**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 faculties and departments. Acceptance on these modules is subject to academic prerequisites, timetabling constraints and ceilings on enrolments. The module descriptions 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.

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

05 is just the departments way to distinguish between classes

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

1, 3, 5, 7 are fall semester classes
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...(of Course)

**Modules featured in this Booklet**

All modules are in alphabetical order by module code.

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*Only open to Journalism Majors

**Faculty Key**

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<td>Arts, Faculty of Humanities &amp; Social Sciences</td>
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<td>Ehs</td>
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<td>Irish World Academy of Music &amp; Dance</td>
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**Disclaimer**

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

Prerequisites: AC4001

AC4213 - FINANCIAL ACCOUNTING
ECTS Credits: 6

Accounting & Finance

Rationale and Purpose of the Module: The purpose of the module is to equip students with an understanding of the context of financial accounting in the business environment, and to provide fundamental accounting capabilities.

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

Syllabus: The purpose of the module is to equip students with a high knowledge of financial accounting in the business environment. Students will obtain an understanding of fundamental accounting capabilities through teamwork, group discussions and assignments. The syllabus covers the following areas:
- Basic accounting principles/definitions, fundamental concepts and valuation bases.
- The regulatory framework of accounting including the role and objectives of the International Accounting Standards Board; the purpose of accounting standards and the standard-setting process.
- The accountant’s role in the preparation and reporting process (including possible ethical issues that may arise and the need for a professional and responsible approach to their actions and decisions at work).
- Books of prime entry and the nominal ledger (including the principles of double-entry accounting and the recording of transactions resulting in income, expenses, assets, liabilities and equity).
- Control accounts and the trial balance (including identifying and correcting errors in accounting records and financial statements; preparing Cash book and bank reconciliations).
- The preparation of sole trader accounts including a statement of comprehensive income, statement of financial position and statement of cash flow.

Prerequisites: none

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

AC4417 - MANAGEMENT ACCOUNTING 1
ECTS Credits: 6

Accounting & Finance
Rationale and Purpose of the Module: This module 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 of their 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 developments and achievements in the programme.

SYLLABUS

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 problems 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 digital fabrication technologies. Use effective communication and interpersonal skills.

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 student's 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 an 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? Einstein/Es view: Newton/Es 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; 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

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: AR4012

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.

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**AR4023 - REPRESENTATION / DRAWING 3**
**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

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**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 students’ 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 field such as architecture is 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 Haussmann’s Boulevards, the Paris Opera, Mies’ Friedrichstrasse Skyscraper, the Villa Savoye, the Barcelona Pavilion, the Bauhaus, Archigram’s Instant City, Superstudio’s Continuous Monument, Herzog and de Meuron’s 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.

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**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 Paxton’s Crystal Palace, the department stores, the arcades), as an agent of production and instrument of sensation (William Morris, Art Nouveau, the Secessionist), in motion (Frank Lloyd Wright, the Werkbund, Futurism, de Stijl), in a culture of hygiene (Tony Garnier, Le Corbusier’s urbanism, the Suburb), at home and in exhibition (the International Style, the Schindler House, the Eames House, the Farnsworth House, Johnson’s Glass House), and nomadic (Team X, Kurokawa, the Smithson’s House of the Future, Archigram).

**Prerequisites:** AR4032

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**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 technology 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, 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 architecture, and encounter the work directly, making observations from experience with the physical object.

**Prerequisites:** AR4034

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**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.

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**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

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**AR4045 - ASSEMBLY AND TECHNIQUES 4**
ECTS Credits: 3
Rationale and Purpose of the Module: The aims of this class are:
- To introduce students to the initial studies required to later generate a comprehensive set of working drawings of a third year design studio project.
- To develop further students’ own intuitive skills in technique alongside knowledge of available construction technology today.
- To develop the students’ capacity to interrogate and develop design decisions through construction principles.

Syllabus: Developed principles of assembly and techniques will further be 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 its 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. "Burning your finger at a hot stainless steel surface while missing the heat radiation - and understand why this happened - is a much deeper experience, than just calculating heat conductivity on a piece of paper."

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 simulation that will be taught. 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:
- Daylighting 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

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: 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 students 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.

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: 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.

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.

The elective modules 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. Smaller classes allow for in-depth interrogation of the subject at an advanced level.

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.

The elective modules 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. Smaller classes allow for in-depth interrogation of the subject at an advanced level.

School of Design
Rationale and Purpose of the Module: 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 (short-term) 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.

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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.

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 (short-term) 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 enact 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.

AR4407 - ARCHITECTURE INTELLIGENCE UNIT  
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 (short-term) 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.

As part of a university, IU offers an unbiased platform to allow a discussion and exploration with every interested party - local authorities, stakeholders, companies,
conservation bodies, planners, professional architects, engineers etc. The research will engage both interested professionals and students of architecture in an exciting opportunity to demonstrate the capacity of architecture in a wider set of imminent and pressing questions. As a group, IU works in a strategic way, located within the context of ongoing work at SAUL.

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

BC4803 - MICROBIAL TECHNOLOGY 1A
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: To introduce students to the fundamentals of microbiology. To develop skills in handling and manipulating micro-organisms. To illustrate the role of microbiology in the environment.

Microbial ecology: bioremediation and biogeochemical cycling. Microbial interactions.

Prerequisites: BY4001

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**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.


Prerequisites: BC4803, BY4001

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**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, disaccharides and polysaccharides; fatty acids, energy storage lipids, structural lipids and eicosanoids; 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.

Prerequisites: BC4903, BC4904

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**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: BC4904, BC4905

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**BR4103 - AUTUMN PRACTICUM (AHSS - 6 CREDITS)**  
ECTS Credits: 6

**Politics and Public Admin**

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**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 and 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.

BY4007 - NEW DEVELOPMENTS IN AGRICULTURAL SCIENCE
ECTS Credits: 3
Biological Sciences

Rationale and Purpose of the Module: The purpose of the module is to provide students with both an understanding and appreciation of new developments in the practice and teaching of agricultural science. This will enhance their technical and pedagogical skills in agricultural science and increase their confidence in teaching the subject. In addition the module will equip students with the skills necessary to conduct independent research in agricultural science.

BY4011 - GENERAL BIOLOGY
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, ecology, and microbiology.

Syllabus: The module is delivered through a combination of lectures, field trips and online resources. Emphasis will be placed on mixed ability teaching utilising a variety of approaches to assessment to include formative, summative and diagnostic strategies; fostering a community of learning (FCL) and self-directed learning in agricultural science. The module content will cover the following topics:

1. Agricultural Pedagogy
   There is a need to provide student with subject specific skills. Emphasis will be placed on investigative and inquiry based approaches in the classroom, laboratory and field based situations.

2. Precision Agriculture
   Information technology is increasingly deployed across all farming systems for a variety of purposes such as efficient resource usage (e.g. fertilisers, fuel), animal fertility, grazing management and mitigation of the environmental impact of agriculture (e.g. greenhouse gas emissions). This content will advance student knowledge of IT use in agriculture.

3. Agriculture and the Environment
   The national soil classification system has recently been changed with implications for agriculture, land use, environmental protection and planning. Students will gain and understanding of this new system and be able to teach it as part of Leaving Certificate Agricultural Science.

4. Health and Safety in Agriculture
   Health and Safety is an often under-appreciated but crucial issue in farm management. Students will be aware of the need for farm level health and safety procedures and be able to recognise basic steps for its implementation.

The course is examined through a series of term tests, written reports and an end of semester exam based on multiple choice questions and essay style questions.

Prerequisites: BY4016

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 Placozoa, 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.


BY4035 - CELLULAR 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:

Area 1: Analysis of carbohydrates
Area 2: Exploring Lipids
Area 3: Behaviour of Amino acids and Proteins
Area 4: Enzymes
Area 5: 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.


BY4068 - NEW DEVELOPMENTS IN AGRICULTURAL SCIENCE 2
ECTS Credits: 3

Biological Sciences

Rationale and Purpose of the Module: The purpose of the module is to provide students with both an understanding and appreciation of new developments in the practice and teaching of agricultural science. This will enhance their technical and pedagogical skills in agricultural science and increase their confidence in teaching the subject. In addition the module will equip students with the skills necessary to conduct independent research in agricultural science.

Syllabus: The module is delivered through a combination of lectures, field trips and online resources. Emphasis will be placed on mixed ability teaching utilising a variety of approaches to assessment to include formative, summative and diagnostic strategies; fostering a community of learning (FCL) and self-directed learning in agricultural science. The module content will cover the following topics:

1. Agricultural Pedagogy
   There is a need to provide student with subject specific skills. Emphasis will be placed on investigative and inquiry based approaches in the classroom, laboratory and field based situations.

2. Precision Agriculture
   Information technology is increasingly deployed across all farming systems for a variety of purposes such as efficient resource usage (e.g. fertilisers, fuel), animal fertility, grazing management and mitigation of the environmental impact of agriculture (e.g. greenhouse gas emissions). This content will advance student knowledge of IT use in agriculture.

3. Agriculture and the Environment
   The national soil classification system has recently been changed with implications for agriculture, land use, environmental protection and planning. Students will gain and understanding of this new system and be able to teach it as part of Leaving Certificate Agricultural Science.

4. Health and Safety in Agriculture
   Health and Safety is an often under-appreciated but crucial issue in farm management. Students will be aware of the need for farm level health and safety procedures and be able to recognise basic steps for its implementation.
**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

**CE4003 - FLUID MECHANICS**  
**ECTS Credits:** 3

**School of Engineering**

Rationale and Purpose of the Module: Aims & Objectives:  
Introduce the physical processes which govern the behaviour of liquids at rest and in motion, relating to hydraulic engineering.

Key objectives:  
* Develop the fundamental principles underlying fluid mechanics.  
* Introduce hydrodynamic principles and the basic laws of fluid flow.  
* Explain pipe flow and network design and basic hydraulic machinery.  
* Include theoretical and practical aspects of open channel flows  
* Practical applications of hydraulic principles will be applied to different hydraulic structures to provide experience and confidence in problem-solving.

Syllabus:  
* Review the properties of Fluids, Hydrostatic forces and Pressure measurement.  

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**CE40005 - STRUCTURAL THEORY**  
**ECTS Credits:** 6

**School of Engineering**


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**CE40007 - 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.
Prerequisites: WT4014

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.

Prerequisites: CE4003

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.
* To 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 Mohr/Es 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.

* Basic Mechanism
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

CE4027 - ADVANCED STRUCTURES
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: Module modified to reflect movement of more advanced topics from earlier structural engineering modules. This facilitates the advanced topics to be explored in greater depth in this module.

Syllabus: Structural scheme design of specialist structures - examples include grandstand, hospital, high-rise, long-span, reservoir, etc. Overall stability of structural schemes. Preliminary sizing of structural components in a variety of materials. Builability of different structure types / components. Communication of concepts using hand sketches and oral presentations. Detailed design and detailing of structural components for a specialist structure therefore typically two of the following component types: pre-stressed and post-tensioned concrete; water retaining concrete; steel-concrete composite; steel plate- and box- girders; Long span components with stiffness critical design criteria.

CE4033 - MODELLING AND ANALYSIS OF FLUID SYSTEMS
ECTS Credits: 3

School of Engineering

Rationale and Purpose of the Module: The purpose of this module is to two-fold. Students are introduced to scale analysis techniques and taught how to interpret and use existing correlations, as well as develop their own from experimental data. Secondly, students are introduced to the concept of potential flow and apply the theory to solve various problems commonly encountered by civil engineers.

Syllabus: Introduction to dimensional analysis/scale analysis/similarity analysis; comparison with design of experiments; conditions of similarity; derivation of dimensionless parameters; overview of dimensionless groups commonly employed in engineering; reading correlations and extracting useful data; derive correlations...
from experimental data; flow structures and transition regimes.

Introduce conservation equations; concept of potential flow; streamlines and equipotential lines; stream functions, point/line sources and sinks; flow around bodies and corners; superposition theory; flow nets.

ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: This module introduces the design of structural elements in reinforced concrete and masonry with the following key objectives:

Key objectives
To master the concepts of design in steel reinforced concrete.
To develop the key concepts in pre-stressed concrete design.
To introduce the concepts in the design of un-reinforced and reinforced masonry.

