a broad introduction to the historical evolution, issues, debates, themes and theories in psychology. The course will provide a a good grounding in a range of theoretical perspectives in psychology including attention in particular to personality and biological psychology.*

Syllabus: This module is the first of two modules which provide a broad introduction to the discipline of psychology. This module will begin with a brief historical and philosophical overview of the roots of psychology and then move on to cover the psychodynamic perspective, behaviourism and learning theory, the biological basis of behaviour, and cognitive psychology. Within the biological perspective the focus will be on motivation and emotion, and within cognitive psychology the focus will be on memory.

PS4022 - PSYCHOLOGY OF THE PERSONALITY
ECTS Credits: 6

Psychology

Rationale and Purpose of the Module: *For students to understand how the field of psychology has approached the topic of personality and for students to develop knowledge of the ways personality and individual difference, intelligence and aptitude are constructed and tested in psychology.*

Syllabus: Personality is a collection of emotion, thought and behaviour patterns that are unique to an individual. Through a series of lectures and practical tutorial sessions, topics relevant to the psychology of personality will be explored; including defining personality, temperament, aptitude and difference; personality and intelligence testing; and models including factorial models, typologies and circumplexes.

Prerequisites: PS4032, PS4031

PS4027 - APPLIED PSYCHOLOGY
ECTS Credits: 6

Psychology

Rationale and Purpose of the Module: *For students to develop an understanding of how psychology is applied in practice*
To introduce students to the range of areas in which professional psychologists work

Syllabus: To examine how major theories and core areas of psychology can be applied in professional practice

Prerequisites: PS4042, PS4021

PS4031 - PSYCHOLOGY AND EVERYDAY LIFE
ECTS Credits: 6

Psychology

Rationale and Purpose of the Module: *This module will introduce students to a range of fundamental theoretical perspectives and issues in general psychology through examining their relevance in everyday life. Through exploring everyday issues students will not only learn about theoretical perspectives but will also gain a basic knowledge of how psychology may be applied.*

Syllabus: Through exploring some key studies in psychology, students will gain a basic understanding of the main investigative techniques used by psychologists. The range of topics will include; definitions of psychology; communication and body language; personality; sex and gender; social interaction; emotion; brain and behaviour; health and illness; human development; psychological problems; perception and thinking; learning; humans and animals; applications of psychology

---

PS4035 - BIOLOGICAL BASIS OF HUMAN BEHAVIOUR
ECTS Credits: 6

Psychology

Structure and function of the mammalian nervous system with reference to the biological bases of major classes of behaviour, including neuroanatomy and neurophysiology, role of neurotransmitters in brain function, CNS and endocrine influences on behaviour, localisation of brain function, the importance and limitations the of case study approach and animal research.

Prerequisites: PS4042, PS4021

PS4041 - PRACTICAL PSYCHOLOGY 1
ECTS Credits: 6

Psychology

Rationale and Purpose of the Module:
To introduce students to the range of research methods employed in psychology and to develop studentÆs ability to work with quantitative data and SPSS in particular

Syllabus: This practical class introduces the range of methods employed in psychology to students. The value of experiments, observational, survey and interviews and case studies work are considered using illustrative examples. Practical skills in these methods are developed though the use of selected examples. Students are also introduced to important IT skills such as library search skills and SPSS for coding of data via practical work.

Prerequisites: PS4021

PS4043 - EMPIRICAL PSYCHOLOGY 1
ECTS Credits: 6

Psychology

Rationale and Purpose of the Module: *To introduce students to a range of laboratory based activities in psychology and to develop studentÆs ability to design, collect, code and analyse empirical data using experimental methodologies.*

Syllabus: Classical approaches to psychology emphasise the importance of the experimental paradigm to understanding behaviour and mental processes. This lab based module introduces students to the traditional experimental approach and familiarises them with concepts such as randomisation, experimenter bias, confounding variables via a series of practicals. Issues such as correlation and causation are discussed and the necessity of quasi experimental approaches highlighted. Students learn to design, conduct, code and analyse experimental data whilst paying due consideration to the welfare of participants and attending to the appropriate ethical guidelines.

Prerequisites: PS4042, PS4041

PS4045 - ADVANCED RESEARCH METHODS
ECTS Credits: 6

Psychology

Rationale and Purpose of the Module: *This module will build on the basic methods and designs covered in introduction to Research Methods (PS4033). Students will be introduced to advanced experimental, quasi-experimental, and survey designs along with the statistical techniques appropriate to analyse data produced by these approaches. Students will examine the fundamental assumptions of psychological research and practice. In addition, students will be introduced to principles of qualitative research design, data collection and some specific analytic techniques.*

Syllabus: Advanced statistical techniques for survey and experimental research such as regression, multivariate ANOVA and categorical data analysis. Qualitative methods and in particular key concepts from critical psychological perspective.
• Design experiments, quasi-experiments, and surveys.
• Undertake statistical analysis and interpretation.
• Design qualitative research.
• Undertake qualitative analysis and validation.
• Evaluate the outcomes of studies.
• Report findings of studies.

Prerequisites: PS4033, PS4042, PS4021

PS4168 - ECONOMIC PSYCHOLOGY
ECTS Credits: 6

Psychology

Rationale and Purpose of the Module: *Economic psychology describes the psychological processes underlying economic behaviour and decision making, as well as the psychological and societal consequences that result from these processes. Specifically, this module integrates consideration of psychological processes with relevant economic phenomena, such as unemployment and consumption, using methods derived from psychological and behavioural science. The module focuses on theory development as well as the application of findings to address societal problems.*

Syllabus: Through a series of lectures, students will be introduced to historical and contemporary theories in decision making, (e.g., prospect theory, heuristics, mental accounting), and the influence of situational and personal variables on preference and choice. Specifically, lectures will focus on variables such as situational cues, sociological conditions, emotional states, self-control capacities, and individual differences. The lecture series will also address consequences of economic behaviour for people on a personal level, such as their subjective well-being, and on a societal level, such as unemployment. Throughout the lecture series, theory building in economic psychology and the application of findings in this research area will be critically discussed.

PS4901 - EMPIRICAL PSYCHOLOGY
ECTS Credits: 6

Psychology

Rationale and Purpose of the Module: *The purpose of this research methods module is to familiarise students with a range of laboratory-based activities and psychometric testing in psychology and to develop students ability to design, collect, code and analyse empirical data using experimental methodologies and psychometrics testing. This module is designed to give students and in-depth understanding of the rationale of the procedures, to develop students critical reflection on these procedures and to develop students independent research skills.*

Syllabus: This module primarily covers experimental research methods and psychological testing methodologies to assess behaviour, mental processes and personality characteristics. The laboratory part of the module introduces students it basic experimental procedures and their underlying concepts e.g. randomisation, experimenter bias, confounding variables, quasi-experiment. The module also covers the rationale of scale constructions and test constructions to assess individual differences. Students learn to design, conduct, code and analyse experimental psychometric test data whilst paying due consideration to the welfare of participants and attending to the appropriate ethical guidelines. Students will demonstrate independent research skills in two research projects based on the procedures that are taught. The tutorials are designed to critically reflect on the purpose and rationale of the research methods.

PS6041 - ADVANCED RESEARCH DESIGNS IN PSYCHOLOGY
ECTS Credits: 6

Psychology

Rationale and Purpose of the Module: *The purpose of this module is to increase teach students how particular research questions relate to particular research designs. Students will get a good understanding of advanced research designs and how they can be developed for experimental and non-experimental psychological research, in both basic and applied research domains. Besides providing the necessary knowledge about advanced research designs, this model seeks to prepare students for their own research (i.e., their Major Research Project).*

Syllabus: This module covers the rationale of methods in both basic and applied research. Students will learn how to investigate research questions by using the appropriate research designs. Pros and cons of several research designs will be discussed. Specifically, we will discuss the merits of experimental methods, non-experimental methods, qualitative methods, implicit methods, explicit methods, computer simulations, and mixed-methods approaches. Besides teaching students the rationale of advanced research designs, this module seeks to teach students the tools that may need for their own research.

PS6051 - ADVANCED ANALYSIS IN PSYCHOLOGY 1
ECTS Credits: 6

Psychology

Rationale and Purpose of the Module: *Psychology makes use of many different advanced statistical methods. This module is the first of a two-part module sequence on advanced methods of analysis in psychology. The goals of this module are to teach students the principles of advanced statistical techniques and the proper uses of these techniques to test research hypotheses. This module will empower students by instilling them with confidence that they can independently use these data analytic techniques.*

Syllabus: Researchers in psychology need to decide which statistical method is most appropriate to a given research question or a particular data set. In order to make these decisions, researchers must understand the basic principles that underlie statistical analyses and have the skills to weigh the advantages and disadvantages of one technique over another. Two modules will examine the underlying principles, strengths and limitations of a range of statistical methods. The modules provide intensive instruction in the use of statistical analyses commonly used in psychology. The statistical techniques taught in this module, the first of a two-part module sequence, include multiple regression, canonical correlation, analysis of covariance, multivariate analysis of variance and covariance, repeated measures analysis, profile analysis, and logistic regression. Besides understanding the principles, benefits and limitations of these statistical methods, students will also learn how to use these methods with computer software.

PS6061 - PROFESSIONAL SKILLS IN PSYCHOLOGY 1
ECTS Credits: 6

Psychology

Rationale and Purpose of the Module: *The aim for this module is to improve students writing skills.*

Syllabus: This course is the second part of a two-course sequence on professional skills. In order to successfully communicate research, students need to train their writing skills. In this module, students we want to improve students writing skills by means of giving good examples for writing styles and by giving students

feedback on their writing skills. Consistent with the purpose of the module, it is intensive in writing.

PS6071 - SOCIAL INFLUENCE AND ATTITUDE CHANGE
ECTS Credits: 6

Psychology

Rationale and Purpose of the Module: *The aim of this module is to give an overview to social influence and attitude change processes. An emphasis is given to the applicability of social influence and attitude change strategies to specific social contexts (e.g., advertisement, work environment, interpersonal, and inter-group relationships).*

Syllabus: Social influence and attitude change are two core issues in psychology. Human interactions involve different forms of social influence and changes in attitudes. In this module we will examine basic cognitive and affective levels as well as the more social levels (e.g., groups) which determine social influence and attitude change. We will review important, representative contributions to social influence and attitude change. We will provide a historical perspective on the development of theories and paradigms in these areas of research. In addition, we will discuss with students whether and how the prominent theories on social influence and attitude change can be applied to everyday life situations.

PS6081 - PROBLEM SOLVING AND DECISION MAKING
ECTS Credits: 6

Psychology

Rationale and Purpose of the Module: *The aim of this module is to provide in-depth knowledge on typical strategies that people use in problem solving and decision making and how solutions to problems and decision can be improved. This module will provide a deep understanding of problem solving and decision making and it will increase the students analytical skills.*

Syllabus: People solve problems and make decision all of the time, but only sometimes do people succeed. In this module, students will learn about the prominent theories and applications in problem solving and decision making. We will touch on different kinds of problems and decisions (personal, inter-personal, group context) in different contexts (e.g., relationships, economics). We will contrast typical strategies that people use to the strategies that would make problem solving and decision making more effective and efficient.

PS6091 - CLINICAL MODELS OF PSYCHOLOGICAL DISORDERS
ECTS Credits: 6

Psychology

Rationale and Purpose of the Module: *Clinical psychology is the study of psychological disorders and distress. The aim of this module is to give an understanding of psychological disorders and distress, and how their occurrence and persistence can be explained with prominent clinical models of disorders.*

Syllabus: The module will provide a valuable introduction to key issues and concepts in clinical psychology. Students will be introduced to prominent psychological disorders (e.g., anxieties, dissociative and somatoform disorders, mood disorders, schizophrenia, personality disorders).
The module will also focus on historical and recent approaches that explain the development and the persistence of these disorders. These perspectives will include, for example, psychodynamic, behavioural, cognitive, and systemic approaches. The validity of these clinical models will be discussed by considering up-to-date research in clinical psychology. The lecture series will provide overviews to the topics and the tutorials will allow for in-depth discussions of clinical models of psychological disorders in class.

PS6101 - PERSONALITY AND INDIVIDUAL DIFFERENCES
ECTS Credits: 6

Psychology

Rationale and Purpose of the Module: *For students to understand how the field of psychology has approached the topic of personality and for students to develop knowledge of the ways personality and individual difference, intelligence and aptitude are constructed and tested in psychology.*

Syllabus: Personality is a collection of emotion, thought and behaviour patterns that are unique to an individual. Through a series of lectures and practical tutorial sessions, topics relevant to the psychology of personality will be explored; including defining personality, temperament, aptitude and difference; personality and intelligence testing; and models including factorial models, typologies and circumplexes.

PS6111 - BIOLOGICAL PSYCHOLOGY
ECTS Credits: 6

Psychology

Rationale and Purpose of the Module: *Students will learn about the role of the brain and the central nervous system in human behaviour.*

Syllabus: Structure and function of the mammalian nervous system with reference to the biological bases of major classes of behaviour, including neuroanatomy and neurophysiology, role of neurotransmitters in brain function, CNS and endocrine influences on behaviour, localisation of brain function, the importance and limitations the of case study approach and animal research.

PT4005 - SUPPLY CHAIN DESIGN
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: *Position supply-chain design in the context of its roots in operations management, and its relationship with other functional management. Put forward the Supply-Chain Operations Reference model (SCOR) as a framework for supply-chain architecture. Introduce foundational concepts for representing and thinking about how to optimise and continuously improves supply-chain operations.*

Syllabus: CONTEXT: Operations and Supply Chain Strategy, integration and the SCOR framework structure and possible approach to implementation.
SOURCE: Forecasting, New Product Development, Project Management,
MAKE: Capacity Planning, Process Design and Analysis,

Quality Management
DELIVER/RETURN: Independent Demand Inventory, Dependent Demand Inventory, Optimization/ Simulation Modelling and logistics.
PLAN: Quality Improvement Methods and Lean Enterprise, Technology and Integrated Supply Management, Global Supply Chain and Service Integration.