Syllabus: Properties of reinforced concrete (RC);
Principles of limit state design; Analysis of the RC section;
stress-strain characteristics of steel and ultimate strain of concrete, stress block and strain profile, balanced, over- or under-reinforced sections; Design of single span, flanged and continuous RC beams; flexure shear resistance;
Serviceability and durability of reinforced concrete;
Limiting span/effective depth ratios; Choice of appropriate RC slab type; Design of RC slabs, one-way, two-way and flat slabs; Punching shear resistance; Design of RC Columns, design formulae and design standard procedure for short/ slender columns, principles of axial load-moment interaction diagram, balanced failure design, load and moment analysis; Design of RC retaining walls and foundations; RC Detailing; bondage, anchorage and curtailment.

Design of unreinforced masonry subjected to vertical and lateral loading.

Introduction to pre-stressed and post-tensioned concrete technology.

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


ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: This module is designed to train '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.


ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: The purpose of this course is to provide 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 (layers, 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).
* [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 & 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; Internet multicast (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); Reliable datagram transport with UDP; Real-time transport with RTP and RTCP; Reliable connection-oriented transport with TCP; SCTP; Wireless TCP; Modular design of protocols.
* [End-to-End Communication] Session management (SIP and SDP protocols); Data transmission (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 protocols 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

**Rationale and Purpose of the Module:**
To introduce the student to algorithms and dynamic data structures (e.g. queue, trees, and dynamic arrays).

**Syllabus:**
* 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:** EE4616

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**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.

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**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 programmer's 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

Browsers. Individual and Team Project/Case Study.

**Prerequisites:** CE4704

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**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.


**Prerequisites:** CE4703

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**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.


**Prerequisites:** EE4817

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**CG4003 - BIOPROCESS ENGINEERING 1**

**ECTS Credits:** 6

Chemical Sciences


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**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.

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**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 renewable energy.

**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.

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**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.

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**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.

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**CG5031 - CHEMICAL ENGINEERING DESIGN METHODS 1**  
ECTS Credits: 6

**Chemical Sciences**

**Rationale and Purpose of the Module:** To introduce the student to quantitative design methods and procedures.

*To develop skills in process flowsheeting and in the use of an industry-standard computer package for modeling/simulation of steady state and non-steady state chemical processing operations.*

*To learn methods for industrial energy management and become familiar with their application in industrial operations.*

*To become familiar and apply concepts and principles of health and safety.*

*To give the student a thorough grounding in the principles and application of HAZOP methods.*

*To provide a working knowledge of environmental impact and sustainability assessment, as applied to chemical processing operations.*


flowsheet synthesis, analysis and evaluation: modular and unit equation-based modes for flowsheet synthesis; rigorous unit equation models for flash, distillation, and heat exchange operations. Recycle of process mass and
energy streams; partitioning, precedence ordering and tearing; convergence criteria. Synthesis of separation systems: ideal distillation; azeotropic mixtures; distillation sequences.

Use of industry-standard computer package for modeling/simulation of steady state and non-steady state chemical processing operations.

Main design project selection. Preparation of preliminary mass and energy balances for main design project.

CH4001 - CHEMISTRY FOR ENGINEERS
ECTS Credits: 3

Chemical Sciences

Rationale and Purpose of the Module: Many students that enter the University of Limerick to study 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 with the various applications of chemistry in everyday life.


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 spectrosopes

Syllabus: - Reaction Process, role of thermodynamics
- Fick's 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
- Basis of IR and UV spectroscopy, fluorescence and phosphorescence

Prerequisites: CH4002

CH4005 - PHYSICAL CHEMISTRY 4
ECTS Credits: 6

Chemical Sciences

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

To familiarise the student with electrochemical methods of chemical analysis.

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, nuclophilic aromatic substitution reactions, dioxin formation; mode of action as auxin analogs.
Amiticides: sulfamides, 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 structures.
Aralgesic 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.

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.

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 nucloephiles continued & Wittig reaction and enolate anions; Aldol and Claisen condensation reactions; alkylation at the α-position. Carboxylic acids: methods of preparation; using pKa as a measure of acid strength; formation of derivatives such as acid chlorides and esters.

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.

Carboxylic acid derivatives - α acid halides, anhydrides, esters and amides; nucleophilic displacement reactions; Aromatic structure and reactivity (Part 1): defining aromaticity and understanding aromatic stabilization; Huckel/Rs 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**

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**CH4153 - ORGANIC CHEMISTRY 2B**

**ECTS Credits: 6**

**Chemical Sciences**

**Rationale and Purpose of the Module:** To build on and extend the functional group chemistry initiated in CH4152; develop the associated reactions/reaction mechanisms of the various functional groups; to cover, in depth, aromatic chemistry and the chemical behaviour of aromatic compounds; to introduce the field of stereochemistry; 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:** Syllabus: Functional Group Chemistry Ctd; Aromaticity; Stereochemistry; Kinetics:

- Aldehydes and Ketones: Typical Carbonyl Group Reactions (Nucleophilic Addition Reactions); Imine formation; Reaction with Grignard Reagents; Reduction Rxns; Wittig Rxn; Synthesis; Occurrence and Applications.

- Carboxylic Acids and Carboxylic Acid Derivatives: - Esters, Acyl Halides, Acid Anhydrides and Amides. Nomenclature; Physical Properties; Acidity of the Carboxyl group; Preparation; Nucleophilic Acyl Substitution Reactions; Interconversion of Carboxylic Acid Derivatives; Reduction Rxns; Pharmaceutical Applications.

- Fats, Oils, Soaps, Detergents; Current Trends.

- Amines: Classification; Aliphatic and Aromatic Amines; Heterocyclic Amines; Basicity; Reactions; Occurrence.

- Organic Polymers: Polysters, polyamides, polyethylene, biological polymers; Applications.

- Aromatic Chemistry: Aromaticity Reviewed; Electrophilic Aromatic Substitution Rxns of Benzene; Functional Group Interconversion; Activating/Deactivating effects and Orientation. Aromatic Heterocyclic Compounds; Retrosynthesis. Occurrence.


- Stereochemistry: Chirality and Achirality; Optical Activity; R/S Configuration of one chiral centre compounds (Cahn, Ingold & Prelog Rules); Perspective and Fischer Projections; Enantiomers, Diastereomers and Racemates. SN1/SN2 and E1/E2 Reactions of Haloalkanes- Kinetics and Stereochemistry.

**Ch4152 - PREREQUISITES:**

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**CH4203 - INORGANIC CHEMISTRY 2**

**ECTS Credits: 6**

**Chemical Sciences**

**Rationale and Purpose of the Module:** - To enable the student to understand the principles underlying the chemistry of the a-, p- and d- block elements and 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.

**Syllabus:**


**Prerequisites:** CH4701, CH4252

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**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 quantitative aspects of analytical chemistry through a working knowledge of the theory and applications of spectrophotometry and spectroscopy.

**Syllabus:** The analytical process, measurements and experimental 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. [Surface Analysis], STM/AFM, LEED, XPS, AES, gas adsorption methods-BET, etc.

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

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 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


Prerequisites: CH4403, CH4404, CH4405, CH4415

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 with the various applications of chemistry in everyday life.
To develop the basic laboratory skills associated with practical chemistry.


CH4901 - SCI FDN 1, CHEM, BIOCHEM AND PHYS FOR NURSING AND MIDWIFERY
ECTS Credits: 3

Chemical Sciences
Rationale and Purpose of the Module: The purpose of this module is to provide the student with a fundamental understanding of Chemistry, Biochemistry and Physics in relation to the study of health and illness.

Syllabus: (a) Chemistry Coverage of selected aspects of atoms, molecules, bonding, chemical reactions, acids, bases, ph. Chemistry of body fluids. Solutions, suspensions, osmosis and diffusion. (b) Biochemistry The structure and function of proteins, carbohydrates and lipids, nucleic acids, enzymes, metabolism, metabolic pathways, cholesterol, hormone function, will be examined. (c) Physics Coverage and application to Nursing and Midwifery of selected aspects of matter, gravity, motion, pressure, heat, light, electromagnetic spectrum; including UV and X-rays, radioactivity, diagnostic radiology, ECT

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, presentational 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.

CS4001 - COMPUTER APPLICATIONS FOR SCIENTISTS 1
ECTS Credits: 6

Computer Science & Information Systems
Rationale and Purpose of the Module: To provide the student with a practical and comprehensive set of skills for the acquisition, management, manipulation, and presentation of scientific information. This module is entirely practically based, with the emphasis on information technology applications in the areas of chemistry, biochemistry, environmental science and health & safety.

Syllabus: - Scientific literature retrieval - use of Internet/Intranet databases e.g. Science Direct, ASTI, Medline, Ullmanns and OHSIS. - Presentational skills: (i) Scientific drawing - use of a 2- and 3-d representations of molecular structures; (ii) Scientific graphing - use of e.g. Advanced Grapher to create professional quality graphs. Computer-aided audio-visual presentations using MS Powerpoint. - Rudiments of spreadsheets: entering names, numbers and formulas into cells; calculations and simple formulae; display of equations in the spreadsheet; editing, deleting,
This module will examine the claims of those who argue for the emergence of a radically new Information Society, as against those who see the emerging society as being fundamentally a continuation of existing socio-economic forces. The differing perspectives of technological determinism and social determinism will be examined. More nuanced frames for understanding human-technology relations, such as actor-network theory, will also be examined. These issues will be explored through practical examination of such areas as e-learning, e-commerce, e-communities, and virtual worlds. The emergence and use of the Internet will be one major theme of this module. This module will embody a strong historical perspective, examining earlier technological developments, e.g. electricity, and first-order, second-order and third-order effects. The notion of “information ecologies” will be examined, as well as the current debate about the “knowledge society”.

CS4006 - INTELLIGENT SYSTEMS
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 of Artificial Intelligence and Intelligent Systems. Given that students from a number of programmes will be taking this module, examples and projects work will be relevant to each group of students in so far as possible

Syllabus: To provide students with an understanding of the basic principles, methods and application domains for Artificial Intelligence. To introduce students to the development of Intelligent Systems, Knowledge Representation, and Machine Learning. This module introduces the history and development of Intelligent system concepts. It includes discussions on AI and Expert Systems, Heuristic Search, Evolutionary Algorithms, Artificial Neural Networks, Cognitive Science, and issues in representation, reasoning and machine learning, together with a set of design principles for intelligent autonomous agents. Real world applications of the course topics are also presented in areas such as robotics and financial prediction.

CS4009 - DIRECTED STUDIES
ECTS Credits: 6

Computer Science & Information Systems

Rationale and Purpose of the Module: The foundation and development of research skills.

Syllabus: Research Methods
Academic Writing
Preparation of a camera ready paper.
Contemporary approaches and issues in technology & aesthetics

CS4012 - REPRESENTATION AND MODELLING
ECTS Credits: 6

Computer Science & Information Systems

Rationale and Purpose of the Module: This module aims to provide students with an understanding of how different kinds of phenomena are represented as digital information. Its objectives are to give students an appreciation of the role of software in rendering and manipulating digital representations, and an introduction to the skills and techniques of abstract representation (modelling) of social and economic phenomena.
**Syllabus:** What is a representation? the represented world, the representing world and the mapping between the represented and representing world; intrinsic versus extrinsic mappings; Representing information in various forms of media (images, graphics, video, audio and text); characteristics of multimedia data; hypertext and hypermedia; document content and structure; content model; semantic structure; metadata and metatags; modelling media objects; modelling correlations among media objects; simulation versus animation;

What is a model? model criteria: mapping criterion, reduction criterion, pragmatic criterion; models versus real systems; abstraction and similarity; iconic, analogic and symbolic models; static and dynamic models; descriptive and prescriptive models; metaphor as a special type of model; purposes of models;

Analyzing social, biological and business phenomena, in order to design and construct models of those phenomena, using spreadsheets and databases;

Models in software development; use of descriptive and prescriptive models; risks associated with model usage; formal approach to building models; problem conceptualization; collection and examination of data; model structure, content and layout; development and use of macros; model validation and documentation; developing model templates.

Prerequisites: CS4411

**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/ancestor) 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: CS4512

**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; copyright 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).

**CS4021 - DIGITAL MEDIA SOFTWARE AND SYSTEMS 1**

**ECTS Credits: 6**

**Computer Science & Information Systems**

**Rationale and Purpose of the Module:** Students will develop their knowledge and competence of digital media systems through the use of specialised software.

**Syllabus:** Audio
Controlling the timeline.
Introduction to sequencing.
Implementation of trackers, sequence layering & looping.
The MIDI protocol, interface and its implications.
Approaches in sequencing software (trackers, workstations, notation software, live sequencing).
Approaches to software and hardware interface design.

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;  
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.

Prerequisites: CS4135

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; 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.

CS4047 - MULTIMEDIA INDUSTRY PERSPECTIVES  
ECTS Credits: 6
Computer Science & Information Systems

**Rationale and Purpose of the Module:** The purpose of the Multimedia Industry Perspectives module is to develop student understanding and knowledge about various digital media industry processes, and to encourage students to examine digital media as a number of varying career options. It will provide the opportunity to introduce a number of external experts from a variety of multimedia industry related areas within a flexible framework.

**Syllabus:** This module introduces the students to a number of external experts from a variety of multimedia industry related areas, within a flexible framework. The set of topics that will be discussed as part of this module will include:

- Exploring the job market and applying for a job (CV and portfolio preparation, cover letter writing, maintaining an online presence).
- Identifying professional communities, information resources and networking opportunities.
- Job profiles and frequently required skills.
- Recent development in the digital media domain.
- Basic entrepreneurial skills: developing a business idea, drafting and presenting a business plan.

Each unit is assessed by coursework and/or class test; there is usually no formal examination at the end of the semester.

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**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.

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**CS4055 - DATA MINING AND DATA WAREHOUSING**

**ECTS Credits:** 6

**Computer Science & Information Systems**

**Rationale and Purpose of the Module:** To introduce students to the principles behind algorithmic visuals and the practice of creating visuals through programmed, procedural approaches.

**Syllabus:**
1. Procedural Visuals
2. Low-Resolution Displays
3. Matrix Displays
4. Networked Data & Visuals
5. Real-time Data Visualization
6. Audio-visual Installations
7. Sensors & triggered audio-visuals

**Prerequisites:** CS4061, CS4072, CS4815

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**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 regression, verifying model assumptions;

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

**Classification and regression trees,** C4.5 algorithm, decision rules, comparison of the CS.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;

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**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 Game Development will be presented. Example applications could include, Game Playing Programs, Path Finding, Control and Goal Oriented Action Planning, Multi-Agent Systems, Semi-automated Animation, and Sound Generation. The AI and Machine Learning operators 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

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**CS4063 - DIGITAL MEDIA SOFTWARE AND SYSTEMS**

ECTS Credits: 6

**Computer Science & Information Systems**

**Rationale and Purpose of the Module:** To develop knowledge and competence of digital media systems.

**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

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**CS4075 - COMPUTER GAMES PROGRAMMING - TOOLS AND TECHNIQUES**

ECTS Credits: 6

**Computer Science & Information Systems**

**Rationale and Purpose of the Module:** The aim of this course is to increase student’s competence in the area of computer games development with the focus on programming activities. It will introduce all the elements constituting computer games and familiarize the student with existing libraries providing required functionality.

**Syllabus:** Introduction to programming interactive computer games. This module provides an introduction to computer game programming; programming process; - Introduction to classes and objects; - Primitive data types; declaring and defining variables/data; constant definitions; mixed data types; assignment statements; input and output; - Arithmetic operators; casting; relational operators; logical operators; precedence rules; - Working with turtle objects to create and display picture objects and to create and play sound objects; sending messages to objects; creating methods; method arguments and parameters; - Introduction to how images are digitized/encoded; different models for colour and colour representations; - Introduction to arrays, using arrays to store images; - Looping constructs; modifying images using loops to undertake lightening and darkening, creating a negative, increasing and decreasing colour values, converting to greyscale; - Using nested looping constructs for processing elements of arrays to mirror images, to compose images, to blend images, to rotate images and to scale images; - Introduction to selection statements; using conditional constructs to replace one colour or a range of colours, to average nearby pixels and to replace the background of an image.

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**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.

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**Prerequisites:** CS4815
**Prerequisites:** CS4815

**Rationale and Purpose of the Module:** This module will provide students with a comprehensive introduction to event driven programming where a strong emphasis will be placed on practical application in at least two high level development environments. In addition, students will be introduced to multiprocessor support for event driven programs and shown how to improve event processing performance through parallel event transformation.

**Syllabus:** Imperative versus event driven paradigms. Introduction to GUI creation; graphical structures: frames, boxes, layout managers, menus, windows. Event handling process, event handling mechanisms: event classes, event sources, event listeners. The Delegation Model of event handling. Avoiding deadlocks in GUI code. Limits of message passing libraries and thread libraries. Event processing performance. Introduction to multiprocessor support for event driven programs. Techniques to improve event processing performance through parallel event transformation.

**CS4085 - COMPUTER GRAPHICS II - TOOLS AND TECHNIQUES**

**ECTS Credits:** 6

**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

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<th>CS4111 - COMPUTER SCIENCE 1</th>
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**Computer Science & Information Systems**

**Rationale and Purpose of the Module:** To understand the mathematical basis of many complex computations, to lay basis for derivation of simple programs from formal specifications and to understand the dependence of program on underlying evaluation mechanisms.

**Syllabus:** - Relation between computer science, computation, and computers, illustrating logical dependence of computations from electronic computers. Programming as a specification of a computation, and its dependence on evaluation mechanisms; - Arithmetic operators and syntax using infix, outfix, prefix, superfix, suffix and so forth. Evaluation of complex arithmetic expressions. - Scope of operations and requirement to grouping operands. Linear notation restricted to infix, prefix, postfix forms, and conventions to specify relative priority/precedence of operators. Syntax trees and their use in the determination of ordering of computations. Use of lambda notation, and representation in syntax trees. - Conditional expressions. Function definitions, and simple recursive definition. Common features of programming languages (notations) and their relationship to mathematics including notion of types as sets of values, instances of a type as values. - Packaging code fragments into functions to simply handling nested inductive definitions and unpackaging inner functions into code fragments to yield conventional implementations of nested loops.

**CS4107 - PERFORMANCE TECHNOLOGY 2**

**ECTS Credits:** 6

**Computer Science & Information Systems**

**Rationale and Purpose of the Module:** Students will develop their knowledge of performance technology in the context of interactive environments for digital media through a combination of laboratory based small group project work and lecture based learning.

**Syllabus:** This module will focus on the use of electronic sensors and actuators in combination with software and PC based approaches in the development of performance systems and interactive environments. Key topics will include: The software and hardware development of a performance system. Implementing performance systems for multimedia (movement triggering, dance, installation, virtual spaces, enhanced environments). Implementing performance software for composition (composition with instruments and electronics, dynamic reactive audio and video playback).
Rationale and Purpose of the Module: To provide a uniform theoretical treatment of the data structures and algorithms used in systems and applications programming. This module includes a practical component to reinforce learning and to encourage students in the practical use of theoretical material.

Syllabus: - Mathematics Review;
- Review of the ADTs, internals and usage of simple data structures and associated algorithms, in particular recursive algorithms;
- Linked Lists and Networks;
- Recursion, and the elimination of recursion from algorithms;
- Study of sorting algorithms: quicksort, heapsort, mergesort and bucket and radix sorting;
- Analysis of general divide-and-conquer algorithms;
- Searching: tree searching, AVL trees, splay trees;
- Graph algorithms: graph traversal and spanning forests, depth and breadth first search of graphs; connectivity; minimal spanning trees for weighted graphs; shortest path algorithms; networks.

CS4132 - INFORMATION MODELLING AND SPECIFICATION
ECTS Credits: 6

Computer Science & Information Systems

Rationale and Purpose of the Module: This module serves to introduce the concepts that will be developed later on in the Systems Analysis and Design and Database Systems modules. Focusing on Data modelling, relational database languages and a formal specification notation, in particular using typed sets, n-ary relations and predicate logic, students are introduced to an integrate systematic approach linking system specification and implementation.


Entities and relationships.
Entity relationship diagrams.
The Z notation, sets and types, schemas, predicates.
Invariants; pre and post conditions.
Specification using Z.
The schema calculus.
Database definition and manipulation in SQL.
Specifying database constraints Z.
Implementing database constraints in SQL.

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
CS4211 - COMPUTER ORGANISATION 1
ECTS Credits: 6

Computer Science & Information Systems

Rationale and Purpose of the Module: Students will gain a familiarity with the architecture, design and organisation of modern machines. Students will conduct basic arithmetic with decimal, binary, octal 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, PC and mainframe development; - The representation of data: pure binary notation, binary operations, negative numbers, excess notation, BCD notation, fractions, floating point numbers; - Hexadecimal and octal notation, inter-base conversions. ASCII and Unicode representation of symbols; - Arithmetic: two's complement and floating point addition and subtraction; - Concept of 'levels' in computer organisation: application, high level language, assembly language, OS, functional unit, digital logic; - Translation of high-level language programs to the execution stage; - Functional unit level: system bus model; memory hierarchies (register, cache, RAM, HDD); registers, CPU, ALU. Instruction fetch execute cycle; - ISA Level: RISC and CISC architectures; examples of assembly language and translation to machine code; - Introduction to Boolean algebra; AND OR NOT NOR NAND EXOR. truth tables, Venn diagrams. De Morgan’s law. dualities. logic gates: half and full adder; - Introduction to PC and Play station architectures: word size, registers, CPU, RAM, multimedia; - Networks and Internet: LAN topologies; protocols: TCP/IP, ICANN, domain names, Internet addressing. HTML; - RFID Technology; passive and active RFID;

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 creation, 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.
Testing tools and their uses within the organisation

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**CS4271 - SOFTWARE QUALITY ASSURANCE STANDARDS (MEDICAL DEVICES)**
**ECTS Credits: 9**

**Computer Science & Information Systems**

**Rationale and Purpose of the Module:** The programme will provide graduates with fundamental theoretical and practical skills, abilities and knowledge for assuring the quality of medical software applications in accordance with regulatory requirements and quality management systems. Graduates will be capable of creating and executing test cases and tracking software issues from their diagnosis to resolution and generally assuring the quality of developed software. There is a growing need for software quality assurance skills in the medical devices sector. Lero and Continuing & Professional Education have worked with the Irish Medical Devices Association in creating this course.

**Syllabus:** Risk Management in the Medical domain: e.g. ISO 14971
- Quality Management System (QMS) and the role of software Quality Assurance in this e.g.
- FDA 21 CFR Part 820, Subpart C - Design Controls
- EN ISO 13485 Quality Systems - Medical Devices
- FDA and MDD regulations from a software development and software Quality Assurance perspective: e.g. IEC62304 and ISO 14971
- Change Management in a Medical Device context
- Current 'state-of-the-art' in medical software standards - including FDA, IEC, ISO, ERES, and GAMP standards

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**CS4411 - INTRODUCTION TO INFORMATION TECHNOLOGY**
**ECTS Credits: 6**

**Computer Science & Information Systems**

**Rationale and Purpose of the Module:** This module is designed to give 1st and 2nd year students from disciplines other than Computing a historical and theoretical introduction to information technology: concepts, terminology and possible future developments; together with practice in standard productivity software.

**Syllabus:** This module is designed to give 1st and 2nd year students from disciplines other than Computing a historical and theoretical introduction to information technology: concepts, terminology and possible future developments; together with practice in standard productivity software.
- Concepts of information technology.
- Data and information.
- Software: general purpose applications, operating systems architectures, programming development languages, HTML; proprietary software and Open Source Software.
- Hardware: types of computers, input/output devices, CPU, memory and secondary storage disks and solid state memory.

- Development of the PC.
- Communications and connectivity: modems, communications channels, networks: LAN, WAN.
- The Internet and the Web: access, browsers, URLs, search engines, multi-media.
- Security issues: virus, firewall, proxy server.
- Computers and society: dependence of society on computers, development of WP, e-commerce, the WWW impact on the media and advertising.
- Future hardware and software developments.
- Word processing and spreadsheet practice.
- Data representation.
- HTML exercises.

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**CS4913 - BUSINESS INFORMATION SYSTEMS**
**ECTS Credits: 6**

**Computer Science & Information Systems**

**Rationale and Purpose of the Module:** Almost all business organisations use computerised information systems to some degree. Many business organisations would not be able to function without such systems. At the same time there are continuous occurrences of problems in the design, implementation and use of these systems. This module introduces students on a range of business studies courses to the fundamental features of business information systems (BIS). The main purpose is to enable graduates of such course appreciate the need for BIS, how BIS can aid the decision making processes of an organisation and how the design of such systems is fundamental to their eventual success or failure.