PT4007 - PLAN WITH SUPPLY CHAINS
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: *This module is part of a stream.*

The centrality of planning activity is established in the context of the Supply-Chain Operations Reference Model (SCOR).

Planning incorporates anticipation represented here by Forecasting and making optimal decisions about capacity of supply, storage, production, delivery and enabling processes, and about how to integrate and deploy this capacity optimally in terms of performance and cost trade-offs within the confines of limited resources.

Syllabus: Demand and Order Management: Role of demand management in supply chain planning, Forecasting, Fundamentals of sales and operational planning.
Capacity Planning and Utilization: Role of capacity planning, Capacity planning techniques, Scheduling capacity and materials.
Production and Inventory Management: Master Production Scheduling (MPS) techniques, Bill of material structuring for MPS, Production Activity Control (PAC), Inventory management concepts, Inventory related costs, Multi-item management.
Distribution Requirements Planning: Distribution Requirements Planning (DRP) in the supply chain, Available to Promise, Allocated Available to Promise.
Planning in Source, Deliver and Product Returns: Source requirements, Deliver requirements, Product return requirements, Reverse logistics.
Planning Systems: Enterprise Resource Planning (ERP), Performance measures for system effectiveness, Material Requirements Planning (MRP) techniques, Advanced Planning and Optimisation tools and techniques,
Solving planning problems with Linear Programming: Planning problems requiring LP, Example LP models, Modelling and solving LP models in a spreadsheet, The purpose of and approaches to sensitivity analysis of LP Models.

PT4011 - INTRODUCTION TO TECHNOLOGY MANAGEMENT
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: *The purpose of this module is to introduce students to the concept of Technology Management and in doing so to provide them with an understanding of what they will be studying during their 4-year degree and why it is relevant. This module will provide students with a framework for understanding technology management activities and tools. The module will examine how firms acquire, exploit and protect technology resources. Students will be introduced to a set of tools that can be used in managing technology. Many of the concepts introduced in this module will be explored in greater detail in future modules.*

Syllabus: Technology Strategy: Integrating technology and strategy, design and evolution of technology strategy, acquiring and selecting new technologies, technological competencies and capabilities. Technology Forecasting and Road Mapping: Technology S-curves, patterns of innovation, Forecasting techniques: Scenario analysis, EMV, Decision Trees, Technology Trajectories Technology Development: new product development, stage gate processes, market research methods, prototyping Incremental vs. disruptive development, technology transfer, Technology Portfolio Planning: Value Analysis/Value Innovation, Life-cycle models, Patent Analysis, product selection.

PT4013 - OPERATIONS MODELLING
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: *Understand the role of operations in both production and service enterprises.*
Introduce Lean thinking and structured operations improvement tools.
Introduce a range of quantitative methods and highlight their application in the decision making process for solving real world problems.
Provide an understanding of optimal decisions under constraints.
Provide an understanding of design and analysis of operations under uncertainty.
To provide students with modeling and software capabilities that can be applied to operations design and analysis.

Syllabus: Lean Thinking and Operations Introduce students to lean thinking and operations improvement tools used within DMAIC (Define-Measure-Analyze-Improve-Control) projects. Related lean thinking to operations modeling methods. Operations Modeling - Software: Introduce and provide students with base skills to use software to solve operations optimization models. The focus is primary on introducing the student to spread sheet modeling, but brief introductions to other modeling and optimization software will be given. Students will apply software modeling skills obtained here to subsequent topics. Operations Modeling Under Constraints
Basic definition of Linear programming, demonstrate method via graphical method, model formulation applications in operations.
Simplex method, Artificial starting solution method, interpretation of simplex tableau, sensitivity analysis.
Transport model, Assignment model, Shortest Route model, Network Minimisation model, Maximum Flow Model, Transshipment model.
Introduce binary and integer applications in operations analysis, integer solution methods such as branch-and-bound and meta heuristics solution methods. Decision Making Under Uncertainty.
Introduce decision making under uncertainty.
Introduce basics of simulation using spreadsheets.
Introduce basic queuing and inventory models.

PT4015 - LEAN THINKING AND LEAN TOOLS
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: *To introduce the main elements of the Lean process improvement framework, focusing on quantity control and human engagement, through lectures, readings and laboratory experience.*
To prepare students to engage in performance

improvement projects during Coop.

Syllabus: Introduction to lean and continuous improvement philosophy in context of quantity control and its relationship with quality control and broad business processes such as new product development and supply-chain. Forms of waste and PDSA. Supply-chain context, supply chain reference model SCOR and performance criteria.
Problem identification and 5S, as initiation for structured problem analysis and enquiry.
Process mapping, focusing, critical questioning, and process improvement.
Work standardisation, allowances, rating, and standard work.
Work-flow, types of layout, consequences: material movement, Littles law, flow factor. Systematic Layout Planning, layout design and improvement.
Inventory control, classical economic order quantity, safety stocks, batch size and consequences: Littles law, flow factor and variability effects. Push planning (MRP/CRP/MRPII).
Setup time, setup time reduction programmes, SMED, flow factor, flexibility and commercial significance.
Pull material flow systems eg kanban, drum-buffer-rope.
Production line balancing and production flow smoothing, goal-chasing methods, and significance.
Engagement of people, kaizen and process improvement teams, organisational conditions eg structure, culture and reward systems. Lean thinking, policy deployment and organisational cohesion.

PT4025 - SIMULATION MODELLING AND ANALYSIS
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: *To provide students with knowledge on discrete event simulation modeling and its application to manufacturing, logistic and services systems.*
To provide students with modelling and software capabilities to apply simulation to manufacturing, logistic and services systems

Syllabus: Introduction to simulation Overview of simulation modelling, introduction to the basic concepts of discrete event simulation. The simulation process steps involved in carrying out a simulation project. Comparison of discrete event simulation with continuous simulation and system dynamics. Computer simulation packages Overview of available computer packages, description of representative packages, computer implementation issues. Development of programming skills to apply simulation to manufacturing, logistic and services systems using a generic simulation package. Provide an overview of available simulation software. Statistical aspects of simulation Input analysis, random number generation, output analysis, experimental design. Queuing Models Provide comparison of simulation with stochastic mathematical models through the introduction of basic queuing models. Systems Design Using simulation students will carry out systems (manufacturing, logistic and services systems) design assignments..

PT4031 - SUPPLY CHAIN MANAGEMENT STRUCTURES
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: *This module is designed to provide a strategic understanding of the supply chain, enabling students to appreciate the supply chain phenomenon. This module:*
- Defines supply chain management theoretically and practically.
- Identifies supply chain management's role in enhancing customer fulfilment.
- Emphasises systems thinking and process management as the foundation of supply chain management.
- Examines the role of environmental scanning to define the forces driving greater collaboration.
- Discusses the critical issues involved in supply chain design.
- Discusses the vital bridges to supply chain integration and collaboration.

Syllabus: Building Blocks of Supply Chain Management: Supply Chain Management & Competitive Strategy, Customer Fulfilment Strategies, Process Thinking: Supply Chain Management's Foundations.
Designing The Global Supply Chain: Scanning & Global Supply Chain Design, Supply Chain Mapping, Strategic Supply Chain Cost Management, Core Competencies and Outsourcing, Supply Chain Rationalisation and Role Shifting.
Collaborating Across the Supply Chain: Relationship Management, Information Sharing, Performance Measurement, People Management.

PT4037 - INNOVATION AND TECHNOLOGY MANAGEMENT
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: *To provide students with an understanding of the role of technology and innovation within industrial organisations and with the ability to manage technology as a resource within products, services and processes.*

Syllabus: Business opportunities and strategies, product and technology strategies, planning, support and finance for technology based businesses, product lifecycles costs, cost estimating. Innovation Management, types of innovation, the innovation process, successful innovation and innovators, creating the innovative organisation, new technology-based firms. Markets for new products and technologies, identifying and interpreting customer needs, translating customer needs into product specifications. New product and service ideas, forecasting techniques, technology trajectories, product concept generation, selection and testing, product planning, product platforms, product specifications. Sources of technology, technology transfer, strategic alliances, the management of patents and intellectual property, Research & Development management, Success Factors, Product Development Process, the use of Prototypes, Product Development Organisation, product commercialisation and launch. Managing technical projects, project definition, planning and execution.

PT4047 - MEASUREMENT AND QUALITY SYSTEMS
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: *Appreciate the importance of measurement standards and systems.*
Apply sound principles to a variety of measurement requirements.
Understand and apply scientific principles to the analysis of manufacturing data.
Use the results of the analysis to identify areas that need improvement.

Syllabus: ISO9000 and its variants, requirements for a

quality system, calibration needs and systems. Basis of measurement and interchangeability, limits and fits, BS4500. Line and length standards, optical flats, interferometry, errors in measurement. Measuring instruments and techniques: Length, angle, flatness, straightness, displacement. Measurement of: straightness, machine tool alignment, flatness, surface texture. Process Variability: capability tests, indices, R & R studies, Central Limit Theorem. Charting techniques: X/R and X/S, average run length, Cusum, np, c, p and u charts. Acceptance sampling: OC curves, design of single, double and sequential sampling plans, variables sampling, continuous sampling. International standards e.g. MIL-STD 105D, MIL-STD-414. Statistical Process Control, Statistical Process Control for Variable Data, Statistical Process Control for Attribute Data, Short Run SPC, Minor Project.

PT4057 - ADVANCED MODELS AND FRAMEWORKS FOR SUPPLY CHAIN MANAGEMENT
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: *To introduce students to a range of frameworks to inform systematic thinking on the alignment, design, implementation and operation supply chains to promote their agility, adaptability and growth.*
To support the lean pursuit of key strategic performance dimensions delivery, quality, and economy in the context of a dynamic, uncertain and competitive operating environment.
To consider frameworks appropriate at micro, meso and macro levels of operation.
To promote a quantitative approach to supply chain operations analysis.
To include a strong human context in addressing diagnosis and design questions.

Syllabus: Supply Chain Context
Positioning, competitive priorities and capabilities. Role of operations and associated decision areas. Comparison of services versus manufacturing, supply-chain structures, identification of supply-chains. Operations reference models, Supply-Chain Operations Reference Model SCOR, Design Chain DCOR, Customer Chain CCOR, Product Development PLCOR performance framework.

Sourcing
Sub-contracting of production and logistics, outsourcing, off-shoring, in-sourcing, globalisation.

Product control
New product and service development activities (eg Urban-Hauser; Stage-Gate, spiral models), product life-cycle., underpinning concepts such as continuous/radical/ disruptive innovation, customer experience, sustainability. Analysis tools eg customer-choice analysis, quality function deployment. Product validation.

Quantity control
micro: process mapping, inventory, job sequencing, push/pull order release, model of human scheduling, queuing, littles law, flow factor. meso: forecasting, aggregate planning, routing and network planning, production-inventory system dynamics. Macro: capacity decisions, location.

Quality control
micro: controllable/uncontrollable variation, sampling for variables and attributes, control charts. Meso: specification capture (QFD), fitness for purpose, reliability and risk analysis, fitness for society. Macro: strategy deployment (Hoshin), quality frameworks ISO, Baldridge, EFQM.

Production economy
Cost of doing: cost estimation, asset investment cost, capital recovery, activity based costing, unit costing, rate of return on investment, intangibles.
Cost of not doing: Feigenbaum quality cost model.

Information Systems
Hierarchical planning and control systems. GRAI grid and levels of decision and analysis. Enterprise Resource Planning. Operations reference models, ARIS and enterprise integration views. Interoperability at technical and organisational levels.

Human factors
Micro: planning cycle for individuals - McKay-Wiers planning cycle and supporting social networks. Meso: interfacing role between organisations, planner-schedulers mediation role at supply chain interface (Berglund-Guinery). Co-ordination in enterprise networks, organisational interoperability. Macro: Technology acceptance model and software implementation. Waefler socio-technical model of planner-scheduler engagement and structural impact.

Process Improvement
Continuous improvement philosophy, commonalities of Lean and 6-Sigma, PDSA, forms of waste, problem seeking, focusing tools, design of experiments, engagement with people, implementation and control, kaizen, DMAIC framework. Capturing the soft side: Qualitative analysis and mixed methods. Project planning and control, specific project methodologies eg PERA. SCOR implementation framework (SCE).

Semester project work
Reflection on SCOR model and its relation with the framework above.
Application in depth of a focused set drawing on the frameworks listed above to solving or analysing specific supply-chain questions in a substantial semester project. The work is to be collaborative, and carried out in project teams using computer mediated communications. The results are to be presented in written and verbal form. Qualitative enquiry should inform the project development path, but the work should be primarily related to quality- and quantity-control processes.

PT4111 - MANUFACTURING TECHNOLOGY 1
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: *To provide the student with a basic knowledge and experience the properties of engineering materials are how they are processed and fabricated.*
To emphasise the importance of safety in the engineering environment.
To provide the student with the knowledge to select an appropriate material for the manufacture of an engineering component or structure.

Syllabus: Safety in the Laboratory.
Production of materials - metals and plastics.
Properties of materials û yield and tensile strength.
Fracture and toughness.
Factors influencing the selection and processing of materials.
Measuring instruments.
Basic machining Cutting tool geometry and materials.
Chip formation. Hand processing and surface treatment of materials.
Metal Forming - Cold, warm and hot metal forming techniques

PT4121 - COMMUNICATION GRAPHICS
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: *This module provides an introduction to the fundamentals of the universal language of engineering, design and technology. The essential conventions, principles and concepts of the graphic language are explored through visualising and solving problems using a combination of freehand sketching and manual drawing communication techniques. The visualisation and graphic skills developed are essential prerequisites for 2D and 3D CAD.*
To promote and nurture spatial-visualisation and spatial-reasoning abilities critical to the success of technology professionals.
To present the standards and conventions of engineering drawing essential to the correct creation and interpretation of graphical representation used in engineering communication and documentation.
To foster manual drawing skills, especially sketching, which are essential to design and communication success.