**Syllabus:** Importance of information systems management in business.
- Differentiate between information and data.
- Using information to aid decision making in business.
- Data management.
- Features and functional components of relational databases.
- Role of the database in business information systems.
- Components of a Business Information System (BIS) including hardware and software components.
- Introduction to systems development methodologies.
- Development of computerised business information systems using system life cycle methodology management of BIS.
- BIS strategy and how it creates business advantage.
- Legal and ethical aspects of the design and use of BIS.
- Construction of a simple relational database using MS Access.

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**CS4556 - BUSINESS ORIENTED PROGRAMMING LANGUAGES**
**ECTS Credits: 6**

**Computer Science & Information Systems**

**Rationale and Purpose of the Module:** This module is a prerequisite module for the Leveraging Legacy Applications module. It provides the foundations for that module by introducing students to languages and technologies required to work in the area of Legacy Systems. Additionally, by providing students with a working knowledge of COBOL, it equips them to work in the Business Computing Domain where an estimated 80% of all future deployment applications will include

- extensions to legacy COBOL programmes.

**Syllabus:** An introduction to the technologies of electronic commerce. Web authoring and site development (HTML, CSS).
- Client/Server Architectures. Models of web applications.
- Introduction to the Visual Studio Integrated Development Environment (IDE).
- Introduction to web development using ASP.NET
- The Internet and the Web: access, browsers, URLs, search engines, multi-media.
- Security issues: virus, firewall, proxy server.
- Computers and society: dependence of society on computers, development of WP, e-commerce, the WWW impact on the media and advertising.
- Future hardware and software developments.
- Word processing and spreadsheet practice.
- Data representation.
- HTML exercises.
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.

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 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.

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 (Lumiére brothers, Georges Melies); 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

Syllabus: 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 students’ 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.

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* To give students the theoretical tools to analyse cultural processes and to investigate new media as cultural institutions, particularly in comparative contexts.
* To raise students’ 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.

DA5001 - ETHNOCOREOLOGY: HISTORY AND THEORY
ECTS Credits: 12

Rationale and Purpose of the Module: The primary objective of this module is to inform students of historical and theoretical perspectives of Ethnochoreology, an interdisciplinary subject which considers dance in its cultural context. This means examining the relevant literature in Anthropology, Sociology, Cultural Studies, Linguistics, Gender Studies and Education in addition to
other relevant areas of Dance Studies, to highlight the main theoretical developments in the discipline.

**Syllabus:** The history and development of ethnochoreological and dance anthropological theory; applications of anthropological perspectives in the discipline including: functionalist, symbolic, structuralist, linguistic, cognitive, practice and interpretive.

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**DA5101 - REPertoire AND style IN IRISH TRAD DANCE PERFORMANCE 1**  
ECTS Credits: 12  
Humanities

**Rationale and Purpose of the Module:** The objective of this module is to introduce students to the repertoires of diverse Irish traditional dance performance practices within a variety of theoretical, methodological and dance performance contexts. Students learn and embody the repertoires and their respective aesthetics from master tutorials. This develops the performance skills of students and enhances their critical awareness and understanding of different performance practices and their respective aesthetic systems within the Irish dance tradition. Students will also learn research methods which they will apply to a dance ethnographic project of their choice.

**Syllabus:** Students will develop their knowledge of traditional dance repertories and styles through practical, studio-based, dance workshops, performances and lectures; the history and development of different dance performance practices; contexts for the performance of traditional dance practices; aesthetic systems and related kinetic vocabularies; and research methods in dance including Labanotation. They will examine the analytical perspectives of dance. The combination of theory and practice within the syllabus is designed for deeper understanding.

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**DA5111 - DANCE PRACTICUM 1**  
ECTS Credits: 12  
Humanities

**Rationale and Purpose of the Module:** The objective of this module is to provide students with appropriate knowledge and skills to create new work from an Irish traditional dance perspective. The module includes both a theoretical and practical dimension. Literature related to choreographic principles and dance are examined along with practical explorations of both Irish dance practices and modern dance techniques and forms. Students learn from, and collaborate with, choreographers in the creation of new work. This theoretical and practical approach provides a foundation from which students can extend their knowledge and abilities to choreograph new work.

**Syllabus:** The syllabus is structured to extend the students’ knowledge, skill and dance experience: practical dance technique and body awareness classes; theoretical and practical classes on the act of choreography and choreographic principles; analysis and critical evaluation of specific choreographed works (live performances and audio-visual material).

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**DA5141 - PRACTICUM 1 - DANCE PERFORMANCE REPertoire**  
ECTS Credits: 12  
Humanities

**Rationale and Purpose of the Module:** The aim of this module is to introduce conceptual frames and theoretical perspectives that support the creation and performance of contemporary dance choreographies and to support students to undertake research into performance-making, with a focus on creating work which is thought provoking and imaginative rather than safe and conventional. Throughout the module each student will investigate a range of approaches towards creating and performing original performing set choreographies and improvisational scores.

**Syllabus:** The knowledge is structured according to the principles and practices underpinning history and tradition of Western Contemporary and Post-Modern dance techniques and performance. Its transmission is through live, text, video, DVD and studio-based, methods and modes of inquiry based on aesthetic, historical, cultural theories and concepts that have informed the development Western Contemporary and Post-Modern choreography and performance to date.

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**DA6021 - DANCE ETHNOGRAPHY**  
ECTS Credits: 6  
Humanities

**Rationale and Purpose of the Module:** The rationale for this module is to train students in appropriate methods and techniques in dance ethnography and to critically engage them in ethnographic documentation, representation and reflexive writing.

**Syllabus:** The objective of this module is to critically engage students in discourses surrounding ethnographic research methodologies in the field of ethnochoreology. These include issues relating to ethnography and ethnographic inquiry; cultural representation; documentation skills; and reflexive writing. Using appropriate ethnographic tools, students will produce a context-rich portfolio based on a firsthand experience in the field and subsequent critical reflection on the process.

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**DA6031 - CONTEMPORARY DANCE TECHNIQUES FOR PERFORMANCE 1**  
ECTS Credits: 6  
Humanities

**Rationale and Purpose of the Module:** This module introduces theoretical practices and principles current with contemporary and post-modern dance performance research. It provides students with the opportunity to experience and critically examine, through study and practice, a range of contemporary/post-modern dance techniques and theoretical principles towards their clear articulation through movement in choreography and performance. Current techniques informing the study and practice of dance will be contextualized with reference to historically key movements in contemporary and post-modern dance and choreography.

**Syllabus:** The knowledge is structured according to the theoretical frameworks, principles and practices underpinning the history of Western contemporary and post-modern dance, choreography and performance. Its transmission is primarily through live studio-based research into the aesthetic, historical, and ideological principles that have informed the development of the field of contemporary and post-modern dance performance. The knowledge is also stored and transmitted through literature and text-based dance research, video, DVD documentation of the canon of works which define the tradition.

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**DA6041 - EMBODYING IRISH DANCE PRACTICES 1**
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 spreadsheet 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 literature survey on same.

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
vview of available computer packages, description of representative packages, computer implementation issues. Development of programming skills to apply simulation to manufacturing, logistic and services systems.

DM4007 - DESIGN PROJECT 1
ECTS Credits: 6

School of Engineering
Rationale and Purpose of the Module: To enable the student to combine previously learned course material with their individual talents in order to solve real-life engineering projects. To develop in the students the ability to organise and direct their own work and to present this work in written and verbal format in a proper manner. To develop the students research ability.

Syllabus: The student is required to complete a project the selection of which is made from a list provided by academic staff members. In some cases the project may be an extension of the work of the student from the Cooperative Education scheme. Projects are selected by the student in the latter part of the Spring Semester in the third year.

During the summer period of the third year the student is encouraged to explore the topic selected and to carry out a literature survey on same. During the Autumn and early part of the Spring Semesters the student meets with the project supervisor at regular intervals where any problems which may arise are dealt with and plans are made for further work. At these meetings the student is always encouraged to show initiative and imagination in developing the project.

Normally students undergo an interim assessment during week ten of the Autumn Semester, this is based on a verbal presentation of the work carried out to date. The final assessment is based on the quality of the presented Project Report and any other relevant associated work. The Grade for the Project is set after an interview of the student by the supervisor together with at least one other member of the academic staff.

The Project Report is typed on good quality A4 paper using a 12 point font and one-and-one-half line spacing. All drawings are to BS 308 standard and other figures, photos and tables are to be properly annotated and neat in their presentation. The covers should be of soft card with suitable plastic binding.
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.

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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.


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EC4003 - INTERMEDIATE MICROECONOMICS
ECTS Credits: 6

Economics

Rationale and Purpose of the Module: This module builds on the introductory microeconomics module. It extends the analysis of producer and cost theory. It also extends the analysis of market structures (focusing on imperfect market structures) and introduces the issue of pricing and allocation of the factors of production. The latter part of the module looks at the economics of information and how choices are made under conditions of uncertainty. Finally, the student is introduced to the notion of general equilibrium and welfare. Using this framework, market failure and the rationale for government intervention (public sector) are examined.

Syllabus: 1) Theory of Production and Costs; 2) Models of Imperfect Competition and Game Theory; 3) Factor Markets; 4) The Economics of Information and Choice under Uncertainty; 5) General Equilibrium and Welfare

Prerequisites: EC4101

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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 Ireland's membership of the 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 businesses 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 module 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.

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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
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
- 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

Topic 9  Dealing with the root causes of the euro area crisis
- Business Cycles theory
- C/a imbalances in the EU (causes)
- 'Reforming' the euro area:
  - Fiscal Compact, EFSM and ESM: towards an EFM?
  - EU sovereign bonds

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EC4035 - ECONOMICS OF INTEGRATION
ECTS Credits: 6

Economics

Rationale and Purpose of the Module: The aim of this course is to analyse the theory and practice of economic integration and its impact on EU countries in a comparative framework (Asia). The rationale for economic integration, forms of economic integration, monetary integration are among the subjects that are discussed throughout the course.

Syllabus: Topic 1 Introduction
- Definitions and economic rationale
- Vehicles of EI (trade, investment - financial investment, others)
- Stages of Economic Integration: from the Customs Union to EMU
- Economic motives for EI
- History of the 'European idea'
- Rationale for a 'historical' approach to EI
- The "United States of Europe" (an old idea)
- 'Triggers' of Integration in Europe

Topic 2 Milestones in the process of (Economic) Integration in Europe
- Four broad milestones
- Political stage (Robert Schuman Declaration, May 1950)
- Economic stage (ToR to 1970s)
- Monetary/financial stage (from 1979)
- Political stage ... (from 1997), GFC
- Treaties (Euratom, ECSC, Rome... Lisbon)
- Ensuing policies
- Objectives of early treaties

Topic 3 Institutions, economic policy making in the EU and budget
- 'Deep' versus 'shallow' integration (examples)
- EU Institutions
- Laws and Legislative process in the EU
- The EU budget

Topic 4 Theory of economic integration (1)
- Free trade versus autarky
- Tariff (economic impact of --)
- Two-country model (Customs Union theory)

- Trade creation and trade diversion effects
- Gains arising from integration in practice
- The 1992 programme (completion of the SEM)

Topic 5 Theory of economic integration (2)
- Integration in factor markets
- factor price equalization theorem
- Integration of capital markets (theory)

Topic 6 Monetary Integration - Theory and practice
- Theory: Optimum Currency area
- Definitions
- Criteria (evolving ---)
- Costs and Benefits of an OCA
- Definitions (currency: international currency)
- Different types of exchange rate regimes
- Evidence (of monetary integration) - Monetary integration at world level:
- The Bretton Woods system
- Europe's snake in the tunnel

Topic 7 Monetary Integration and Economic and Monetary Union (EMU) in the EU
- The European Monetary System
- The Barre Plan
- The Werner Report
- Delors Report and Maastricht Treaty
- Implications in terms of Fiscal policy - The Stability and Growth Pact
- Economic implications: the issue of 'asymmetric shocks'
- Conclusions: an assessment of EMU

Topic 8 The 2008 GFC: first test on the resilience of the Euro-area
- The global financial crisis (GFC)
- Origin, causes and triggers
- Crisis contagion (through the Irish door...)
- Public debt crisis in the Euro-area
- Dealing with the crisis: short-term policy responses

Topic 9 Dealing with the root causes of the euro area crisis
- Business Cycles theory
- C/a imbalances in the EU (causes)
- 'Reforming' the euro area:
  - Fiscal Compact, EFSM and ESM: towards an EFM?
  - EU sovereign bonds
- Regulation, surveillance
- A global response to the euro-area and GF crises: role of the G20 (and IFIs)

**Topic 10 EU macroeconomic policies**
- Common Agricultural Policy
- EU competition policy
- EU trade policy

**Topic 11 The EU in the global economy**
- Emerging Countries and Less Developed Countries (LDCs)
- The EU Global strategy
- EU-Asia economic relations
- EU Economic Integration in a comparative perspective

**Topic 12 Conclusions, revisions, exam preparation**

**Prerequisites:** EC4101, EC4004, EC4102

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**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.