Syllabus: Fundamentals of technical drawings and graphic communication. Spatial visualisation for design and engineering. Projection systems - multi-view drawings, orthographic, isometric, oblique and perspective projection. Freehand Sketching of everyday objects - translation of simple drawings. BS ISO 128 and 129 conventions and general principles relating to technical drawings. Sectional and Auxiliary views. Dimensioning and Tolerancing. Detail and assembly drawings of engineering components. Introduction to the ISO system of limits and fits. Data sheet BS4500A: hole basis system. Engineering working drawings. Intersection and Developments.

PT4213 - DRAWING AND CAD
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: *To introduce the students to the standards, conventions and projection systems used to communicate design information.*
To develop the students technical communication abilities
To introduce students to the principles and concepts of parametric solid modelling using SolidWorks.
To introduce students to best practice sketching, modelling and assembly strategies for design intent as part of the design process.

Syllabus: Engineering drawing communication. Visualisation. Technical sketching. Conventional representation. ISO 128 and 129. Projection systems. Auxiliary and sectional views. Dimensioning. Detail and assembly drawings. Using the SolidWorks user interface. File management and document templates. Introduction to robust sketching for design intent. Sketch relations. Basic part modelling using extruded and revolved features. Open and closed profiles. Thin features. Feature end conditions. Capturing design intent through dimensioning and relations. Applied features. Basics of bottom-up assembly modelling. Basic mates. Creating basic Part and Assembly drawings. Edrawings for visualisation and communication. Links from SolidWorks to Excel, 2D CAD, CAM and RP systems. Edrawings.

PT4423 - 2D CAD
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: *2D CAD drawings are vital to the communication of engineering design information. 2D CAD generated drawings are use in such diverse areas as architectural design, mechanical part design, facilities layout, service and circuit diagrams and technical publications.*
This module introduces students to the concepts, principles and techniques of 2D CAD drawing and design using AutoCAD. The adoption of best practice strategies for the efficient and effective use of CAD for creating, editing and viewing geometry as part of the design process are stressed throughout the module.

Syllabus: Contemporary CAD software with particular reference to AutoCAD; hardware, software and operating systems; the AutoCAD drawing environment: absolute and relative coordinates, units and limits; CAD tools and drawing setup; drawing templates; the UCS; basic and advanced drawing and editing commands; introduction to layers; creating and using blocks Wblocks, attributes and symbol libraries; communicating engineering and design details; dimensioning and dimensioning styles; text styles; toleranced dimensioning; sectional views and hatching; tool palettes; Paper Space layouts; customisation techniques; customising toolbars and toolbar macros; isometric drawing. CAD construction techniques; plotting; sheet sets; raster images, multilines; using DesignCenter; DWF drawings; Introduction to 3D geometry.

Prerequisites: PT4121

PT4427 - DESIGN FOR MANUFACTURE
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: *To introduce the student to the science and art of New Product Development. It links the manufacturing and construction skills learnt in earlier modules with the design process and these are brought together by means of a project. The project is intended to take the student through the basic design process into requirements engineering, market analysis, materials, manufacturing processes and the production of an initial business plan.*

Syllabus: Problem definition and clarification - design briefs; New Product Development (NPD) Concurrent Engineering NPD vs Traditional NPD; The deliverables of processes of design; NPD Failure Reasons, Rationale for Concurrent Engineering.
NPD Project Planning- Minimising NPD Lead Time, NPD Resources, Teams.
NPD Requirements Definition - Specifications, QFD, Focus Groups, Functional Analysis. Defining Customer Requirements, House of Quality (HOQ), Voice of the Customer (VOC), Product, Process Planning -Parts Deployment & Production Planning.
Product Concept Evolution- Idea & Concept Generation, Creativity, Brainstorming - Morphological Analysis, Synectics, Analogy.
Concept Evaluation - Ranking Methods, Concept Assessment Techniques, AHP. -Pughs Concept Selector, Convergence and Divergence.
Standardisation & Modularity- Features of Good Design, Parts & Processes Commonality.The cost of complexity and variation. Variety Reduction.
Design for Assembly (DFA).
Legal Aspects of NPD - Laws on Product Liability and EU PL Directive, CE Mark.- Safety Evaluation, Prevention of

Defective Products.
Intellectual Property - Patents, Application Process and requirements.
-Copyright, trademarks and design registration.

PT4617 - RELIABILITY TECHNOLOGY
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: *To give students an understanding of the principles of reliability evaluation and the influence on maintenance strategies, costs and replacement decisions.*
To equip students with abilities to perform environmental audits on products and processes.
To present environmental impact assessment and ecological foot-printing of products and processes used in the critical realisation of current unsustainable engineering trends.

Syllabus: Fundamentals: concepts and formulae, hazard rate calculations, use of redundancy and considerations of implications on costs of purchase, operation and maintenance, system reliability using block diagram reduction and state transition analysis techniques. Reliability estimation: from observed failure characteristics, use of Weibull distribution, Weibull Hazard Plotting for censored data, Markov analysis including systems subject to repair. System availability and factors affecting this. Prediction of repair times. Part failure rate analysis, data sources, failure modes, effects and criticality analysis, influence of environment and operational modes, identification of areas for effort to improve reliability and techniques for doing so, load-strength relationships and [application of simulation] to this. Case study. Acceptance testing for reliability, confidence levels. Environmental testing: methods and instrumentation, effects of heat, humidity, corrosion, mechanical hazards eg shock loading and vibration, consideration of packaging and mounting, burn-in procedures.
Fault-tree analysis and cost-benefit analysis. Safety. Replacement decision-making examples of deterministic and probabilistic analyses including [modelling and simulation], use of discounted cash-flow techniques, MAPI analysis, influence of depreciation and tax. Optimisation of the lifetime of products shifting towards a cradle-to-cradle concept, combined with a Product Lifecycle Analysis (PLCA). Packaging design and analysis. Redesign and reengineering to minimise parts and fasteners. Transport, distribution and reverse logistics. Renewable materials and energy, repair, reuse and recycling. Materials selection for sustainability.

PY4071 - PEDAGOGY OF OUTDOOR AND ADVENTURE EDUCATION
ECTS Credits: 6

Physical Education & Sport Sciences

Rationale and Purpose of the Module: *National documents (Teaching Council 2011) call for preservice teachers to, among other things:*
• have knowledge of current national curricula/syllabi in the relevant sector and an awareness of curriculum requirements in preceding and subsequent stages of learning,
• understand the subject matter, pedagogical content and related methodology of the relevant curricula/syllabi and guidelines, and
• be able to think critically, analyse and solve problems, as an individual and a member of a team.

The concepts and skills associated with outdoor and adventure uniquely address each of these skill sets. As such, this module is designed to prepare preservice teachers to organise, teach, and facilitate outdoor and adventure education in Irish physical education.

Specific purposes are to:
1) enhance students' capabilities teaching outdoor and adventure to post primary students;
2) draw links between the current national curricula/syllabi regarding outdoor education and selected curricular and instructional models;
3) recognize the potential of non-sport related activity in the lives of post primary students; and
4) gain understanding of the conduct of off-site teaching.

Syllabus: Through the acquisiton of adventure and outdoor skills and knowledges, the pedagogy in teaching outdoor and adventure education and selected curricular models will be examined. Adventure principles include full value contract, experiential learning cycle, challenge by choice, briefing, processing and facilitating an experience, the determination of physical and emotional risk, and safety. Outdoor activities may include: orienteering, hill walking, camp craft, exploring nature, leave no trace, canoeing, rock climbing. Pedagogical skills involve big picture goals and assessment, aligned learning outcomes, content progression, and assessment, focused reflection on student learning linked to teacher action.

PY4081 - PEDAGOGY OF INVASION GAMES
ECTS Credits: 6

Physical Education & Sport Sciences

Rationale and Purpose of the Module: *The rationale of this module is to allow students to become familiar with a selection of invasion games, ones in which skills and tactics can easily be identified and practiced, and where minimal equipment is required. The purpose of the module is twofold: 1.) for students to be able to understand the tactical approaches, appropriate skills, and safety considerations necessary when engaging in invasion games and 2.) to provide students with the pedagogy skills needed to teach invasion games within a post-primary setting. The module will be taught through particular curriculum model, for example TGFU. The students will live the curriculum model in order to understand the structure of the model and how it can be taught within a post primary setting.*

The module will focus on principles of play and tactics within invasion games. Therefore links will be made across all invasion games so students can see the correlation and common tactics involved in each.

Syllabus: The purpose of this module is for students to become familiar with simple invasion games and, in particular, how these games are presented in the Junior Cycle, junior cycle short course, Senior Cycle, and Leaving Certificate physical education curricula. Students will experience and analyse many invasion games, for example Gaelic Football, Hurling, Soccer, Hockey, Rugby and Basketball, focusing on the following areas: common principles of play, tactical awareness, rules and skill acquisition; how to introduce activities and progressions; and safety considerations specific to all the games. The module will be taught through a curriculum model, for example: TGFU. TGFU will aid the principles of play and tactical focus of the module.

PY4122 - GAELIC GAMES
ECTS Credits: 6

Physical Education & Sport Sciences

Rationale and Purpose of the Module: *This module is designed to give an introduction to Gaelic games from a practical and cultural perspective. It will offer an introduction to the history of the Gaelic Athletic Association (GAA) and the development of the association from its foundations in 1884 through to the present day. The module will also introduce students to Hurling, Camogie and Gaelic Football specifically through participation in 'Gaelic Games related' learning activities as well as practical labs. Emphasis will be placed on developing knowledge and basic competency with respect to the core skills of these games and principles of play (e.g. defending and attacking). Students will become aware of how to provide a safe environment and ensure personal safety as well as that of others in Gaelic Games activities. Understanding the rules and regulations of each game will also be developed through the practical labs. Basic coaching skills will also be introduced.*

Syllabus: Foundations of the GAA; Development of the GAA (1884-2016); Key strategies, programmes, policies and initiatives (1884-2016) (e.g. Go-games Initiative, Grassroots to National Programme); Gaelic Games Associations (e.g. Gaelic Players Association, Ladies Gaelic Football Association); Gaelic Games Worldwide.

Introduction to the core skills of Hurling, Camogie and Gaelic Football; Common principles of play; Structures, rules and regulations; Skill development, including fundamental movement and basic motor skills; Warm-up and cool-down; Games vs drills; Basic tactics; Introducing activities and progressions including modified and full-sided games; Safety aspects (environmental, personal and player safety); Coaching styles and methods; Planning practical sessions for different ability groups; Developing communication and organisations skills in practical environments; Player and self-evaluation in a practical context.

PY4123 - INSTRUCTIONAL ALIGNMENT IN PHYSICAL EDUCATION
ECTS Credits: 9

Physical Education & Sport Sciences

Rationale and Purpose of the Module: *The rationale of this module is for students to be introduced to instructional alignment in physical education, i.e., when outcomes, activities, instruction and assessment of a physical education programme are matched and compatible. Students will become familiar with and be able to critically comment on the central topics of curriculum, assessment, and teaching and learning, within the (Irish) post-primary physical education context; thus, informing what they believe is worth learning and assessing within physical education. Students will be directed to address these central topics in their preparation of schemes of work and lesson plans for year 2 school placement.*

The purpose is threefold:
1) To allow students to become familiar with various ways of looking at curricula which encourage critical monitoring and evaluation of the (Irish) post-primary physical education curriculum.
2) To acquaint pre-service teachers with how learning by individual pupils can be facilitated through the provision of appropriate environmental factors (e.g., safety, facilities, equipment, and teacher information) and the setting of tasks (through instructional and teaching strategies) suitable to individual learners. It will introduce pre-service teachers to ideas on how to design challenging learning experiences for students, select applicable teaching strategies to facilitate student learning, and modify / adapt these to accommodate student learning.
3) To introduce the concepts of assessment of learning and assessment for learning and their potential to document student learning in a physical education environment.

Syllabus: This module provides an opportunity to understand instructional, curricular, and assessment concepts related to effective teaching and learning in physical education. Course content will examine various teaching strategies and instructional formats, physical education curricular models, and formative and summative assessment strategies. In addition, the extent to which personal orientations and philosophies impact instruction, curriculum, and assessment will be investigated. Further topics include an understanding the physical education curriculum within the (Irish) school system and what is worth learning. Students will be directed towards aligning their belief systems with the use of particular curriculum/instruction models. Understanding assessment and its relationship to learning goals and learning experiences will allow students to determine what is worth assessing and how this can be done in a meaningful, relevant and effective way. The preparation of schemes of work and lesson plans for year 2 school placement will be a consistent focus of the module.

PY4133 - PEDAGOGY OF DANCE AND GYMNASTICS
ECTS Credits: 6

Physical Education & Sport Sciences

Rationale and Purpose of the Module: *The purpose of this module is to prepare students to teach the fundamentals of Dance and Gymnastics in a post-primary context; to provide safe, inclusive and educationally meaningful experiences for post-primary students in the Dance and Gymnastics. Students will be introduced to Junior cycle requirements for both strands, develop their knowledge and understanding of the key pedagogical principles of both through critically examining the Physical Education curriculum and the frameworks for the relevant Junior Cycle short course. Students will learn about relevant bodily techniques, skill development, aesthetic appreciation, creative composition, using basic gymnastics equipment and the transferability of learning in Dance and Gymnastics across the post primary curriculum. A range of strategies for teaching, learning and assessment in and through Dance and Gymnastics will be introduced and practiced. The key instructional strategy will focus on but not be limited to the Inquiry Model. To give focus to the module learning outcomes and module content this module will be framed around selected Curriculum Models for example Sport Education. This will help frame the content of the module and by focusing teaching and learning experiences on a more complete and authentic level in these two Physical Educatuion strands students will be provided with a map for decision making about teaching and learning in Dance and Gymnastics.*

Syllabus: At the centre of this module syllabus will be the introduction to the Junior and Senior Cycle Frameworks for Physical Education and JCPE short courses. Attention will be paid to Wellbeing as well as aesthetic education through meaningful movement experiences along with the Junior Cycle Statements of Learning and Key skills. There will be an introduction the Laban's Movement Analysis as a tool for developing observation for physical literacy, Curriculum Models, inclusive teaching and learning practices, resources for teaching Dance and Gymnastics, assessment of and for Dance and Gymnastics, lesson planning (warm ups,

tasked based activities, lesson development and closure) and schemes of work design with specific reference to curriculum alignment. Students will be introduced to basic equipment and apparatus and as a consequence also be introduced to safe practice in Gymnastics.

PY4135 - ADAPTED PHYSICAL ACTIVITY AND PHYSICAL EDUCATION
ECTS Credits: 3

Physical Education & Sport Sciences

Rationale and Purpose of the Module: *Integration and inclusion of all individuals into school structures and curricular provision is an essential feature of physical education teaching. Catering for individuals with varying levels of ability from limited to a high level requires knowledge of appropriate pedagogical principles and an ability to situate the needs of the individual on a whole school and classroom basis. Empowerment and entitlement are key concepts within this module.*

The purpose of this module is threefold:
1) To critically evaluate the attitudes and beliefs about teaching and learning which inform and guide his/her professional practice.
2) To act as an advocate on behalf of learners, referring students for specialised educational support as required and participating in the provision of that support, as appropriate.
3) To identify cross-curricular links and themes including citizenship; creativity; inclusion and diversity; initiative and entrepreneurship; personal, social and health education; and ICT, as appropriate to the sector and stage of education, and how these are related to life experiences.

Syllabus: This module is designed to provide students with an introduction to adapted physical activity with a focus on physical and motor characteristics of persons with disabilities as they relate to programming in physical education. The course will focus on past and present research regarding motor/physical development, assessment, and programming for individuals with cognitive, sensory, physical and health impairments. Students will be able to identify and understand how Ireland views the placement of children with disabilities and the efforts it takes to promote more inclusive physical education programmes.

PY4155 - PEDAGOGY OF AQUATICS / ATHLETICS
ECTS Credits: 6

Physical Education & Sport Sciences

Rationale and Purpose of the Module: *This module introduces students to two strands that are focused on individual performance; Aquatics and Athletics. Students will learn how to plan both Aquatics and Athletics lessons which are safe, enjoyable, inclusive and educationally meaningful. Furthermore, established links will be made between the two respective activities and bio-mechanics particularly in the context of contemporary Irish Physical Education. Both strands provides opportunities "for the personal, physical, and social development of each student in a safe, enjoyable environment" (JCPE, 2003; 19). It will be emphasized how important adaptions and modifications are with in a physical education class, whether it be "modified forms of standard events" or "combinations/adaptations" or recognized strokes. The module will be taught through particular curriculum model, for example HRA. The students will live the curriculum model in order to understand the structure of the model and how it can be taught within a post primary setting.*

Syllabus: Aquatics: the focus will be on learning the fundamentals of swimming; buoyancy, propulsion and streamlining. Being aware of the effects of being in water on balance, propulsion and resistance will be introduced. Observing the differences in buoyancy between individuals and various depths in the pool will also be observed. Understanding and demonstrating the importance of safe water entries will be emphasized. Performance and analysis of various strokes/modifications of strokes, e.g. front crawl, back crawl and breast stroke will be taught. Understanding the benefits of and participating in exercise in the water will be taught to the students. Demonstrating the ability to perform various water safety skills and survival skills will be an important skill for the students to learn. A brief introduction to water polo will be introduced.
Athletics: An overview of athletics from a variety of perspectives (bio-mechanical, physiological, educational)will be given to the students. Athletics within post primary schools will be explored; limitations and possibilities, athletics lessons, planning for mixed ability and the logistics of running a school athletics event. The fundamentals of running, jumping and throwing will be emphasized, progressing to basic, event specific technique in traditional track & field athletics events (e.g. sprints, hurdles, Long Jump, High Jump, Shot, Discus etc.). Students will be involved in 'athletics related activities' (indoors & out). There will be a focus on the teaching of athletics within a post primary school setting.

RM4001 - RESEARCH METHODS IN LANGUAGES, LITERATURE AND CULTURAL STUDIES 1
ECTS Credits: 6

School of Culture and Communication

Rationale and Purpose of the Module: *This module introduces students to research methods in languages, literature and cultural studies, covering the main areas of these disciplines, their methods of inquiry, and their key concepts and problems. The module provides training in essential research skills, equipping participants to pursue self-directed study, to individually select a research topic and develop appropriate research questions, to identify the appropriate tools and methods of research to carry out this project, and write a research proposal. The aims of the module are:*
To introduce students to research methods in languages, literature and cultural studies;
To equip students with the necessary skills to select a research topic, develop a research question(s) and write a research proposal;
To introduce students to the research skills required for sourcing, storing and presenting research data;
To develop an awareness of the information technology skills necessary to develop the above research skills.

Syllabus: Intended as an introductory course for students undertaking research in languages, literature and cultural studies, students will be introduced to the quantitative and qualitative methods employed in each of these disciplines. Incorporating a practice-based element, students will be equipped with the necessary skills to select a research topic, develop a research question, identify the appropriate methods to carry out this research project, and write a research proposal. Students will also be introduced to the skills needed to source and present language, literary and cultural data, in particular the information technology skills necessary for analysing online data such as collections of literary texts and linguistic corpora.

SO4001 - INTRODUCTION TO SOCIOLOGY
ECTS Credits: 6

Sociology

Rationale and Purpose of the Module: *This module aims to introduce students to the subject matter of contemporary sociology. It will familiarise students with the key concepts used within sociological analysis and demonstrate, using illustrative materials, the uses and importance of sociological analysis in the modern and post-modern world.*

Syllabus: An introduction to the sociological perspective
What is sociology and what do sociologists do?
The development of sociology
The sociological imagination
An introduction to sociological theory
Agency and Structure
Culture, Norms and Values
An introduction to structural functionalist theories
An introduction to conflict theories
An introduction to interaction theories
An introduction to feminist theory and post-modernism
An introduction to sociological research
The ethics of social research

SO4033 - SOCIOLOGY OF MEDIA
ECTS Credits: 6

Sociology

Rationale and Purpose of the Module: *This course aims to provide students with a critical understanding of the mass media from a sociological viewpoint. It will introduce students to key aspects of the debate amongst social scientists about the workings and influence of the media. The course is structured upon an examination of these key areas as well as presenting examples of the various methodological approaches used by sociologists in their analysis of the mass media.*

Syllabus: * Sociology and the analysis of mass media.
* The production/content/reception model of media analysis.
* Applying sociological theories and methods in critically understanding the mass media.
* Media globalization.
* Globalization, æG-localizationÆ and Media Audiences.
* Media Ownership, concentration and conglomeration.
* The political economy perspective. The public sphere.
* Media production and media professionals.
* Structure and agency in a media setting.
* HallÆs encoding/decoding model.
* Ideology, dominant ideology and discourse.
* Analysing media content: media re-presentations in a divided world.
* Media representations of class, ethnicity, gender and sexuality.
* Media audiences. Qualitative approaches towards understanding media audiences.
* Audiences as fans.
* Diasporic audiences.

SO4037 - QUALITATIVE METHODS FOR SOCIOLOGICAL RESEARCH
ECTS Credits: 6

Sociology

Rationale and Purpose of the Module: *The aim of the module is to provide students with an understanding of the development of the field of qualitative research and to introduce students to the central methods and approaches that fall under the category of qualitative research. Furthermore students will be provided with guidelines governing research that is grounded in the assumptions of qualitative methodology.*

Syllabus: What is qualitative research? What are the different paradigms, which fall within the parameters of qualitative research? The
history of qualitative research. Approaching research from a qualitative perspective, generating ideas, defining cases, analysis
and interpretation. Doing interviews and conducting observation studies.

SO4047 - SOCIOLOGY OF THE WELFARE STATE
ECTS Credits: 6

Sociology

Rationale and Purpose of the Module: *The key focus and aim of the module is to provide students with an understanding of the welfare state. Students will be familiarised with debates, definitions and theoretical frameworks pertaining to the concept of the welfare state, the different models of welfare in existence, and the need for a rigorous analysis of the welfare state. In addition to enhancing students awareness and understanding of key sociological theories, concepts and issues, this module is oriented to developing students ability to use sociology as an analytical tool. It is hoped that students will consider the issues covered in the module as case studies through which they can develop their understanding of the techniques of sociological analysis, which may then be applied to other contexts.*

Syllabus: This module aims to provide students with an understanding of the welfare state. Students will be familiarised with debates, definitions and theoretical frameworks pertaining to the concept of the welfare state, the different models of welfare in existence, and the need for a rigorous analysis of the welfare state. The module examines the development of welfare provision and the different models of welfare throughout Europe & in the USA. Specifically the module will focus on the Irish context as it seeks to examine the structural, cultural and ideological dynamics underpinning the Irish model of welfare provision. We will engage with current and established sociological theories and debates as a means of interpreting and understanding the implications these issues have for the distribution of power, the concept of and the operation of citizenship, processes of social exclusion, the role of social policy, and public discourse.

SO4056 - HATE CRIME: ROOTS, REALITIES AND REDRESS
ECTS Credits: 6

Sociology

Rationale and Purpose of the Module: *The purpose of this module is to explore the phenomenon of hate crime through a sociological and legal lens. Specifically the module aims to unpack hate crime as a social construct; to examine is structural roots; to explore the social consequences of legal formulations and legislative lacunae; to critically evaluate the potential for legal, civic, and educational solutions; to familiarise the student with the field of hate studies as an interdisciplinary project drawing on both sociology and legal scholarship and to critically interrogate the hate crime paradigm.*
This module is being created for the inclusion on the new BA Arts programme.

Syllabus: Introducing hate crime as a socio-legal problem and hate studies as an interdisciplinary project

drawing on both sociology and legal scholarship; exploring relationships and conceptual distinctions between hate crime, hate incidents and hate speech; critically interrogating the hate crime paradigm; prevalence and manifestations of hate crime; victim impact; the significance of interchangeable victimisation; the normalisation of hate crime; exploring the structural & individual roots of hate crime; interrogating the efficacy of legal, civic and educational responses to hate crime; theorising the politics of legislative lacunae.

SO4057 - SOCIOLOGY OF HEALTH AND ILLNESS
ECTS Credits: 6

Sociology

Rationale and Purpose of the Module: *The aim of this course is to introduce students to the important sub-disciplinary field of the sociology of health and illness.*

The overall objective is to develop the students analytical ability to examine the concepts of health and illness from a sociological perspective (perspectives), and critique the structures and processes involved in these within late modern Western society.

Syllabus: THEME I: NEW SOCIO-CULTURAL DIMENSIONS
The sociology of the body/embodiment
The sociology of risk

THEME II: SCIENCE, TECHNOLOGY & MEDICINE
Theorising the relationship between science, technology and medicine
Human Genetics and the redefinition of disease
Reproductive genetics, predictive testing and the construction of risk
New reproductive technologies: assisted reproduction and infertility

THEME III: SOCIAL PERSPECTIVES ON MENTAL HEALTH & ILLNESS
The social construction of mental illness
Social models of mental health & illness
Therapeutic and social meanings of the recovery concept

THEME IV: THE MEANINGS AND EXPERIENCES OF HEALTH, ILLNESS & DEATH
The social construction of health, illness & disease
The experience of chronic illness
Illness related stigma
Death and dying

THEME V: SOCIAL STRUCTURE AND HEALTH
Social Class and health
Gender and health
Ethnicity and health

THEME VI: MEDICINE, POWER AND AUTONOMY
The professional dominance of medicine in healthcare
Inter-professional relationships: power, knowledge and jurisdiction.
Alternative and complementary medicine

SO4063 - INTRODUCTION TO SOCIAL RESEARCH METHODS
ECTS Credits: 6

Sociology

Rationale and Purpose of the Module: *The aim of this module is primarily to provide a general introduction to the range of quantitative and qualitative research methods which are used in sociological research. Secondly, the course introduces students to the underlying epistemological, conceptual and ethical dimensions of the research process. In addition, the course establishes the importance of understanding social research in the context of some key debates in contemporary sociology. The primary objective is to provide students with basic skills in the use of both quantitative and qualitative techniques of research, and experience in collecting, handling, organising and analysing data of their choice.*

Syllabus: This module enables students to gain an understanding of the principles of social research and related philosophical debates from a generic social science perspective. The module addresses the ethical and legal dimensions of, and power relationships within, the research process. Students learn to appreciate the variety of methodological techniques, how to judge which are appropriate to particular research problems and how to identify the merits and limitations of different types of research design, including issues of sampling, sampling error, objectivity, values and validity. They are introduced to basic statistics, SPSS, and Qualitative Techniques in Context and thus provided with a foundation for future advanced methods modules. This module covers: conceptualisation and operationalisation in research design; an introduction to qualitative techniques; analysing qualitative data; surveys and sampling; descriptive statistics and inferential statistics (SPSS); political and ethical issues in social research; presenting and dissemination research; experimental and documentary methods in social research.

SO4067 - SOCIOLOGY OF WORK
ECTS Credits: 6

Sociology

The course will introduce theories of social change and perspectives on work as well as examining contemporary changes in work practice. The effects of class, gender and ethnicity on access to and experience of work will be examined. The changing organizational context of work will be explored. Other themes include sectoral decline, development and relocation as well as an examination of globalization and the rise of the transnational corporation. The continuance of hierarchical and vertical segregation in the midst of organisational, societal and cultural change will be explored, as well as organisational culture. A number of Irish case studies will be examined e.g those related to the semi-state and educational sectors. The course concludes with a consideration of the future direction of socioeconomic change and its impact on the distribution, structuring and experience of work.

SO4073 - CLASSIC SOCIOLOGICAL THEORY
ECTS Credits: 6

Sociology

Rationale and Purpose of the Module: *This module introduces students to classic social theory. Key work is reviewed, incorporating various perspectives from classic thinkers who continue to have an enduring influence on the sociological imagination. The module will consider some of the major works of: Marx, Durkheim, Weber, Simmel, Schutz and Mead.*

Syllabus: The module begins by outlining the socio-historical transformations (industrialisation, urbanisation, expansion of capitalism) that gave rise to classic social theory. Key thinkers, who sought to make sense of modernity and `the problem of social reality, are then discussed; such as: Mark, Durkheim, Weber, Simmel, Mead and Schutz. Discussion will focus on their different analyses of, among other things: the development of capitalism and the money economy; the division of

labour; social solidarity; class conflict and ideology; rationalisation; religious life; the structures of the life-world; the dynamics of symbolic interactions and the self. The module considers analyses of historically unfolding macro-social structures, meso-social formations (e.g. bureaucratic organisation) and the vicissitudes of everyday life. The import of classic social theory to the discipline of sociology - including its aims, scope and analyses of modernity is a theme that runs through the module.