**Prerequisites:** EC4111, EC4102, EC4101, EC4112

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**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. 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.
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.

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**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 make or break 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 microeconomics 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 ECB/ES monetary policy in EMU.

**Prerequisites:** EC4112, EC4111

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**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
tech
History of European Integration since the beginning of the 20th century.

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

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

Trade with important macro and micro economic issues and problems facing the Irish economy in the context of its status as one of the most globally integrated economies. The course covers characteristics of the economy such as demographic and labour market characteristics and distributional aspects. It also examines the principal sectors of the economy including agriculture, services and manufacturing. It emphasises the challenges posed by increased integration in the international economy including questions of immigration and environmental sustainability.

Syllabus: The course begins with a review of the history and characteristics of the Irish economy in terms of its transition to relatively small closed economy to a regional economy with high levels of integration with the global economy. It covers recent demographic and labour market trends as well as distributional issues including poverty and income distribution. It proceeds to cover the policy and performance of the agriculture, services and manufacturing sectors. This is followed by the conduct of supply side policies such as competition and regulation policy. The course also covers the issues arising from the increased integration of emerging economies such as China as well as developing economies and the challenges posed by their development in terms of different aspects of sustainability including environment, trade and labour market issues.

Prerequisites: EC4102, EC4101, EC4004

Syllabus: The module begins with economic perspectives and behavioural models. It also covers property rights and transaction cost perspectives of the firm. It explores the Theory of the firm: Neoclassical and others
Market Structure
Structure and Strategy (Oligopoly Theory - Cournot and Bertrand duopoly models)
Non price strategies
Technological Innovation

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.Strategy and Strategy (Oligopoly Theory - Cournot and Bertrand duopoly models)
5.Non price strategies
6.Technological Innovation

Rationale and Purpose of the Module: This course deals with important macro and micro economic issues and problems facing the Irish economy in the context of its status as one of the most globally integrated economies. The course covers characteristics of the economy such as demographic and labour market characteristics and distributional aspects. It also examines the principal sectors of the economy including agriculture, services and manufacturing. It emphasises the challenges posed by increased integration in the international economy including questions of immigration and environmental sustainability.

Syllabus: The course begins with a review of the history and characteristics of the Irish economy in terms of its transition to relatively small closed economy to a regional economy with high levels of integration with the global economy. It covers recent demographic and labour market trends as well as distributional issues including poverty and income distribution. It proceeds to cover the policy and performance of the agriculture, services and manufacturing sectors. This is followed by the conduct of supply side policies such as competition and regulation policy. The course also covers the issues arising from the increased integration of emerging economies such as China as well as developing economies and the challenges posed by their development in terms of different aspects of sustainability including environment, trade and labour market issues.

Prerequisites: EC4101, EC4102, EC4004
EDS011 - 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
Modern Basics
Sequential circuits: D-type flip-flops and registers; Counters and their applications; Shift registers ü serial ü to ü parallel conversion (and vice-versa); Simple state diagrams
Mass Storage: Discs, Magnetic storage, sectors, data rates, Optical storage; Flash memory

EDS031 - 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).

EDS021 - 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 defined 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:

EDS041 - COMPUTER NETWORKS 1
ECTS Credits: 6
Electronic & Computer Engineering

Rationale and Purpose of the Module: To provide students with a unified view of the field of multimedia communications and networking infrastructures 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.


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.

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 as well as the ability to express ideas, to assume leadership, to operate within teams (sometimes interdisciplinary) and organisations and to make ethically considered decisions.

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, Commonality & Codes of Ethics, Analysing the Problem, Utilitarian & Respect for Persons Philosophies, Creative Middle Ways

EE4005 - ELECTRICAL POWER SYSTEMS  
ECTS Credits: 6

Electronic & Computer Engineering


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: The students will learn about the fundamental principles of each discipline. Engineering is directed to developing, providing and maintaining infrastructure, goods, systems and services for industry and the community in a sustainable manner. It is important that graduate engineers are thoroughly versed in the engineering technologies relevant to their chosen discipline. Examples would include; telecommunications, power systems, control systems, algorithms, data structures, manufacturing processes, highway construction, aeronautical engineering etc. Students will also have the opportunity to become involved in multi-disciplinary security of supply, stability, protection system components, zones of protection, current transformers, fuses, relays, breakers, inverse time, generator and transformers protection schemes, auto-reclosing circuit breakers. Relay types, over current, differential, impedance and pilot relaying, transformer protection, generator and motor protection, circuit interruption and switching over voltages. Rectification, Inversion and High Voltage DC Systems Advanced Topics: Grid design, transmission and distribution systems, integrating renewable generation onto a grid, grid design for the future, smart grids.
projects which require them to draw upon technologies outside their immediate area of interest.

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**EE4023 - DISTRIBUTED SYSTEMS**  
ECTS Credits: 6  
Electronic & Computer Engineering

**Rationale and Purpose of the Module:** This module is designed to provide students with a framework for comparing emerging distributed systems, as well as an understanding of the algorithms necessary to support a distributed system. Computing models and data communications will be studied, as well as software development issues relating to the development of distributed applications. Potential security threats in distributed systems will also be discussed.

**Syllabus:**  
- Distributed System Fundamentals  
- Types of Distributed Systems, Distributed Systems Architectures, Location of Services, Data conversion and Marshalling of data. Replication, Clock synchronisation, Mutual Exclusion & Deadlock Detection, Distributed File System Case study.  
- [Component based Software Architectures] Elements of Component based Software Architectures, Case Study: e.g. CORBA, Java Remote Method Invocation (RMI).  

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**EE4027 - TELECOMMUNICATION NETWORK ARCHITECTURES 1**  
ECTS Credits: 6  
Electronic & Computer Engineering

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**EE4115 - SYSTEMS ANALYSIS**  
ECTS Credits: 6  
Electronic & Computer Engineering

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**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 â€” Combining impedances, frequency response, source conversions, Thévenin and Norton Equivalent Circuits, Mesh and Nodal Analysis, Bridge Networks, D-Y and Y-D conversions.  
- 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

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**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. Synthesizable
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.

Example common ASIC blocks: adders and multipliers.


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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.)


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.


Register-Transfer-Level (RTL) description.

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EE6011 - CRYPTOGRAPHY AND SECURITY FUNDAMENTALS
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: Introduces 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.


[Key management] Key distribution, key-sharing. Use of key distribution centres, authentication servers and certification authorities.

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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.


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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 defined 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 purify 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;

**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 emphasize 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).

**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.


**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 filter design.

**Syllabus:** Discrete signals and systems. The DFT, its properties and applications; relationship to other transforms; Fourier, Laplace, Z-transform etc. Rallings as theoretical samplers. Spectral descriptions of sequences. Analogue and digital convolution, the z-transform in the design of FIR digital filters. Linear-phase, all-pass filters. Minimum-phase filters. Differentiators and Integrators. Windowing techniques in filter design. Filter design and fast convolution by FFT. Frequency-sampling filters. IIR filters: mapping from analogue filters, bi-linear mapping, review of other

**EE6471 - ADVANCED DIGITAL SYSTEM DESIGN**
ECTS Credits: 6

**Electronic & Computer Engineering**

**Rationale and Purpose of the Module:** This module aims to equip the student with a range of techniques applicable to the design and test of very high speed and fault-tolerant digital circuits.

**Syllabus:** Review: High-speed design in the time and frequency domains; refection, ringing and crosstalk, transmission lines. Transmission lines and termination strategies: Series, Thevenin, diode and AC terminations; Crosstalk, reflections, ground bounce. Properties and behaviour of stripline and microstrip traces. Technology review: LVDS, ECL/PECL, G, SSTL, HSTL, and high-speed CMOS drivers and receivers; mixed voltage systems; bus-hold and bus-loading considerations; hot insertion. Synchronous Design: Clock oscillators and buffering, Clock Distribution, Metastability. System Design and Manufacture: PCB materials; Layer build and specification; Power supply considerations; Decoupling techniques. EMC/ESD: Radiated vs conducted; Filtering; Effects of apertures, gasketing; Conducted emissions, coaxial cables, twisted pair; Shielding. Thermal Aspects: Sources of heat; Thermal resistance; Basic airflow models; Impact on reliability; Altitude Effects. Reliability: Bathtub curves; Highly Accelerated Life Testing (HALT). Models and Simulation: Spice and IBIS-based simulations. Fault-tolerance and redundancy: Fault-tolerant digital circuits. Architecture of fault-tolerant computers.

**EE6621 - ASICS 1 (DIGITAL ASICS)**
ECTS Credits: 6

**Electronic & Computer Engineering**

**Rationale and Purpose of the Module:** This module introduces issues relating to the design and implementation of application-specific integrated circuits (ASICs) for digital systems.

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).

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 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 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 studies.

Rationale and Purpose of the Module: This module provides students with a survey of English literature of the eighteenth and early nineteenth centuries, a period in which literature was involved with, and inspired by, revolutionary political activity.

Syllabus: Inspired and subsequently alarmed by French and American revolutions, the writers of this period grappled with issues of race, slavery, gender, democracy, and republicanism. The module will begin with examples of the anxious introspection which characterises the poetry of sensibility; from this point forward is traced a shift from a negative and trivialising concept of the romantic towards the more complex Romantic cults of Nature and Imagination.

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,
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 author's 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 Joyce’s work using contemporary literary and cultural theory. Focusing on the major fictions of Joyce, the module will also explore the interconnections between these various writings. Joyce's 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 Joyce's 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.

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.

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 women’s 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.

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 Sèoín 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.

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**EN4006 - CURRICULUM STUDIES**  
ECTS Credits: 6

**School of Education**

**Rationale and Purpose of the Module:** Aim To situate whole curriculum in its macro educational and political context and develop students understanding of key aspects of curriculum planning, development, reform, innovation and change.

**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 relationship between curriculum and education policy; external influences on curriculum policy and policymaking; 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; purposes, modes and techniques of assessment; assessment for learning; contemporary national and international curriculum issues; some radical alternatives.

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**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.

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**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.

**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.

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**EN4033 - PLANNING FOR LEARNING**  
ECTS Credits: 6

**School of Education**

**Rationale and Purpose of the Module:** This module requires students to take a detailed look at a variety of planning and teaching skills and concepts that combine to make a teacher effective in the classroom. Students are introduced to the complexities of planning and preparation for student-centred learning in preparation for their school placement in semester 4. A particular emphasis will be placed on planning, implementing learning strategies, assessment and evaluation of practice.

**Syllabus:** This module will introduce students to the various elements required to establish and maintain an effective/positive learning environment - communication (theory, skills and dynamics); the relational art of teaching; group dynamics. Students will be introduced to models of planning/curriculum models (product, process, subject-centred, learner-centred, problem-centred, Teaching Personal and Social Responsibility (TPSR) model); psychological/instructional frameworks (ARCS Model, e5 Instructional Model, Integrative Model, Social Interaction Model, Inductive Model, Concept-Attainment Model, Concept-Development Model, Problem-based Model, Direct-Instruction Model); learning outcomes (behavioural/non-behavioural); planning and preparing schemes of work and lesson plans. Students will have the opportunity to implement these plans in small group settings with young people (Micro-Teaching) and reflect on their own learning from this experience.

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**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).

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 to identify and critically analyse influences which shape the individual in becoming a teacher and to also focus on the key concepts of communication and reflection as significant processes in professional identity formation.

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.

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.

EQ4025 - THE YOUNG HORSE
ECTS Credits: 6

Biological Sciences

Rationale and Purpose of the Module: The module provides 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 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, acclimating the horse to the rider early riding of the young horse. Equipment; lunging and longrein 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.

EQ4051 - INTRODUCTION TO HORSEMANSHIP
ECTS Credits: 6

Biological Sciences
**Rationale and Purpose of the Module:** The purpose of this module is to 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.

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**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 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 regional & global environmental effects that arise from the generation and use of energy.

Students are required to read and explore case studies relevant to the conservation of biodiversity.