SO4087 - SOCIAL TRENDS AND SOCIOLOGICAL RESEARCH
ECTS Credits: 6

Sociology

Rationale and Purpose of the Module: *Aims: via examination of key themes in current sociological research extends advanced students knowledge of substantive theory by applying it to societies using multiple sources of empirical data and deepens their data-analytic skills by applying them to real-life examples. To enhance their ability to see sociology as a source of concrete answers to practical questions about social policy and action.*
Objectives: to enable students to apply theoretic and conceptual frameworks to a range of research questions; familiarise them with a range of data sources (surveys, censuses, statistics and official sources, UN/OECD/EU reports, other quantitative research reports); enhance their conceptual and technical skills in using data to address questions; appreciate the importance of micro-macro, agency-structure and local-comparative dimensions in research; enhance their understanding of the principle features of current social change from a theoretical and empirical point of view.

Syllabus: This course takes insights about contemporary societies drawn from sociological theory, and applies them empirically. The core sociological literature on a number of key, interlocking, themes characterising contemporary societies and social change will be examined (gender roles; the life course; the labour market; education; stratification, class, inequality and social mobility; the welfare state; values and attitudes -- religious change, sexuality, partnership formation). A broad range of empirical evidence relevant to the theoretical claims will be investigated, and students will be encouraged to use data sources and data analysis to critically address the theoretical claims. Linkages between social, economic and cultural change will be tested, in a national and comparative perspective. Students will be encouraged to think about what sociological theory and evidence has to say about the organisation of contemporary society, at a policy, political and personal level.

SO4118 - SOCIOLOGY OF GENDER AND POPULAR CULTURE
ECTS Credits: 6

Sociology

Rationale and Purpose of the Module: *a. To provide an opportunity for the student to examine of key theoretical perspectives relevant to the study of gender and popular culture*
b. To offer ways of evaluating the work of major sociological schools/theorists in the study of popular culture and gender studies.
c. To develop the ability to analyse and interpret popular cultural texts through the lens of gender analysis.

Syllabus: This module explores the twin themes of bodies and sexualities in the spaces of contemporary Western culture. Utilising a range of popular cultural forms, sites and events which are most accessibletelevision, cinema, magazines; households, shops and workplaces; and popular understandings of medicine, science and technologythe module involves students in a series of critical engagements. The module addresses a number of issues; why the subjects of sexualities and the body become the focus of so much interest across a broad range of disciplines; How we an de-naturalise and problematise normative gender categories by setting gendered identities in cultural contexts; What important contributions have been made to the field by recent work on masculinities; How the practices of everyday life can be interrogated to yield insights about the relationships between the body, gendered identities and prevailing cultural norms.

SO5051 - RESEARCHING SOCIAL EXCLUSION
ECTS Credits: 9

Sociology

Rationale and Purpose of the Module: *The concept of exclusion forms the central focus around which this module is organised, it offers the possibility of considering how finely tuned are the mechanisms whereby we are integrated or cut off from full involvement in the wider society.*

Syllabus: The course critically interrogates the concept of social exclusion examining its economic, social, cultural, political and ideological underpinnings. It focuses in particular on the process of æotheringÆ as a practice of domination and the subtle ways in which privilege is reproduced. Through the course students will be enabled to untangle the notion of exclusion, its dynamics, processes involved, the implications of exclusion and the structural, cultural and ideological issues underlying this phenomenon and its reproduction. Through BourdieuÆs conceptual arsenal students will be facilitated to consider the hierarchial ordering of the process of exclusion and the multi-faceted and interlinked nature of domination, privilege and exclusion.

SO6021 - THEORETICAL APPROACHES TO GENDER, CULTURE AND SOCIETY 1
ECTS Credits: 9

Sociology

Rationale and Purpose of the Module: *1. To provide an overview of feminist and queer theoretical debates, including feminist theory, masculinity studies, queer and transgender theory.*
2. To assess critically different theoretical positions in gender and sexuality theory
3. To apply feminist and queer theoretical concepts and arguments to particular substantive topics such as family and work.
4. To examine how gender interacts with other identity markers like age, ethnicity, race, class, ability, sexuality.
5. To identify how notions like identity, self, nation are gendered and culturally constructed.
6. To examine changing cultural representations of feminism, gender and sexuality.

Syllabus: This course will review and critically examine the main theoretical approaches to gender, sexuality and the position of women and men in society, starting in the late eighteenth century, but concentrating on the period from the 1970s onwards. The module will analyse theories about the social and cultural construction of gendered identities, their origin, maintenance and representation. It will pay attention to intersectionality, the connection between gender and other identity

markers like age, ethnicity, race, ability, sexuality, class etc. Of central importance is the practical application of different theoretical positions to specific topics like gender and employment, gender and childhood, gender and the body, gender and nationalism, gender and the media, gender and the family.

SO6031 - FEMINIST APPROACHES TO RESEARCH
ECTS Credits: 3

Sociology

Rationale and Purpose of the Module: *1. To examine how knowledge is constructed and deployed and supplement core module on methodology*
2. To identify how interdisciplinary feminist perspectives inform research methods.
3. To examine how feminist analysis redefines traditional categories and disciplinary concepts through attention to gender and other social categories social as race, class, culture, sexual orientation, and age.
4. To find, formulate, limit, and state a research question from a feminist perspective; select/combine appropriate feminist research methodologies informed by the course readings and discussion.

Syllabus: This 3 credit module on feminist research methodology will supplement the 9 credit disciplinary research module undertaken by students. It will enable students to bring feminist critiques of knowledge and methodology to their research and writing up the dissertation. Students will address questions such as : What have feminist theorists to say about objectivity and truth/ the distinction between knower and known/ self and other/ mind and body/ subject and object? How might we understand culture and society differently if we incorporate reproduction, bodily work, and intimate relations in our research? What might be the limits of feminist standpoint, the idea that women, as a subordinated group, are in a better position to arrive at an adequate representation of social reality than men? What kinds of questions guide feminist research? How do feminist researchers approach the objects of their research? What is the relationship between the object of research and the feminist researcher?

SP4001 - WHO ARE THE SPANIARDS? INTRODUCTION TO SPANISH CULTURE
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *The development of Spanish culture has been marked by different attempts at constructing a national identity in different forms, from the attempts at uniformity promoted by the Spanish Empire ûthen re-appropriated by the dictatorship of Francisco Franco- to the re-construction of an identity directed towards the integration of Spain in Europe and, more recently, the attempts to construct an identity which integrates both past and present.*
Accordingly, the module will pay special attention to the cultural impact of the end of the Spanish Empire, the Spanish Civil War and the Transition to Democracy.
After completion of this module, students will have achieved a general but solid knowledge of the main socio-political processes in Spanish history and their effects on and interaction with literary and film production, as well as other forms of culture.

Syllabus: This module offers an introduction to the most important events and movements in Spanish culture. It focuses mainly on the cultural impact of the Spanish Empire, the Spanish Civil War, the dictatorship of Francisco Franco, and the Transition to Democracy. Through the use of literature, music, film and other forms of culture, the module will serve as a platform for the exploration of up-to-date socio-political issues in Spain and their effect on cultural production.

SP4003 - SOCIO-POLITICAL ISSUES IN THE CONTEMPORARY HISPANIC WORLD: SOCIETY, CULTURE AND REPRESENTATION
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *Aims and Objectives:*
** To further develop studentsÆ background knowledge of the Hispanic World.*
** To explore contemporary socio-political issues and their impact on cultural production in Spain and Latin America.*
** To develop studentsÆ analytical skills in the study of contemporary Hispanic culture.*
** To prepare students to analyse contemporary socio-political issues in the Hispanic World in a critical manner.*

Syllabus: This module builds on the foundation modules taken in year one. Students will explore issues of relevance in contemporary society in Spain and Latin America by means of the exploration of up-to-date cultural production about such issues.
Accordingly, the module will focus on the politics and representation of gender, cultural constructions of the past and contemporary developments in the construction of national identities.
After completion of this module, students will have achieved an in-depth knowledge of contemporary socio-political issues in the Hispanic World and their cultural representation, thus enhancing their understanding of the cultures they will be encountering during their off-campus period.

SP4007 - MODERN TRENDS IN HISPANIC CULTURE AND THE ARTS
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *This module offers an introduction to the main the artistic forms of expression in the Hispanic world which constituted a break with the traditional canons and therefore signalled the beginning of modernity both in Latin America with the movement of 'Modernismo' and in Spain with the work of the Romantic poet Gustavo Adolfo BÚcquer who can be considered a precursor of modern poetry. These artistic forms were the beginning of a move towards modernity which culminated in Surrealism during the second decade of the 20th century. In Spain, after the civil war, artistic resistance to the dictatorship developed in the context of severe censorship and in this respect the module will also deal with cultural forms of resistance to the dictatorship of General Franco.*

Syllabus: This module will focus on five areas:
- The Spanish Romantic period in art and poetry (Goya and BÚcquer)
- Latin American 'Modernismo' and its legacy in Spain in the form of the 'Generacin del 98'
- The Poetry of Pablo Neruda
- The Spanish 'Generacin del 27' and the Spanish avant-

garde: Surrealism in art and literature.
- Cultural forms of resistance to the Franco regime: The theatre of Buero Vallejo and the 'New Song', a form which often pays tribute to the Spanish poetic tradition.

SP4131 - SPANISH FOR BEGINNERS 1 (EUROPEAN STUDIES)
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *This module is set at A1 on the Common European Framework of Reference for Languages (CEFR).*
The beginners course aims to provide the student with a strong basic knowledge of Spanish and of contemporary Spain and Latin America.
The course is designed to:
Enable the student to understand and use basic structures of Spanish grammar.
Expose the student to a range of vocabulary and expressions which will allow her/him to present her/himself to, and communicate with native speakers of Spanish.
To foster autonomous language learning skills.
To introduce the student to Spanish and Latin American cultures.
To develop listening and speaking skills in Spanish.
To equip the student with basic writing skills.

Syllabus: This syllabus is set at A1 on the Common European Framework of Reference for Languages (CEFR).
Lecture: introduction to Spanish and Latin American history, politics and cultures. These include: the Spanish language and the languages of Spain, socio-cultural and historical background to Spain and Latin America from the formation of the Spanish state and the indigenous cultures of Latin America to the mid-20th century.

Tutorials and lab: working with set text-book, back-up audio-visual an online materials, students are introduced to the concepts of gender, number, verb systems and to the basic structures of the Spanish language.

SP4133 - SPANISH FOR BEGINNERS 3
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *This module is set at A2+/B1 on the Common European Framework of Reference for Languages (CEFR).*
Consolidation of the structures, functions and vocabulary taught in the first year and expands grammatical competence to include use of the subjunctive.
Development of knowledge of contemporary Spain and Latin American cultures and societies, with a particular focus on the most salient socio-cultural/political issues of contemporary Spain and Latin America.

Syllabus: This syllabus is set at A2+/B1 on the Common European Framework of Reference for Languages (CEFR).
Lecture: further develop the knowledge-base of Spain and Latin America developed in first year and examines some of the salient socio-cultural/political issues of contemporary Spain and Latin America.
Tutorials and lab: Working with set textbook, complementary audio-visual and online material, as well as intermediate difficulty literary texts.

Prerequisites: SP4132

SP4141 - SPANISH LANGUAGE AND SOCIETY 1
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *This module is set at B1 on the Common European Framework of Reference for Languages (CEFR).*
The course is designed to:
* *Revise and broaden the students knowledge of the structures of Spanish grammar.*
* *Expand the students range of Spanish vocabulary.*
* *Improve pronunciation and patterns of intonation in Spanish.*
* *Further develop the students language skills by exposing them to different situation and registers, both formal and informal.*
* *Facilitate the students understanding of various cultural aspects within the Spanish-speaking world.*
* *Foster autonomous language learning.*

Syllabus: This syllabus is set at B1 on the Common European Framework of Reference for Languages (CEFR).

The course is designed to:
Revise and broaden the students knowledge of the structures of Spanish grammar.
Expand the students range of Spanish vocabulary.
Improve pronunciation and patterns of intonation in Spanish.
Further develop the students language skills by exposing them to different situation and registers, both formal and informal.
Facilitate the students understanding of various cultural aspects within the Spanish-speaking world.
Foster autonomous language learning.

SP4143 - SPANISH LANGUAGE AND SOCIETY 3
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *This module is set at B1+ on the Common European Framework of Reference for Languages (CEFR).*
Second year aims to build on and develop the skills introduced in the first year course: increase the oral and written ability of the students, enhance their linguistic competence, present a wide range of Spanish and Latin-American literary and cultural contents and develop further strategies for autonomous language learning.

Syllabus: This syllabus is set at B1+ on the Common European Framework of Reference for Languages (CEFR).
The advanced course consists of four hours of Spanish per week:
- One grammar class (grammar review and consolidation).
- One literature class (a selection of Peninsular and Latin American short stories and newspaper articles)
- One laboratory/oral class (communication skills).
- One General Lecture

Prerequisites: SP4142

SP4147 - SPAIN EUROPE AND BEYOND
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module:
This module is set at B2+ on the Common European Framework of Reference for Languages (CEFR).
By the end of this module students should have:
1. developed further their command of Spanish, by focusing on oral, aural, reading and writing skills.
2. a greater analytical awareness of linguistic issues, developed in particular through translation and critical text analysis activities.
3. a deeper critical understanding of contemporary society, in particular as a result of study of contemporary literature and other text types.
4. the ability to discuss critically a variety of issues relating to Spain and Latin American societies and their connections to both European and global parameters and contexts.