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**ER4405 - CONSERVATION ECOLOGY**  
ECTS Credits: 6

**Chemical Sciences**

**Rationale and Purpose of the Module:** To explore the purpose of biodiversity conservation, and how expenditure of resources on conservation may be justified. To examine the concept of biodiversity and explore its significance. To understand the impacts of humanity on biodiversity and possible mitigation measures. To provide a theoretical and practical understanding of ecological evaluation. To review case studies in the management of conservation areas, and habitat restoration.

**Syllabus:** Biodiversity is defined, its importance to humanity explained in terms of ecosystem services and functioning. Human impacts on biodiversity under a range of categories and mitigation measures are explored. Students are required to read and explore case studies relevant to the conservation of biodiversity.

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**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.

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**ER4438 - ENVIRONMENTAL FATE MODELING**  
ECTS Credits: 6

**Chemical Sciences**

**Rationale and Purpose of the Module:** 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/eco/logical risk.

**Syllabus:**
- **Chemical Sciences**
  - **Rationale and Purpose of the Module:** To provide an understanding of the principles underlying wastewater treatment.
  - **Prerequisites:** ER4507

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**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.

**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.

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**ER4708 - BIOMETRICS**
**ECTS Credits:** 6

**Biological Sciences**

**Rationale and Purpose of the Module:** To provide a practical course in analysis of the type of data encountered in environmental science and health and safety.

**Syllabus:** Practicals for this module consist of a weekly two hour session on computers where the students use the following packages: Microsoft Excel, SPSS for Windows and MVSP (Multivariate Statistical Package, W. Kovach). The students learn to input ecological data and transfer it between the various packages; carry out preliminary data analysis and descriptive statistics; move on to more advanced analyses. Finally, using MVSP, the students undertake simple multivariate procedures including dendograms and correspondence analysis.

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**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 introduction 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.

**ET4008 - TEST ENGINEERING 2: DIGITAL CIRCUIT AND SYSTEM TEST**

**ECTS Credits:** 6

**Electronic & Computer Engineering**

**Rationale and Purpose of the Module:** The increasing complexities and speed of operation of modern digital circuits and systems is increasing the demand on product testing. The purpose of the module is to introduce the students to modern semiconductor integrated circuit (IC) test methods, including automatic test equipment (ATE), design for testability (DFT) and built-in self-test (BIST) for digital ICs.

**Syllabus:** The increasing complexities and speed of operation of modern digital circuits and systems is increasing the demand on product testing. The module will concentrate on IC designs, with the following key areas covered:-

1. Semiconductor test overview:- test points for semiconductor devices from wafer to package.
2. Test Engineering requirements.
3. Digital logic test concepts:- sequential and combinational logic.
4. Memory test:- RAM and ROM.

5. Fault modelling and fault simulation
6. Design for Testability (DFT).
7. Built-In Self-Test (BIST).
8. Problem with design complexity: System on a Chip (SoC) test problem.
9. ATE systems.
10. IEEE Standard 1149.1 (Boundary Scan).

**Prerequisites:** ET4015
**DEVELOPMENT AND ATE SYSTEMS**

**ECTS Credits: 6**

**Electronic & Computer Engineering**

**Rationale and Purpose of the Module:** To provide an insight into how commercial electronic systems are designed, manufactured and tested.

**Syllabus:** Troubleshooting: How circuits, systems and components fail. How are they diagnosed and repaired?
Reliability: Arhenius and Eyring Models of failure.
Electronic Production: PCB Design. Through hole and Surface Mount Technology. How can production processes be made more reliable?
Lean Manufacturing.
Advanced Interconnection Systems for modern Electronic Production.

**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/e (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).
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 vulnerabilities:] 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 (Bletchley 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**

**Rationale and Purpose of the Module:** 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.
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**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.

**ET4037 - EMBEDDED SOFTWARE**

**ECTS Credits: 6**

**Electronic & Computer Engineering**

**Rationale and Purpose of the Module:** 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.
**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 access. 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.


**ET4121 - LABORATORY SKILLS 1**

**ECTS Credits:** 6

**Electronic & Computer Engineering**

**Rationale and Purpose of the Module:** The aim of this module is to provide the students with the necessary basic laboratory skills in which to effectively undertake the necessary laboratory work within the course. The module will be based on an introduction to the electronic engineering laboratory and the development of laboratory skills required within the course. This will be introduced within the laboratory environment and the emphasis is on building practical electronic hardware skills.

**Syllabus:** The module will consist of three main sections:

1. Introduction to the electronic engineering laboratory: - codes of conduct, operation of test and laboratory test and measurement equipment: - power supply, signal generator, oscilloscope, circuit prototyping boards. Taking measurements (voltage, current, resistance, inductance, capacitance, frequency) and measurement equipment limitations.

2. Electronic circuit prototyping, build and test: - soldering, wire-wrapping, board design and layout, component choice and correct handling. Determining
component values from the package coding.

3. Printed Circuit Board (PCB) build and test, working in a project group environment.

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)

ET4151 - 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. It prepares them for more detailed in-depth coverage of these topics in later modules, yet is sufficient to allow for some practical laboratory work to reinforce the concepts introduced.

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 Modern 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

ET4203 - ANALOGUE ELECTRONICS 3
ECTS Credits: 6
Electronic & Computer Engineering

Rationale and Purpose of the Module: Introduction to structures of semiconductor devices and their use in basic amplifier circuits and systems.


Prerequisites: ET4141, ET4122

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

ET4253 - COMPUTER SYSTEMS ARCHITECTURE 2
ECTS Credits: 6
Electronic & Computer Engineering

Rationale and Purpose of the Module: The aim of this module is to introduce students to advanced processor
architectures and processing concepts, such as RISC, pipelining, and superscalar instruction execution. Students will understand the architecture of modern motherboards, internal buses, modern external interfaces, and interactions between application software, BIOS and device drivers.

**Syllabus:** Pentium and later microprocessors and simple RISC and CISC concepts; Protected Mode operation and relationship to Windows operating system; P4 incorporation of RISC techniques. Architecture of a modern PC, showing memory and bus hierarchies, use of caches in memory hierarchy; Legacy of ISA bus and Real Mode; Introduction to PCI and other internal PC buses. Use of the BIOS in a PC and its relationship to application programs and the operating system; The use of device drivers in a PC; I/O standards, including USB, IEEE 1394, serial and parallel interfaces; Disk and mass storage interfaces and standards; Video and graphics standards. Role of the Motherboard in a PC; Evolution of the PC. Project Work: Write simple programs to illustrate aspects of the PC architecture, detailed study of a PC motherboard, configuration of a PC, installation of an operating system on a PC.

**Prerequisites:** ET4142

**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.


**Prerequisites:** ET4224, ET4204

**ET4345 - OPERATING SYSTEMS 2**

**ECTS Credits:** 6

**Electronic & Computer Engineering**

**Rationale and Purpose of the Module:** The prerequisite module, Operating Systems 1, introduces operating system concepts for uniprocessor systems. This module builds on the previous module by introducing a specific operating system, UNIX, and covering the underlying design and implementation features of the UNIX operating system. A set of laboratory exercises exposes the student to the internals of the UNIX operating system.

**Syllabus:** UNIX Overview: History, standards, shells, interfaces. UNIX architecture: Features, partition of functions and position in the layered structure. Kernel organisation: Control flow, execution, daemons, timers, interrupts, clocks, modules. Process Management: Process manager, system calls, task creation, blocking, wait queues, scheduling, IPC, booting. Memory management: Virtual address space, secondary memory, shared memory, addressing, performance issues, system calls. File management: File I/O, file access, different file systems, performance issues, system calls. Device management: Device drivers, streams, interrupt handling, disk drive example. Laboratory: A set of laboratory exercises based on skeleton example programs will guide the student through the internals of the UNIX operating system. The example programs will be developed in shell scripts and C/C++ programming environments.

**Prerequisites:** ET4725

**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 of the PC architecture, detailed study of a PC motherboard, configuration of a PC, installation of an operating system on a PC. Project Work: Write simple programs to illustrate aspects of the PC architecture, detailed study of a PC motherboard, configuration of a PC, installation of an operating system on a PC.

**Prerequisites:** ET4725

**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.


Case Study. Extensible Mark-up Language (XML) and Simple Object Access Protocol (SOAP). Major programming project.

**Prerequisites:** ET4355

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**ET4725 - OPERATING SYSTEMS 1**

ECTS Credits: 6

**Electronic & Computer Engineering**

**Rationale and Purpose of the Module:** This module provides an introduction to multi-tasking operating system concepts. Topics include: processes, threads, memory management and file systems. Focus is on a single processor machine. The module will include a laboratory project.

**Syllabus:** Operating System: Definitions, types of operating systems.

Processes: Concurrency, states, queues, scheduling, threads.

Interprocess communication and synchronisation: Mutual exclusion, race conditions, busy-waiting solutions, TSLS, semaphores, monitors, simple message passing, classical problems.

Deadlock: Conditions for deadlock and solutions.

Memory Management: Swapping, virtual memory, paging and segmentation.

File systems to support multi-tasking: Disk organisation, space management, file sharing, file protection, performance issues.


Laboratory: The students will become familiar with one operating system: UNIX or Microsoft Windows. Exercises will involve: shell scripting, system calls using C/C++, solving synchronisation problems in a concurrent programming environment.

**Prerequisites:** ET4253, ET4263

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**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, ontology 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.

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**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...
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.

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 method, 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

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: (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: 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
ECTS Credits: 6
School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: (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: 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 an introduction to contemporary social, economic and political life in France in a European and global perspective. This is achieved:
by developing students 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: 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 discussing a broad selection of contemporary oral and written material from diverse media. An overall review of French grammar is carried out with special emphasis on French grammatical metalinguage.

FR4243 - FRENCH LANGUAGE CULTURE AND SOCIETY 3
ECTS Credits: 6
School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: (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; (v) to build on students practical language skills acquired in first year.

Syllabus: 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. An overall review of French grammar is carried out.
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.

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**FR4921 - FRENCH FOR BUSINESS 1A**

**ECTS Credits:** 6

**School of Modern Languages and Applied Linguistics**

**Rationale and Purpose of the Module:** (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:** 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 a variety of theoretical and literary texts will be addressed in relation to each topic, for example existentialism; structuralism/semiology; post-modernism; feminist theory.

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**FR4923 - FRENCH FOR BUSINESS 3A**

**ECTS Credits:** 6

**School of Modern Languages and Applied Linguistics**

**Rationale and Purpose of the Module:** (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
Finally, students study a literary text related to the module title, currently, Voltaire’s Candide.

Prerequisites: FR4925

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FR4305 - 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.


Prerequisites: PH4022

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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

Syllabus: 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 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

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FR4927 - FRENCH FOR BUSINESS 7A
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: While building on previously acquired reading, speaking, writing and listening skills, the course aims to enhance students’ ability 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: 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

Syllabus: 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

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FR4925 - FRENCH FOR BUSINESS 5A
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: To prepare students for study or work placement abroad taking place in semester 6. This is achieved: by developing students’ 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: 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

and active);
(iv) to promote students critical reading of French literature;
(v) to build on the grammatical skills acquired in year 1.
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

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. Maillard-browning reactions, protein degradation, lipid oxidation. Food and health issues of consumer concern including bovine spongiform encephalitis (BSE), genetically modified foods, E. coli O157:H7.

Prerequisites: FT4204, FT4325

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.


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.


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 to develop a critical awareness of emerging research in the field of food science and health.

Syllabus: Using specific examples, students will be trained 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)
- Neutriceuticals (Hypotensive peptides, peptides and cognitive function)
- Neutragenomics (Diet and gene interactions)

Prerequisites: FT4335

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

Prerequisites: GA4105

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

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.
- 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 Europe/Es 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.

GA4116 - IRISH LANGUAGE 2
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.
- 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 Europe/Es 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.

GA4133 - LITRÍOCHT AGUS SAÍOCHT 1: 1890-1940
ECTS Credits: 6

School of Culture and Communication

Rationale and Purpose of the Module: Go gcothófáil teagmháil an mhic léinn leis an nualitríocht ó thús ré na hAthbheochana go c.1940 (gearrscéalta, úrscéalta, filíocht agus drámaí); go gcothófáil scileanna anailíse agus bunchumas léirmheastóireachta.

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

GA4138 - LITRÍOCHT AGUS SAÍOCHT 4:
ECTS Credits: 6

School of Culture and Communication

Rationale and Purpose of the Module: Go gcothófaí teagmháil an mhic léinn leis an nualitríocht ó thús ré na hAthbheochana go c.1940 (gearrscéalta, úrscéalta, filíocht agus drámaí); go gcothófaí scileanna anailíse agus bunchumas léirmheastóireachta.

Syllabus:
- Mionscagadh ar phrós agus ar fhilíocht thús ré na hAthbheochana leiseartha; litríocht an phobail agus staidayáir speisialta ar príomhádhúr na linne. Léirítear ar shaothar na n-údar seo: Pádraig Mac Piarais; Liam S. Gogan; Pádraic Ó Conaire

Prerequisites: GA4133, GA4136

GA4139 - LITRÍOCHT AGUS SAÍOCHT 5:
ECTS Credits: 6

School of Culture and Communication

Rationale and Purpose of the Module: Go gcothófaí teagmháil an mhic léinn leis an nualitríocht ó thús ré na hAthbheochana go c.1940 (gearrscéalta, úrscéalta, filíocht agus drámaí); go gcothófaí scileanna anailíse agus bunchumas léirmheastóireachta.

Syllabus:
- Mionscagadh ar prós na n-údar na nualitríochtaí de ré na hAthbheochana. Léirítear ar shaothar na n-údar seo: Pádraig Mac Piarais; Liam S. Gogan; Pádraic Ó Conaire

Prerequisites: GA4133, GA4136
School of Culture and Communication

Rationale and Purpose of the Module: Go bhforbrófaí teagmháil an mhic léinn liomhthuisceantaithe ar na Gaeilge dúchais; go léifeadh an mac léinn na mórshaothair litriúcháin a scriobhú údará de chuid na Gaeltachta, agus go gcuirfeadh sé atthe is air litriúcháin chomhaimseartha a ngeacantaigh éagsúil séirid prorsú, dhríbhheascánaisnéisiúnta, fhiachlocht, amhránaíocht agus ábhar lighnéitheach eile.

Syllabus: Saothair roghnaithe de chuid na litriúcháin chomhaimseartha a scriobhadh sa Ghaeltacht, nó a scriobhú údará na Gaeltachta; prós, filíocht, aisteoir a chur chun cinn i nGaeilge, spóirt agus araíle; dúchas litriúcháin a nGaeltachta sa lá atá inniu ann; Leabhair go raibh go mbeadh an Ghaeilge a labhairt agus a scríobh go cruthú agus go nádúrtha ar ábhair a bhaineann lena gcúlra féin, lena n-ábhar suime agus leis an na hOileáin; go bhforbrófar scileanna léamhthuisceanta atá i ngniomhróidhchear na Gaeilge.

Rationale and Purpose of the Module: To encourage an mac léinn an teagmháil a dhíon i na Gaeil agus an Mhóir-Roinn agus Meiriceá Thuaidh agus Theas; oidhreachtaí Ghaelach a nGhaoth Dobhair agus a Mheiriceá Thuaidh; go mbeadh cur amach leathan ag an mac léinn ar shaíocht na Gaeilge agus ar shaol na nGael ón 16ú go dtí an 18ú haois, agus ar shaibhre is fearrthaí sa bhunadh ar n-áthasormar; forbairt, leathnú, saolthar a bhí a bhaineadh teangacha do thírphréasaíocht; politiúchta agus sláin air na n-Héireann agus na n-Eorpa.

Syllabus: Ranganna teagaisc: Fheabhsa a chur ar an gcumas bainte amach go dtí GA4142; gramadach agus comhréireacht na Gaeilge; grinnléitheoireacht ar dhírbheathaisnéisí; leathnú, díospóireachtaí; prós, filíocht, aisteoirí. Go mbeadh an mac léinn an teagmháil a dhíon i na Gaeil agus an Mheiriceá Thuaidh agus na hÉireann.

ECTS Credits: 6

GA4141 - TEANGA, SOCHÁI AGUS SÁIOCHT 1

Rationale and Purpose of the Module: Go dtiocfadh an mic léinn ar thuiscint ar ghnéithe de shaol chomhaimseartha agus doidhneachta i na Gaeilge, agus go mbeadh ar a gcumas an Ghaeilge a labhairt agus a scriobh go crúnnaí agus go nádúrtha ar ábhair a bhaineann lena gcúlra féin, lena n-ábhar suime agus leis an na hOileáin; go bhforbrófar scileanna léamhthuisceana atá i ngniomhchear na Gaeilge.

Syllabus: Ranganna teagaisc: Dianchúrsa feabhais i nGaeilge, ábhar i n-áthasóirí; feabhas a chur ar na téamaí Gaeilge a bhaineann le hábhair eile a chéime; go mbeadh máistreach aige ar na téamaí Gaeilge a bhaineann le hábhair eile a chéime; go mbeadh an mic léinn in ann an Caighdeán Oifigiúil a úsáid agus a mhíniú; go mbeadh tuiscint ag an mic léinn ar an malartú teanga dháin comhaimseartha na Gaeilge a nGhaoth Dobhair; go mbeadh an mic léinn ar an Caighdeán Oifigiúil a úsáid agus a mhíniú; go mbeadh tuiscint ag an mic léinn ar an malartú teanga dháin comhaimseartha na Gaeilge a nGhaoth Dobhair.

ECTS Credits: 6

GA4143 - TEANGA, SOCHÁI AGUS SÁIOCHT 3

Rationale and Purpose of the Module: To encourage an mac léinn an teagmháil a dhíon i na Gaeil agus an Mhóir-Roinn agus Meiriceá Thuaidh agus Theas; go mbeadh cur amach leathan ag an mac léinn ar shaíocht na Gaeilge agus ar shaol na nGael ón 16ú go dtí an 18ú haois, agus ar shaibhre is fearrthaí sa bhunadh ar n-áthasormar; forbairt, leathnú, saolthar a bhí a bhaineadh teangacha do thírphréasaíocht; politiúchta agus sláin air na n-Héireann agus na n-Eorpa.

Syllabus: Ranganna teagaisc: Fheabhsa a chur ar an gcumas bainte amach go dtí GA4142; gramadach agus comhréireacht na Gaeilge; grinnléitheoireacht ar dhírbheathaisnéisí; leathnú, díospóireachtaí; prós, filíocht, aisteoirí. Go mbeadh an mac léinn an teagmháil a dhíon i na Gaeil agus an Mheiriceá Thuaidh agus na hÉireann.

ECTS Credits: 6

GA4153 - LITRÍOCHT AGUS SÁIOCHT 1250-1690

School of Culture and Communication

Rationale and Purpose of the Module: Go dtiocfadh an mic léinn ar thuiscint ar ghnéithe de shaol chomhaimseartha agus doidhneachta i na Gaeilge, agus go mbeadh ar a gcumas an Ghaeilge a labhairt agus a scriobh go crúnnaí agus go nádúrtha ar ábhair a bhaineann lena gcúlra féin, lena n-ábhar suime agus leis an na hOileáin; go bhforbrófar scileanna léamhthuisceana atá i ngniomhchear na Gaeilge.

Syllabus: Ranganna teagaisc: Dianchúrsa feabhais i nGaeilge, ábhar i n-áthasóirí; feabhas a chur ar na téamaí Gaeilge a bhaineann le hábhair eile a chéime; go mbeadh máistreach aige ar na téamaí Gaeilge a bhaineann le hábhair eile a chéime; go mbeadh an mic léinn in ann an Caighdeán Oifigiúil a úsáid agus a mhíniú; go mbeadh tuiscint ag an mic léinn ar an malartú teanga dháin comhaimseartha na Gaeilge a nGhaoth Dobhair; go mbeadh an mic léinn in ann an Caighdeán Oifigiúil a úsáid agus a mhíniú; go mbeadh tuiscint ag an mic léinn ar an malartú teanga dháin comhaimseartha na Gaeilge a nGhaoth Dobhair.

ECTS Credits: 6

GA4153 - LITRÍOCHT AGUS SÁIOCHT 1250-1690

School of Culture and Communication

Rationale and Purpose of the Module: To encourage transfer of oral and written communicative skills to a wider range of situations. To consolidate and revise the grammar, pronunciation and communicative skills acquired in the first two semesters. Students will progress to a level suitable to undertake a coop placement in Irish and join students who have successfully completed modules Teanga, Socháí agus Saíocht 1-3, in Semester 6.

Syllabus: The language course will address some of the specific topics will be covered: social occasions, the family, food and drink and health and illness. The lecture hour will deal with current issues in Irish language and society.

ECTS Credits: 6

GA4163 - BEGINNERS IRISH 3

Rationale and Purpose of the Module: Go dtiocfadh an mic léinn ar thuiscint ar ghnéithe de shaol chomhaimseartha agus doidhneachta i na Gaeilge, agus go mbeadh ar a gcumas an Ghaeilge a labhairt agus a scriobh go crúnnaí agus go nádúrtha ar ábhair a bhaineann lena gcúlra féin, lena n-ábhar suime agus leis an na hOileáin; go bhforbrófar scileanna léamhthuisceana atá i ngniomhchear na Gaeilge.

Syllabus: Ranganna teagaisc: Dianchúrsa feabhais i nGaeilge, ábhar i n-áthasóirí; feabhas a chur ar na téamaí Gaeilge a bhaineann le hábhair eile a chéime; go mbeadh máistreach aige ar na téamaí Gaeilge a bhaineann le hábhair eile a chéime; go mbeadh an mic léinn in ann an Caighdeán Oifigiúil a úsáid agus a mhíniú; go mbeadh tuiscint ag an mic léinn ar an malartú teanga dháin comhaimseartha na Gaeilge a nGhaoth Dobhair; go mbeadh an mic léinn in ann an Caighdeán Oifigiúil a úsáid agus a mhíniú; go mbeadh tuiscint ag an mic léinn ar an malartú teanga dháin comhaimseartha na Gaeilge a nGhaoth Dobhair.

ECTS Credits: 6
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: 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: 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.

Prerequisites: GE4142

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

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: 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: 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) graded translation exercises focussing on German/English translations.

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: This module completes students’ basic language study. It aims to
increase students’ 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: 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 lexicon 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

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

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: To provide 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: 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 textbook 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: 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: 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, Vormôrz, 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-Fouquû, 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: 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: 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: 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).

Prerequisites: GE4922

GE4925 - GERMAN FOR BUSINESS 5A
ECTS Credits: 6
School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: 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).

Prerequisites: GE4924

GE4927 - GERMAN FOR BUSINESS 7A
ECTS Credits: 6
School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: 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.
Syllabus: 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

Syllabus: I ENVIRONMENTS AND ECONOMIES
------------------------------------------------------------
1 wind, rain, soil  
2 time and place  
3 diet: cattle, grain, roots  
4 regional ecologies, economies and cultures  
5 growth and crisis; land, wages, prices, trade
6 demographic transitions: births, deaths, migrations
7 infrastructures
8 the 1850 economy

II SOCIETIES AND CULTURES
------------------------------------------------------------
1 rural social structures: landownership, farming, labour
2 the cult of improvement
3 household; gender, sexuality and patriarchy
4 urban society: merchants, trades, mendicants
5 the languages of Ireland: Anglicisation 1750-1850
6 belief and faith

III POLITICAL AND CIVIL LIFE
------------------------------------------------------------
1 the constitution: king, lords and commons of Ireland
2 parliamentary reform in Britain and France after 1815; Austria in the age of Metternich; the revolutions of 1848.
3 Austria in the age of Metternich; the revolutions of 1848. 

Syllabus: The decline of belief in witchcraft and the scientific revolution; the emergence of Russia as the leading power in eastern Europe; Europe at peace, 1715-1740; the expansion of Britain as a world power; the Enlightenment and its impact on economy, society and politics; the Enlightened absolutists: Joseph II and Catherine the Great; Spain in the eighteenth century; the rise of Prussia and the diplomatic revolution of 1756; the role of women at the court of Louis XV; the collapse of the Old Regime in the 1780s; the French revolution; European radicalism in Britain, Poland and the Low Countries; Napoleonic Europe; the Congress of Vienna and the balance of power in the early nineteenth century; reaction, conservatism and romanticism, 1815-1830; social and parliamentary reform in Britain and France after 1815; Austria in the age of Metternich; the revolutions of 1848.

Prerequisites: HI4112

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 century. It is intended as a gradual introduction...
for first-years into the early modern period, and covers a shorter and more manageable time-frame than the previous practice of teaching two centuries in one semester.