Syllabus: This syllabus is set at B2+ on the Common European Framework of Reference for Languages (CEFR).
Central focuses of the syllabus, in addition to the development of overall language competence, are cultural, linguistic and political aspects of Spain and Latin America; issues of relevance to both Spain and Ireland and Hispanic perspectives on European and global questions. The module places a particular linguistic emphasis on questions of register and style in Spanish.

Prerequisites: SP4146

SP4151 - SPANISH FOR BUSINESS 1 (BEGINNERS)
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *The beginners module aims to provide the student with a strong basic knowledge of Spanish and of contemporary Spain and Latin America, particularly as regards the economic and commercial dimensions. The module is designed to: Enable the student to understand and use basic structures of Spanish grammar. Expose the student to a range of vocabulary and expressions which will allow her/him to present her/himself to, and communicate with native speakers of Spanish. To foster autonomous language learning skills. To introduce the student to Spanish and Latin American cultures. To develop listening and speaking skills in Spanish. To equip the student with basic writing skills.*

Syllabus: The main areas of grammar covered are: present indicative of regular (-ar, -er, -ir), reflexive and common irregular verbs (e.g. tener, hacer); demonstrative adjectives and pronouns; ordinal numbers; gender; definite and indefinite articles; possessive adjectives; que as a relative pronoun; basic ser/estar differences; interrogatives (qué, dónde, etc.).

The main areas of phonology covered are: the phonemic qualities represented by b/v, c/qu, c/z, ch, g/gu, g/j, h, ll, ñ, r; basic word stress patterns.
The above are complemented by communicative, lexical and oral and written skills syllabi included in a textbook which will be chosen according to the range of availability at the relevant point in time. An example of the latter would be units 1-4 of the textbook Socios, the details of which are described at: https://www.difusion.com/uploads/telechargements/catalogue/ele/socios/socios1_LA_muestra.pdf

---

SP4161 - SPANISH FOR BUSINESS 1
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *(i) To introduce students to Business Spanish relevant to their future professional needs, (ii) to provide students with an understanding of key aspects of contemporary Spanish society, (iii) to enable students to develop practical skills (receptive and active), (iv) to consolidate students' knowledge of Spanish vocabulary and grammar.*

Syllabus: The main areas of grammar covered are: the passive voice; imperative forms which use the subjunctive; the conditional tense; second and third conditionals; present subjunctive with temporal adverbs and to express future time.;

The main areas of phonology covered are: reinforcement of the vowel and consonant systems and basic word stress patterns.

The above are complemented by communicative, lexical and oral and written skills syllabi included in a textbook which will be chosen according to the range of availability at the relevant point in time. An example of the latter would be units 1-3 of the textbook Expertos. These include areas such as: writing CVs and job applications and participating in interviews; the language of business meetings and negotiations; cross-cultural politeness; expressing opinions, conditions and agreement; the lexis of expatriate life; conducting interviews. The details of these syllabi are described at: https://www.difusion.com/catalogo/metodos/profesional/expertos/expertos-libro-del-profesor

---

SP4231 - SPANISH LANGUAGE, CULTURE AND SOCIETY 1 (BEGINNERS)
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *This module is set at A1 on the Common European Framework of Reference for Languages (CEFR).*
The beginners course aims to provide the student with a strong basic knowledge of Spanish and of contemporary Spain and Latin America.
The course is designed to:
Enable the student to understand and use basic structures of Spanish grammar.
Expose the student to a range of vocabulary and expressions which will allow her/him to present her/himself to, and communicate with native speakers of Spanish.
To foster autonomous language learning skills.
To introduce the student to Spanish and Latin American cultures.
To develop listening and speaking skills in Spanish.
To equip the student with basic writing skills.

Syllabus: This syllabus is set at A1 on the Common European Framework of Reference for Languages (CEFR).
Lecture: introduction to Spanish and Latin American history, politics and cultures. These include: the Spanish language and the languages of Spain, socio-cultural and historical background to Spain and Latin America from the formation of the Spanish state and the indigenous cultures of Latin America to the mid-20th century.
Tutorials and lab: working with set text-book, back-up audio-visual an online materials, students are introduced

to the concepts of gender, number, verb systems and to the basic structures of the Spanish language.

SP4233 - SPANISH LANGUAGE CULTURE AND SOCIETY 3 (BEGINNERS)
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *This module is set at A2+/B1 on the Common European Framework of Reference for Languages (CEFR).*
Consolidation of the structures, functions and vocabulary taught in the first year and expands grammatical competence to include use of the subjunctive.
Development of knowledge of contemporary Spain and Latin American cultures and societies, with a particular focus on the most salient socio-cultural/political issues of contemporary Spain and Latin America.

Syllabus: This syllabus is set at A2+/B1 on the Common European Framework of Reference for Languages (CEFR).
Lecture: further develop the knowledge-base of Spain and Latin America developed in first year and examines some of the salient socio-cultural/political issues of contemporary Spain and Latin America.
Tutorials and lab: Working with set textbook, complementary audio-visual and online material, as well as intermediate difficulty literary texts.

Prerequisites: SP4232

SP4241 - SPANISH LANGUAGE, CULTURAL AND SOCIETY 1
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *This module is set at B1 on the Common European Framework of Reference for Languages (CEFR).*
The course is designed to:
** Revise and broaden the studentÆs knowledge of the structures of Spanish grammar.*
** Expand the studentÆs range of Spanish vocabulary.*
** Improve pronunciation and patterns of intonation in Spanish.*
** Further develop the studentÆs language skills by exposing them to different situation and registers, both formal and informal.*
** Facilitate the studentÆs understanding of various cultural aspects within the Spanish-speaking world.*
** Foster autonomous language learning.*

Syllabus: This syllabus is set at B1 on the Common European Framework of Reference for Languages (CEFR).
The advanced course consists of four hours of Spanish per week:
- Two language tutorials (grammar, vocabulary, communication skills, writing and reading skills).
- One laboratory/oral class (oral communication skills).
- One General Lecture

SP4243 - SPANISH LANGUAGE, CULTURE AND SOCIETY 3
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *This module is set at B1+ on the Common European Framework of Reference for Languages (CEFR).*
Second year aims to build on and develop the skills introduced in the first year course: increase the oral and written ability of the students, enhance their linguistic competence, present a wide range of Spanish and Latin-American literary and cultural contents and develop further strategies for autonomous language learning.

Syllabus: This syllabus is set at B1+ on the Common European Framework of Reference for Languages (CEFR).
The advanced course consists of four hours of Spanish per week:
- One grammar class (grammar review and consolidation).
- One literature class (a selection of Peninsular and Latin American short stories and newspaper articles)
- One laboratory/oral class (communication skills).
- One General Lecture

Prerequisites: SP4242

SP4247 - SPANISH LANGUAGE, CULTURE AND SOCIETY 5
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *This module is set at B2+ on the Common European Framework of Reference for Languages (CEFR).*
By the end of this module students should have:

1. developed further their command of Spanish, by focusing on oral, aural, reading and writing skills.

2. a greater analytical awareness of linguistic issues, developed in particular through translation and critical text analysis activities.

3. a deeper critical understanding of contemporary society, in particular as a result of study of contemporary literature and other text types.

4. the ability to discuss critically a variety of issues relating to Spain and Latin American societies and their connections to both European and global parameters and contexts.

Syllabus: This syllabus is set at B2+ on the Common European Framework of Reference for Languages (CEFR).
Central focuses of the syllabus, in addition to the development of overall language competence, are cultural, linguistic and political aspects of Spain and Latin America; issues of relevance to both Spain and Ireland and Hispanic perspectives on European and global questions. The module places a particular linguistic emphasis on questions of register and style in Spanish.

Prerequisites: SP4246

SP4627 - TWENTIETH CENTURY TRENDS IN HISPANIC LITERATURE
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *To introduce students to the major modern cultural movements in the Hispanic world from the mid-nineteenth century to the twentieth century and to develop their awareness of forms of cultural resistance to the Franco regime.*
To critically analyse a variety of texts, including music, film and visual art, belonging to different periods and the relationship between socio-political factors and the artistic forms of expression.

Syllabus: One weekly lecture to examine the historical context of the four major areas and two tutorials in which the literary texts will be studied in detail. The module is divided into four units:
1. Modernismo:
Introduction to Modernismo: Europe and Latin America.
Latin American Modernismo: RubÚn DarÝo
Spanish Modernismo: Antonio Machado and Juan Ramn JimÚnez.
2. Surrealism: Rafael Alberti, Federico GarcÝa Lorca and Salvador DalÝ.
3. Magical Realism: Alejo CarpentierÆs lo real maravilloso; Juan Rulfo, Elena Garro, Gabriel GarcÝa Mßrquez, Isabel Allende.
4. WomenÆs writing in Spain and Latin America: Josefina Aldecoa, Dulce Chacn, LucÝa Etxebarria, and Isabel Allende, Rosario Castellanos, ZoÚ ValdÚs and Alicia Kozameh.

Prerequisites: SP4625

SS4128 - APPLIED SPORT PSYCHOLOGY
ECTS Credits: 6

Physical Education & Sport Sciences

Rationale and Purpose of the Module: *The emphasis in this course is on the application of psychological concepts, skills and strategies to applied settings in sport for performance enhancement. Specifically, students will explore the social and psychological factors related to sport participation and peak sport performance.*

Syllabus: Content relating to performance enhancement includes psychological characteristics of peak performance, characteristics of elite athletes and their development, increasing of awareness; selected mental skills and strategies (e.g. muscle relaxation, autogenic training, meditation, self talk, plans & routines, simulation training); guidelines and procedures for implementing intervention strategies; conducting mental skills training programmes. Attention will also be given to the environment in which sport occurs focusing on aspects of group dynamics.

SS4145 - PERCEPTION AND COGNITION IN ACTION
ECTS Credits: 6

Physical Education & Sport Sciences

Rationale and Purpose of the Module: *To advance the students knowledge and understanding of the scientific methods used to gain an understanding of how motor skills are interpreted, controlled and learned*
To provide students with frameworks for the analysis of motor cognition and insights for the facilitation of acquisition, retention and transfer of motor skills

Syllabus: Review of the perceptual, cognitive and motor learning processes. Measuring motor skill performance and learning; retention and transfer tests; novice and expert differences. Scientific evidence for changes due to learning. The scientific method; observation, formulation & testing of laws & principles, Hick's Law, FittsÆ Law; theories to explain observations, principles & laws; AdamsÆ closed loop theory, SchmidtÆs schema theory, motor cognition approaches. Roles of vision and proprioception in the control of movement; visual search; open loop and closed loop systems of control; motor programmes. The structuring of practice (e.g. frequency & spacing, variability, random & blocked) and its effects on learning. Implicit learning. Demonstration and learning. Instruction and learning. Feedback for learning. Whole-part practice. Learning from a dynamical systems perspective. Application of principles and of research findings. Role of practice and related factors in achieving excellence/expertise

---

SS4202 - INTRODUCTION TO MAJOR PHYSIOLOGICAL SYSTEMS
ECTS Credits: 6

Physical Education & Sport Sciences

Rationale and Purpose of the Module: *A thorough understanding of how the body functions underpins all subject areas in the study of sport, exercise sciences and physiotherapy. Physiology (from Greek Physio meaning nature and -logy meaning the study of) deals with the coordinated activities of cells, tissues, organs and systems. In this module students are introduced to the basic structures and functions of human physiological systems and the integration of these systems to maintain homeostasis.*

Syllabus: NA

SS4203 - PHYSIOLOGY OF MUSCLE IN MOVEMENT
ECTS Credits: 6

Physical Education & Sport Sciences

Rationale and Purpose of the Module: *This module aims to deliver a thorough knowledge and understanding of skeletal muscle function. It will allow students to understand how skeletal muscle adapts to exercise, training and disease. By the end of the module students should have a full understanding of the Physiology of muscle applicable in sport and exercise sciences and in physiotherapy.*

Syllabus: Skeletal muscle structure at the tissue and cell level. The process of muscle contraction at the ultrastructural and whole muscle level. The Physiology and energetics of the muscle contraction process adn cross bridge cycle. Motor units and muscle fibre types. Functional properties of the different muscle fibre types. Sources and consequences of skeletal muscle fatigue. Muscle training; neural and physiological adaptations to strength and endurance training. Muscle damage and muscle repair. Muscle disease and injury. Treatments for muscle injury and recovery.

Prerequisites: SS4202

SS4205 - NUTRITION, EXERCISE METABOLISM AND SPORTS PERFORMANCE
ECTS Credits: 6

Physical Education & Sport Sciences

Rationale and Purpose of the Module: *Probably greater than any other component of the physiology syllabus, the application of good nutritional practice and nutritional manipulation has made a significant impact upon general health and sporting performance. This course is designed to provide a thorough understanding of the nutritional needs of exercise, exercise metabolism and the use and abuse of nutritional (ergogenic) aids to improve health, training and competitive performance.*

Syllabus: Fundamentals of nutrition and energy balance. Nutrient and energy value of food. An examination of 'healthy' energy balance through body composition. Critical review of BMI as a index of overweight, obesity and adiposity.
Energy expenditure of sporting activities. Power and capacity of metabolic pathways. Metabolic substrate ('fuel') during exercise of varying intensity and duration. Carbohydrate metabolism. Critical role of muscle and liver glycogen. Dietary manipulation and glycogen supercompensation. Carbohydrate feeding during the event and replacement after the event.
Fat metabolism. Metabolic regulation of fat oxidation. Effect of endurance training on fuel selection, fat and carbohydrate oxidation. Caffeine feeding and endurance performance.
Healthy exercise: exercise metabolism in relation to obesity and insulin resistance.
Protein metabolism. Muscle metabolism of amino acids during endurance exercise.
Muscle protein synthesis (MPS). Exercise and amino acid regulation of MPS.
Fluid balance during and in the recovery from prolonged exercise.
Metabolic limitations to high intensity exercise. Phosophocreatine buffering of ATP turnover. Creatine supplementation in sport. Glycolytic flux and lactic acid production. Critical role of pH and muscle buffering. Oxidative stress during exercise. The role of free radicals. Antioxidant defence and the effects of training. Nutritional antioxidant supplements.

Prerequisites: BC4002

SS4217 - EXERCISE AND HEALTH
ECTS Credits: 6

Physical Education & Sport Sciences

Rationale and Purpose of the Module: *This is a module which brings together the knowledge you gained in the last three years to investigate aspects of exercise and health. These include sport performance, lifestyle and general well being. Included in this module are examples of how exercise may be used prospectively to improve the quality of life and also as an adjunct therapy to clinical medicine in the treatment of life-threatening disease. Underpinning this content is the filed of physical activity science and exposure which explores physical activity behaviour determinants, recommendations, measurement, interventions, levels and policy and promotion.*

Syllabus: The module delivers core knowledge in lecture format. Further understanding and breadth are gained by self directed learning.

SS4231 - HUMAN PHYSIOLOGICAL SYSTEM FOR SPORT AND EXERCISE SCCIENCES
ECTS Credits: 3

Physical Education & Sport Sciences

Rationale and Purpose of the Module: *A thorough understanding of how the human body functions underpins all subject areas in the study of Sport, Exercise Sciences. Physiology deals with the coordinated activities of cells, tissues, organs and systems. In this module students are introduced to the basics of several human physiological systems and the integration of these systems to maintain homeostasis.*

Syllabus: This module will cover material on the function of several human physiological systems including the nervous, urinary, endcrine, immune and digestive systems.

SS4305 - QUANTITATIVE BIOMECHANICAL ANALYSIS
ECTS Credits: 6

Physical Education & Sport Sciences

Rationale and Purpose of the Module: *To further advance the students knowledge of biomechanics within both sport and exercise and to further explore the quantitative domain of biomechanics.*

Syllabus: Overview of measurement techniques in biomechanics. Data smoothing techniques and criteria for their optimisation including residual analysis. Free body diagram analysis of human movement. Mechanical properties of biological materials. Introduction to human simulation theory.
Practical Content
Force plate data capture and subsequent analysis. Advanced data analysis using spreadsheet solutions. Butterworth filter design and optimisation. Introuduction to simulation.

SS4308 - ADVANCED BIOMECHANICS ANALYSIS
ECTS Credits: 6

Physical Education & Sport Sciences

Rationale and Purpose of the Module: *AIMS:*
** To consolidate students' understanding of kinematics analysis by more advanced biomechanical analysis skills in 2D and 3D analysis of motion*
** Apply 3D analysis techniques to selected sporting and exercise activities*

Syllabus: SYLLABUS:
[Kinematic Conventions - Absolute spatial reference system, Total description of segments in 3D space. Advanced smoothing techniques: use of cubic and quintic splines and FFT. Advanced use of link segment equations and free body diagrams. Calculation of joint forces and moments of force. Interpretation of moment of force curves.]
Mechanical work, energy and power: Internal versus external work, Energy transfer between body segments, Energy exchanges within segments. Review of forward solution models. Effects of orthotics on gait. Examination of footwear and sports equipment design.

SS4312 - QUALITATIVE BIOMECHANICAL ANALYSIS
ECTS Credits: 6

Physical Education & Sport Sciences

Rationale and Purpose of the Module: *While a sound knowledge of anatomical structure is important for effective analysis of human movement activity - Analysis requires in-depth understanding of how forces act on joints and how joint structure affects movement. There is a need for the sport scientist and physical education specialist to develop effective skills qualitatively analyzing human movement, it causes and effects, through a synthesis of knowledge of anatomy and of basic mechanics. There is also a need to encourage the student to focus on the applied nature of anatomy and biomechanics in sport and Physical education. An emphasis on applied nature of this knowledge to sports performance will be achieved through extensive practice in the application of deterministic models of performance, and examination of overall performance objectives, biomechanical factor and principles and critical features of performance in a wide range of sport and exercise activities. The emphasis on this module will be on developing the student's skill in analysing movement without direct measurement and developing the ability to recommend ways of improving performance or learning as an outcome of qualitative analysis.*

Syllabus: SYLLABUS
Forms of motion; translation rotation and general motion. Effects of forces. Momentum and impulse. Qualitative analysis - deterministic models and their applications in human movement:
projectile based motions in sport: Jumping and throwing, striking activities etc. Cyclical movement patterns : Running, walking. Centre of gravity, line of gravity. Mechanical determinants of balance equilibrium and stability. static and dynamic posture. Analysis of balance related situations.
Angular motion of body free of support - axis of rotation, torque and angular impulse, moment of inertia applications to sports situations Motor Development and qualitative kinematic analysis

---

SS4403 - COACHING SCIENCE AND PERFORMANCE 2
ECTS Credits: 6

Physical Education & Sport Sciences

Rationale and Purpose of the Module: *To enable the student to extend their coaching knowledge and ability in a specific sport and in the related areas of pedagogy, exercise prescription and physical conditioning / training.*

Syllabus: Sports: Students will be required to select one sport from three offered during the semester. In addition to the sports specific content, common elements of pedagogy (reflective practice, ethics in coaching and the development of 'expert' coaches) and applied physical conditioning will be included.

Exercise Prescription: Classification of sports. Sports needs analysis in terms of physical, technical, tactical and mental demands. Athlete assessment. Periodisation. Monitoring of training and athletic condition. Tapering for peak performance.

Physical Conditioning 2: Sport-specific warm-ups and cool down. Circuit training - different types, structure and phases. Flexibility development - active and passive techniques. Resistance training - selection, structure, progressions, regressions. Plyometric training - slow and fast SSC exercises. Devising and implementing taining programmes. Aspects of organisation and safety will be addressed throughout. Developing competence in demonstrating specific exercise techniques, competence in spotting and coaching, knowledge and understanding of progressions and regressions are key elements of this element.

Prerequisites: SS4402

SS4411 - COACHING SCIENCE AND PERFORMANCE 1
ECTS Credits: 3

Physical Education & Sport Sciences

Rationale and Purpose of the Module: *To give students a basic proficiency, understanding and appreciation of rules, principles, tactics and demands of a selected sport. To introduce students to basic coaching skills and current issues.*

Syllabus: Sports: Students will learn about and through a selective individual/dual sport. In addition to sport specific content (skills and tactics), common elements of coaching and applied physical conditioning will be included.

Pedagogy: Criteria for effective coaching, philosophy and role of the coach, coaching styles, communication, group organisation and management, demonstrations, safety and ethics in sport.

SS4417 - HUMAN PERFORMANCE EVALUATION
ECTS Credits: 6

Physical Education & Sport Sciences

Rationale and Purpose of the Module: *To gain insights into how human performance objectives in sport and health are achieved by integrating as appropriate knowledge and techniques associated with the disciplines of physiology, biomechanics, psychology and exercise and health. Effective application of measurement, testing, interpretation and evaluation techniques associated with the named disciplines will be a key focus of the module.*

Syllabus: This is a final year integrative module that aims to complement research skills gained in the sport and exercise science final year project with practical skills and experience in sport and exercise evaluation. The course will consist of lectures on the theory and practice of performance evaluation in an integrative format to make the students critically aware of appropriate testing for different populations and the On an individual basis students will prepare a comprehensive piece of written work on effective evaluation processes pertaining to human performance and functioning in the context of sport and health. In a team-based exercise, students will make a seminar presentation on an effective evaluation process for a specific scenario in the sport and health domain.

SS6002 - APPLIED SPORT PSYCHOLOGY
ECTS Credits: 6

Physical Education & Sport Sciences

Rationale and Purpose of the Module: *The emphasis in this course is on the application of psychological concepts, skills and strategies to applied settings in sport for performance enhancement. Specifically, students will explore the social and psychological factors related to sport participation and peak sport performance.*

Syllabus: Content relating to performance enhancement includes psychological characteristics of peak performance, characteristics of elite athletes and their development, increasing of awareness; selected mental skills and strategies (e.g. muscle relaxation, autogenic training, meditation, self talk, plans & routines, simulation training); guidelines and procedures for implementing intervention strategies; conducting mental skills training programmes. Attention will also be given to the environment in which sport occurs focusing on aspects of group dynamics.

TE4011 - ENGLISH AS A FOREIGN LANGUAGE 1 (INTERMEDIATE)
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *This module is set at B1 on the Common European Framework of Reference for Languages (CEFR).*
To provide language support to students on the Erasmus exchange programmes to enable them to benefit more fully from their Erasmus experience at a social, cultural and academic level.
To provide integrated tuition and practice in the four language skills of listening, speaking, reading and writing.

Syllabus: This syllabus is set at B1 on the Common European Framework of Reference for Languages (CEFR).
Students work from a set text book, back-up audio visual and on-line material.
Practice is given in the four language skills, language awareness-raising and with special emphasis on pronunciation at this level.
The following grammatical areas are covered: verb tenses e.g. present simple and continuous, past simple and continuous, future forms, present perfect simple and continuous; modality and conditionality; modal verbs expressing obligation, deduction, possibility and ability, first conditional
lexis e.g. frequent collocations, common expressions, conversational responses and idioms, qualifying using adverbs and adjectives, comparatives and superlatives, discourse markers (oral and written) e.g. connectives, sequencing, signposting.

TE4021 - ENGLISH AS A FOREIGN LANGUAGE 1 (UPPER INTERMEDIATE)
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *This module is set at B2 on the Common European Framework of Reference for Languages (CEFR).*
To provide language support to students on the Erasmus exchange programmes to enable them to benefit more fully from their Erasmus experience at a social, cultural and academic level
To provide tuition and practice in the four language skills of listening, speaking, reading and writing.

Syllabus: This syllabus is set at B2 on the Common European Framework of Reference for Languages (CEFR).
Students work from a set text book, back-up audio visual and on-line material.
Integrated tuition and practice is given in the four language skills.
The following grammatical areas are covered: Phrasal verb structure, position of adverbs, future time forms, conditionals, narrative tenses, modal verbs of deduction
lexis e.g. frequent collocations, common expressions, conversational responses and idioms, discourse markers (oral and written) e.g. connectives, sequencing, signposting.

TE4031 - ENGLISH AS A FOREIGN LANGUAGE 1 (ADVANCED)
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *This module is set at C1 on the Common European Framework of Reference for Languages (CEFR).*
To provide language support to students on the Erasmus exchange programmes to enable them to benefit more fully from their Erasmus experience at a social, cultural and academic level
To provide tuition and practice in the four language skills of listening, speaking, reading and writing.

Syllabus: This syllabus is set at C1 on the Common European Framework of Reference for Languages (CEFR).
Students work from a set text book, back-up audio visual and on-line material.
Integrated tuition and practice is given in the four language skills.
The following areas are covered: grammar; modals and meaning, the perfect infinitive, mixed conditionals, tenses in accounts and narratives, all aspects of reported speech
Lexis: word-building, compound adjectives, synonyms, confusable words, metaphorical language, intensifying adverbs, discourse markers, phrasal verbs, collocations, British v American English
Recognition and use of the IPA
future forms, wishes and regrets, defining and non-defining relative clauses, noun clauses, adverb clauses, perfective v progressive aspect, gerunds, infinitives

---

TE4107 - TEACHING ENGLISH TO SPEAKERS OF OTHER LANGUAGES (TESOL) 2
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: *To give students a theoretical and practical understanding of classroom teaching in the ESOL context, including: an introduction to lesson planning; teaching productive and receptive skills; teaching vocabulary, grammar and pronunciation relevant to the ESOL context.*
To enable students to develop a more advanced knowledge of the grammatical and phonological aspects of the English language relevant to TESOL.
To give students the opportunity to practically apply aspects of the above knowledge through peer teaching or teaching practice.
To allow students to develop an understanding of the

different levels of language competency in the ESOL classroom.

This is the second of a three-module suite, preceded by TEXXXX (TESOL 1) and followed up by TEXXXX (TESOL 3). This suite of modules is intended to give students a foundation in Teaching English to Speakers of Other Languages which is validated by TESOL certification from the University of Limerick. TEXXXX (TESOL 1) and TEXXXX (TESOL 3) are offered in the Spring semester; TEXXXX (TESOL 2) is offered in the Autumn semester.

Note: This suite of modules replaces TE4025 (TEFL 1), TE4026 (TEFL 2) and TE4028 (TEFL 3). The roll out of this new stream of TESOL modules will not affect students currently completing the TEFL suite of modules, and they will exit with a TEFL certificate. New entrants in the academic year 2014/15 will start the new TESOL suite of modules.

Syllabus: The module is structured into three independent but related components:
1. A theoretical and practical introduction to ESOL classroom teaching to include the teaching of the receptive skills (reading and listening) and productive skills (writing and speaking), the teaching of vocabulary and semantic concepts and the teaching of grammar and pronunciation.
2. The further development of knowledge in relation to grammatical aspects of the English language to include active and passive voice and direct and indirect speech and the development of a more advanced understanding of the English sound system at both the micro- and the macro-level.
3. The practical application of the above knowledge through practice.

Prerequisites: TE4025

TW4003 - INTRODUCTION TO TECHNICAL COMMUNICATION
ECTS Credits: 6

School of Culture and Communication

Rationale and Purpose of the Module: *This module is designed to replace TW4115: Principles of Professional and Technical Communication and Information Design. This module is being developed to fully de-couple undergraduate and postgraduate modules which were historically taught together, but are now fully separate. The new title is also clearer. The module's purpose is to introduce students to the disciplines of technical and professional communication and information design; to establish a rigorous standard in the writing of clear, concise, correct English appropriate for technical communication; to develop the students' ability to choose appropriate writing styles for a range of technical communication genres and diverse audiences; to provide practice through a range of assignments designed to improve the students' performance in creating different types of documentation: summaries, brochures etc.; and to develop the students' expertise in using the tools of the profession. This module introduces technical communication for different genres. More advanced modules include content on referencing and academic writing.*

Syllabus: Introduction to technical communication; audience analysis; writing style for technical communication; information design; typography; colour; graphics and illustrations; technical communication genres; writing summaries; designing and writing brochures.

TX4007 - TAXATION FOR CORPORATES
ECTS Credits: 6

Accounting & Finance

Rationale and Purpose of the Module: *This module aims to provide an understanding of Irish Corporation Tax, the rationale for incorporation of a business, the taxation implications of close company status and the effective use of losses and group reliefs. It also introduces students to the principles of Value Added Tax (VAT) and the application of VAT in a business context.*

Syllabus: General principles of Irish Corporation Tax. The rationale for, and the tax implications of, incorporation. Computation of the corporation tax liability. Loss relief for companies, group relief for losses, charges and transfer of assets. Close companies, definition and consequences. Tax planning for companies including restructuring to maximise tax reliefs. Current issues in Corporation Tax. Introduction to VAT, general principles, administration, registration and deregistration, exemptions and zero rating, inter EU sales and purchases. VAT on property transactions.

TX4204 - CAPITAL TAXATION
ECTS Credits: 6

Accounting & Finance

Rationale and Purpose of the Module: *This module is designed to provide students with an understanding of the theoretical and legal framework of capital taxation. It aims to give students a thorough understanding of the manner in which individuals taxed in the State on the disposal of assets.*

Syllabus: Introduction to Capital Gains Tax; Calculation of Capital Gains Tax; CGT Exemptions & ReliefÆs; CGT Retirement Relief; Transfer of a Business to a Company; CGT and Share Transactions CGT and Liquidation of Companies; Company Purchasing its Own Shares; Principle Private Residence Relief; CGT and Development Land; Introduction to Capital Acquisitions Tax; Basic Concepts & ReliefÆs; Business Relief; Agricultural Relief; Taxation of Trusts; Foreign Aspects; Stamp Duty.

TX4305 - TAXATION THEORY AND PRACTICE
ECTS Credits: 6

Accounting & Finance

Rationale and Purpose of the Module: *This module is designed to provide students with an understanding of the theoretical and legal framework of taxation. It aims to give students a thorough understanding of the manner in which individuals and unincorporated businesses are taxed in the State. The module reviews the taxation implications of business decisions and introduces the basics of tax planning.*

Syllabus: Introduction to the theory of taxation and basic tax policy; overview of Irish income tax system; the self-assessment system; personal tax computations; Schedule E employment income, benefits in kind and termination payments; interest income, rental income, foreign income, dividend income; the taxation treatment of married couples; the measurement of taxable business profits, allowable and disallowable expenditures, commencement and cessation of trading; capital allowances, balancing allowances and charges; the effects of residence and domicile of individuals on tax liability; basics of tax planning; the annual budget

---

UP4101 - PRACTICUM 1
ECTS Credits: 15

Politics and Public Admin

Rationale and Purpose of the Module: *The UL Practicum provides a mechanism to broaden the curriculum through action- oriented research and service-learning. It is designed to facilitate students to work incross-disciplinary teams, on real-world problems, identified with external partners. Students on this module will take part in faculty designed, multi- and/or inter-disciplinary applied research projects in collaboration with external community stakeholders (civic, public, private). As with any project, Practicum projects will comprise a varied number of work packages, which may require a variety of levels of experience and/or skills. This experiential and disciplinary diversity will be provided by a team of students with different disciplinary and programme expertise, in terms of their competence levels (e.g. undergraduate or postgraduate) and the extent of their involvement in the project (e.g. as part of a programme, as an elective or as dissertation).*

This practicum module reflects student input and work that is equivalent to one diploma level module at 15 ECTS.

Syllabus: This module will provide students with practical experience, generic skills development (such as applied research work, team work, problem-solving and project work) as well as the experience of being part of a multi- or inter- disciplinary team. It will enable them to apply the disciplinary knowledge that they have learnt to multi-faceted real-world problems. Students will: take part in problem identification and ideation; develop a deeper understanding of academic issues areas and problems in consultation with external stakeholders; work towards solutions in collaboration; implement identified changes and evaluate outcomes. A reflective practice will underpin the student experience throughout.

UP4201 - AUTUMN PRACTICUM (AHSS - 6 CREDITS)
ECTS Credits: 6

Politics and Public Admin

ACADEMIC CONTENT IS NOT CURRENTLY AVAILABLE FOR THIS MODULE – UPDATES ARE IN PROGRESS

WT4003 - CONSTRUCTION TECHNOLOGY AND MANAGEMENT 2
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: *The aim of this module is to provide a comprehensive introduction to industrial, high-rise and construction practice and technology*

Key objectives

Provide knowledge of
** Organising and selecting resources needed to successfully complete the project*
** The principles of erecting large structures and the various forms they take.*
** Internal and external components of industrial and high rise structures*

Syllabus: Site works, site layout, electricity on building sites; Plant and equipment; Substructure construction, ground water control, deep trench excavations, cofferdam and caissons, tunnelling and culverts; Underpinning, piled foundations; Demolition and temporary works, Portal frames; Introduction to highrise construction, Introduction to fire protection; Claddings to framed structures; Formwork systems; Pre-stressed concrete; Industrial buildings.

Prerequisites: WT4502, WT4401

WT4017 - ENERGY EFFICIENT BUILDINGS
ECTS Credits: 6

School of Engineering

Background: Energy supply and demand, climate change, energy performance of buildings directive and Irish legislation, technical guidance documents Part-L.
Energy: Supply and demand considerations for domestic buildings (new and existing)
Concepts of Temperature and Heat Energy: Concepts of conduction, convection and radiation; thermal bridging; heat energy and energy losses of materials; U-value; heat loss and heat gain; energy performance; thermodynamics and heat; energy balance; air flow and energy transfer.
Electrical and Lighting Energy assessment: Principles of measurement from plans, surveys and drawings; electical measurements; electircal devices and efficiency.
Energy Efficiency, Energy Storage and Control: Fundamental principles; principles of energy storage; heat capacity; thermal mass; heat and water; temperature measurements and control; energy sources; energy conversions; fuel, combustion and CO2 emissions; greenhouse gases; carbon dioxide emission rating; solar energy; thermal mass; solar gains; solar collectors; efficiency adjustment factors; primary and secondary heating systems; single and immersion heaters; carbon dioxide emission rating.
Building Energy Ratings in domestic buildings; Use of Dwelling Energy Assessment Procedures (DEAP) software for new and DEAP+ for existing buildings; generation of advisory reports.
Introduction to BER in non-domestic buildings; Introduction to SBEM for new and existing non-domestic buildings.
PassivHaus Standard.
Exemplar Buildings.

WT4117 - STRUCTURAL DESIGN
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: *The aim of this module is to provide a basic understanding of structures and the design of principal structural elements*

Syllabus: Basic structural concepts and material properties, design loads, limit state design principles, beam design, axially loaded column design, column base & splice details, design of tension members and compression members, design of simple connections, trusses and bracing, floor design, introduction to structural detailing; bearing pressures, design of shallow foundations, introduction to lateral stability.

Prerequisites: WT4503

WT4401 - CONSTRUCTION TECHNOLOGY AND MANAGEMENT 1
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: *The aim of this module is to provide a comprehensive introduction to every aspect of the technology of domestic low-rise construction, and to present this in a rational and logical progression reflecting the construction process.*

Syllabus: Introduction to the Building Regulations and Technical Guidance Documents.
Site works, temporary works, subsoil drainage, excavations, scaffolding.
Radon problems and prevention. Radon membranes and sumps.
Substructure construction techniques, foundations û strip, raft and piled, concrete. Damp proof courses and membranes.
Superstructure construction techniques, stonework, brickwork, blockwork, cavity walls.
Timber framed construction. Components. Site control.
Insulation and damproofing.
Floors - suspended timber, raised access, precast concrete, hollow block, waffle slabs.
Roofs û timber, flat and pitched, tiling, asphalt flat roofs, roof lights and ventilation.
Stairs û timber, reinforced concrete and precast concrete.
Detailing of opes, eaves and other junctions.
Sound insulation û airborne, impact & flanking. Soundproofing.
Thermal insulation, thermal bridging, condensation and draughtproofing. Basic U-value calculation.

WT4503 - STRUCTURAL MECHANICS
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: *To develop the student's understanding of:*
** force systems*
** criteria for structural design*
** structural behaviour*

Syllabus: SI units and manipulation of formulae, sources and types structural loading, reactions and supports, free body diagrams, shear force and bending moment calculations, static determinancy and indeterminancy, qualitative analysis of beams and frames, stability and analysis of pin jointed frames, section properties, engineers equation of bending.

These topics will be covered through lectures, tutorials, experimentation and problem solving projects.

WT4505 - BUILDING ECONOMICS
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: *The overall aim of this module is to illustrate the application of economic principles to the building and construction process.*

Specific objectives include providing the student with;

** An overview of the construction industry and its role in the economy*
** An understanding of the construction firm and its management from an economic perspective*
** The economic considerations in evaluating building projects and making decisions.*

Syllabus: The construction industry, its economic development, structure and role in the economy. construction as a production process. Management of firms, costs, revenues and markets from the point of view of economists and managers. strategic decision making in property development and project appraisal and feasibility studies. Linking the economics of the production process of construction to the economics of its output, buildings and structures of the built environment. Cost modelling techniques, cost and price forecasting, cost product and process modelling, dealing with uncertainty. Building design, its interaction with the construction process in determining the cost and quality of buildings. The economics of buildings essential resources, energy efficiency and its cost. Cost limits and values, determining value for money Commercial values and the property market.

Prerequisites: WT4804

WT4507 - FORENSIC ENGINEERING AND ETHICS
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: *This module introduces the important subject of ethics through the study of engineering failures. Well-documented case studies, project work and invited speakers form an intrinsic part of achieving the following key objectives:*

** To promote ethical behaviour throughout the studentsÆ personal, university and professional lives.*
** To demonstrate the value of learning from engineering failures.*
** To emphasise the scientific method in engineering practice.*
** To produce good citizens.*
** To emphasise the importance of effective communication.*

Syllabus: Reasons for failures in engineering; Modes of failure; Risk; Failure case histories in concrete, steel, masonry, foundations and timber etc; Common pitfalls, FeldÆs ten basic rules; Nonstructural failures; Learning from failures; Forensic engineering practice; Conducting a forensic engineering investigation; Writing a forensic engineering report; Ethics and Responsibilities, Standard of Care; Rules of evidence, Depositions, Arbitration.

These topics will be addressed through PBL exercises involving individual and/or team challenges. The module assessment is by 60% CA work and 40% end of semester examination. Examples of CA work include class debates (e.g. cases involving ethical dilemmas faced by engineers such as Citicorp building N.Y.), individual online quizzes on ethics, individual online quizzes on forensic engineering, team based forensic engineering projects requiring presentations and report writing.

Cross faculty collaboration on projects involving law and architecture is also encouraged on this module.

WT4605 - PROCUREMENT AND CONTRACTING
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: *The aim of this module is to provide an understanding of the different*

forms of contract and their commercial implications, and provide project managers with an overview of the procurement and contracting processes as part of the overall project management process.

The specific objectives are to provide learners with the knowledge of;

* *The different types and forms of contract used in procuring services for projects.*
* *The principle elements of a contract and contract law*
* *Standard contract forms and how they are used in the various stages of the project lifecycle*
* *The procurement process and the perspectives of different parties*
* *Contract administration, issues underlying disputes and claims.*

Syllabus: Contract building blocks, forms and essential elements of contracts, partnering and new developments forms, buyer-seller relationship. Invalidity factors and frustration, agreements, conditions and warranty, liquidated damages, performance bonds and terms of payments. The procurement process, tendering and bidding, tender evaluation and awarding of contracts, uncertainty and risks, negotiations legislative restrictions. eProcurement, centralised purchasing within organisations. Contract administration, claims and disputes, legal procedures, conciliation & arbitration. Managing conflict and negotiating procedures. Contract closure, compliance, maintenance periods, commissioning, payment structures and final accounts.

Prerequisites: WT4804, WT4704

WT4705 - BUILDING PRODUCTION
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: *To introduce the student to the sciene and art of New Product Development within the construction domain. It links the manufacturing and construction skills learnt in earlier modules with the design process and these are brought together by means of a project. The project is intended to take the student through the basic design process into requirements engineering, market analysis, materials, manufacturing processes and the production of an initial business plan.*

Syllabus: Problem definition and clarification - design briefs; New Product Development (NPD) Concurrent Engineering NPD vs Traditional NPD; The deliverables of processes of design; NPD Failure Reasons, Rationale for Concurrent Engineering.
NPD Project Planning- Minimising NPD Lead Time, NPD Resources, Teams.
NPD Requirements Definition - Specifications, QFD, Focus Groups, Functional Analysis. Defining Customer Requirements, House of Quality (HOQ), Voice of the Customer (VOC), Product, Process Planning -Parts Deployment & Production Planning.
Product Concept Evolution- Idea & Concept Generation, Creativity, Brainstorming - Morphological Analysis, Synectics, Analogy.
Concept Evaluation - Ranking Methods, Concept Assessment Techniques, AHP. -Pughs Concept Selector, Convergence and Divergence.
Standardisation & Modularity- Features of Good Design, Parts & Processes Commonality.The cost of complexity and variation. Variety Reduction.
Design for Assembly (DFA).
Legal Aspects of NPD - Laws on Product Liability and EU PL Directive, CE Mark.- Safety Evaluation, Prevention of Defective Products.
Intellectual Property - Patents, Application Process and requirements.
-Copyright, trademarks and design registration.

WT4707 - CONSTRUCTION TECHNOLOGY AND MANAGEMENT 3
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: *The aim of this module is to provide an understanding of overall project management process and principles and how they apply to construction projects*

Syllabus: * Introduction to Construction Project Management and PM Software - purpose, concepts and conventions.
* Construction Planning Tools and Techniques û Schedule Definition and Management; Construction Project Network Analysis, Critical Path, PERT & Line of Balance.
* Resource Allocation & Levelling û labour, material and equipment
* Site Establishment and Management
* Managing Resources and Costs
* Communications & Change Control Management û Site Meetings and Progress Reports
* Leadership and Negotiation Skills on Construction Projects
* Construction Risk Management û Identification, Analysis, Response and Control
* Construction Productivity Improvement - Define, Measure, Analyze, Improve and Control
* Lean Construction methods û TQM, Value Engineering, Waste Elimination, Root Cause Analysis, Supply Chain Management & Partnering.

Prerequisites: WT4401, WT4502, WT4003