**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; diet, demography and disease; a society of estates - nobles, clergy, merchants and peasants; family life - birth, marriage and death; Charles V, Francis I and the Habsburg-Valois conflict; Luthers protest and the Evangelical movement in Germany and Scandinavia; Calvin and the second Reformation; capturing the hearts and minds of the ordinary people - preaching and literacy; the response of the Catholic Church - Jesuits, the Council of Trent and the alliance of Church and State; Wars of Religion in France and the Netherlands; Philip II and Spanish world hegemony.

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**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 provide advanced students with the opportunity to further develop their analytical and research skills through a study of a significant historical issue, namely, the Holocaust/Shoah, in the middle decades of the twentieth century.

**Syllabus:** Jews in inter-war Germany and Europe; war and the racial reordering; everyday life under the Occupation and in the ghettos; deportations; hierarchies of power in the camps; perpetrators; surviving the Holocaust ñ co-optation and resistance; opening the camps ñ reconstructing Holocaust experiences; the Holocaust and historians; the victims/E experience and its legacy for contemporary society; interface between the Nazi espousal of eliminationist biology and the motivation of perpetrators; politics and law; victims/E varied reactions in the context of national and local communities; national, communal and individual bystanders; recovering Holocaust experiences.

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**HI4112 - SOURCES FOR HISTORY**

**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:** 1. Historians and their sources: a brief history
2. Primary and secondary sources
3. Identification, location, accession, critical evaluation and use of sources
4. Public and private archives: origins, ideologies and holdings
5. Using archives: access, availability, procedure and professional practice
6. The range and scope of electronically available source materials
7. Audio and visual sources
8. Old histories and new histories
9. Forgery, fabrication and the historian
10. The withdrawal, suppression and destruction of sources
11. Professional practice and political necessity
12. Appropriate citations of primary and secondary sources
13. Presenting a small research project

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**HI4147 - IRELAND AND THE USA, 1790 - 1960; A SPECIAL RELATIONSHIP?**

**ECTS Credits:** 6

**History**

**Rationale and Purpose of the Module:** The module is offered as an elective seminar module to year four BA English and History, BA History, Politics, Sociology and Social Studies and eventually BA Arts (history students). It is an opportunity for students who have chosen the module, to study the theme in an in depth way. Secondly, the purpose is to sharpen the student/s critical skills, through discussing ideas, events and individuals that retain contemporary resonance

**Syllabus:** Irish emigration - the first wave; the appointment of a US consul in Ireland; Irish-American economic links in the nineteenth century; the impact of the 1845-51 famine on the relationship; Ireland and the US civil war; managing the second emigrant wave and impact on US and Irish societies; the Irish in the US political system; Woodrow Wilson, World War One and Irish-America; the US and revolutionary Ireland, 1916-22; De Valera and F.D. Roosevelt's relationship; economic and social ties in the inter-war period; David Gray, De Valera and World War Two; Ireland and the Marshall Plan, 1947-57; Irish and US diplomatic relationship, 1951 to 60.

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**HI4187 - HEALTH, STATE AND IRISH MEDICAL CARE, 1837 - 1948**

**ECTS Credits:** 6

**History**

**Rationale and Purpose of the Module:** The aim of this course is to provide students with an introduction to major issues, approaches and sources in the history of medicine from the Poor Law 1837 to the 'Mother and Child scheme' debacle in 1948

**Syllabus:** This module traces the evolution of Irish healthcare provision from the Poor Law in 1837 to the introduction of the Mother and Child Scheme in 1948, it will highlight the complexity of nineteenth-century Irish administration and will focus on how the dual system of public and private healthcare and its services emerged; major health concerns which dictated the shape the system such as outbreaks of cholera, typhus and pulmonary tuberculosis; lunacy acts; sanitation law; housing acts; the contagious diseases acts and their implementation and implications for health; the foundation of the Irish Free State and its relationship with the Catholic hierarchy invoked more change in the healthcare sector; issues of social class and healthcare; British policy and technological advances will be highlighted from a comparative perspective

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**HI4207 - THE FIRST GLOBAL EMPIRE: THE SPANISH MONARCH, EUROPE AND AMERICA 1479 - 1598**

**ECTS Credits:** 6

**History**

**Rationale and Purpose of the Module:** This module is intended as a research-based elective module for final-year undergraduate students. It will build on the success of previously offered elective modules on early modern history by giving students a thematic and chronological overview of the history of Spain and America that is specific to the late medieval period and the sixteenth century. As such, it responds to the very positive
analytical techniques. Gases/Vapours, active versus passive sampling, sampling techniques, direct reading instruments, units of concentration, control of airborne concerns; Lebanon Civil War and the wider region; Israeli policies and the First Intifada; Creating a 'Peac Process': from Madrid to Oslo; Camp David II and the Second Intifada; Simulation: Hope for Peace?

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**HP4108 - PUBLIC ADMINISTRATION PROJECT**

**ECTS Credits:** 6

**Politics and Public Admin**

**Rationale and Purpose of the Module:** The purpose of the module is to provide the student with an introduction to research as taught on a one-to-one basis by embarking on an extended research project of between 9,000 and 13,000 words

**Syllabus:** The student will initiate a research project on a topic approved by a supervisor. The student will, by a specific date, submit a 500 word brief which will include a resume of the subject matter, the scope of the project, a review of sources and an outline of the methodology required. The student will start the collection of the necessary data.

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**IN4003 - PRINCIPLES OF RISK MANAGEMENT**

**ECTS Credits:** 6

**Accounting & Finance**

**Rationale and Purpose of the Module:** To introduce the student 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.

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**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...
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.

IN4725 - 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. With the spiralling cost of health care and the changing demographic in Ireland and Europe there is significant focus on the health care market by the state and the insurance industry. This module will introduce students to t
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.

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

JA4211 - JAPANESE LANGUAGE, CULTURE AND
SOCIETY 1
ECTS Credits: 6

School of Modern Languages and Applied
Linguistics
Rationale and Purpose of the Module: 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: 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.

JA4213 - JAPANESE LANGUAGE, CULTURE AND
SOCIETY 3
ECTS Credits: 6

School of Modern Languages and Applied
Linguistics
Rationale and Purpose of the Module: 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: 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: JA4246

JA4911 - JAPANESE FOR BUSINESS 1
ECTS Credits: 6

School of Modern Languages and Applied
Linguistics
Rationale and Purpose of the Module: 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: 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: 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.
**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 student's contributions to the final project.

**School of Modern Languages and Applied Linguistics**

**Rationale and Purpose of the Module:** *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 society particularly in the world of work.*

**Syllabus:** 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:** *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 on everyday topics.*

**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 classmates' 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 student's patch, and a timed exam on news writing and editing.

**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 consolidates and extends students' abilities in listening and reading comprehension, spoken and written 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:** 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:** *To consolidate and extend 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:** 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:** JA4912

**JM4008 - INVESTIGATIVE JOURNALISM**

**ECTS Credits:** 6

**School of Modern Languages and Applied Linguistics**

**Rationale and Purpose of the Module:** *This module is being created to introduce radio journalism to the BA Journalism and New Media degree program, following recommendations by the external examiner and feedback from industry.*

**Syllabus:** The module will examine historical perspectives on the medium of radio and the current organisational structures of radio in Ireland and internationally. The impact of broadcast journalism on democracy will be examined. Areas such as podcasting and on-line streaming, and their impact on news media and on democracy will also be explored. Lectures will also examine radio research techniques, interviewing for audio and on scriptwriting for the ear. Practical classes will focus on the development of skills for professional journalism practice for audio-based outputs, and will take place in studio and in a dedicated newsroom. Writing and presentation skills for radio, microphone technique, voice training, audio mixer operation, telephone recording procedures, the operation of portable recording devices and computer-based editing of audio reportage will be examined.
School of Culture and Communication

Rationale and Purpose of the Module: The Team Project aims to polish students’ writing, reporting, and design 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 publication, 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 student’s contributions to the final project.

School of Culture and Communication

Rationale and Purpose of the Module: This module is being created to introduce broadcast journalism - with a focus on radio and television elements - to the BA Journalism and New Media degree programme, following recommendations by the external examiner and feedback from industry. This module will focus on the key skills in broadcast journalism - radio and television - which are crucial for graduates in this area.

Syllabus: The module will examine historical perspectives and current organisational structures of broadcast media in Ireland and internationally. The impact of broadcast journalism on democracy and the impact of various pieces of legislation on its development will be examined. The rise and impact of digital media will also be explored.

School of Culture and Communication

Rationale and Purpose of the Module: This module aims to introduce students to key principles of sub-editing and design for journalism. It will develop students’ theoretical understanding as well as skills and abilities by introducing them to the fundamentals of sub-editing practices including grammar, punctuation and syntax for news and feature journalism, for both print and online. It will also introduce students to the basic principles of news design using text and images for print and online.

Syllabus: Students will use a stylebook to understand basic elements of text editing, proofreading and sub-editing. They 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. They will analyse and compare design in national and local newspapers and websites, and will use these analyses to inform their own work. Assessment will be by sub-editing assignments, the production of a portfolio of work completed during the course, and a news website.

School of Culture and Communication

Rationale and Purpose of the Module: This module 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 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.
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
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.

jm5005 - LEGAL ENVIRONMENT OF BUSINESS
ECTS Credits: 6
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.

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.


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
knowledge of the legal process, including an introduction to court structure and procedure, the doctrine of precedent, statutory interpretation and legal research and writing. The syllabus will focus extensively on self-directed learning and active exercises. In addition, students will be expected to explore the role of law in society, paying particular attention to its jurisprudential underpinnings.

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 them 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.


LA4022 - COMMERCIAL LAW
ECTS Credits: 6

Law
Rationale and Purpose of the Module: To familiarise the student with the legal background of commercial transactions.


ADR process: students will engage in a fact scenario involving either collaborative law or mediation with the aim of resolving a dispute between individuals without recourse to litigation.
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.

LA4034 - JURISPRUDENCE
ECTS Credits: 6

Law

Rationale and Purpose of the Module: To acquire a variety of theoretical perspectives on law through an examination of its nature and operation and an analysis of key concepts and issues.


LA4040 - LAW OF EVIDENCE
ECTS Credits: 6

Law

Rationale and Purpose of the Module: To critically examine the rules and general principles governing the admissibility of evidence in criminal trials.

Syllabus: Principles of criminal evidence; burdens and standards of proof; witness testimony; confession evidence and illegally obtained evidence; expert evidence; corroboration; rule against hearsay; identification evidence; similar fact evidence; privilege.

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 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.

LA4098 - SPORT AND THE LAW
ECTS Credits: 6

Law

Rationale and Purpose of the Module: To examine the law relating to the governance and regulation of sport.

Syllabus: Sport and the Law will examine the interaction between the law and sport. The course will examine a number of topics, including what is sport and the law, violence in sport, drug testing, contract and employment issues, administration and judicial review, commercial and competition law, arbitration and alternative dispute resolution.

LA4111 - CONTRACT LAW 1
ECTS Credits: 6
Law

Rationale and Purpose of the Module: To provide the legal basis for the creation and enforcement of contracts and to examine what restrictions exist regarding freedom to contract.


Rationale and Purpose of the Module: To examine the general principles of criminal law through consideration of their ethical, social and legal dimensions.


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.


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.


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.

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.


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.

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, European Union law, Criminal law and Tort law.

LA5132 - COMPARATIVE LEGAL RESEARCH SKILLS
ECTS Credits: 3

Law

Rationale and Purpose of the Module: To provide students with the ability to conduct high level research in both common and civil law systems.

Syllabus: Primary and secondary source materials in common and civil law jurisdictions; electronic databases; quantitative and qualitative analysis.

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-tariff 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 antidumping issues; Subsidies and countervailing subsidies; state trading entities; the Foreign Corrupt Practices Act and illegal payments abroad, US 3101 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.

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**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 the 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 and the Cross border mergers and acquisitions, including national control over corporate ownership in protected sectors, such as the press, transportation, etc.

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**LA6031 - LAW OF INTERNATIONAL TRADE ORGANIZATIONS**

**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.

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**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 dispositions (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.
**International Business Litigation and Dispute Resolution**, documentary analysis. Overseas investment, including investment in the EU, developing countries and investments in NAFTA members. Expropriation of overseas investments. Ethical investment policy element in the Council of Europe’s 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.

**LA6110 - 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-tariff 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 antidumping issues; Subsidies and countervailing subsidies; state trading entities; the Foreign Corrupt Practices Act and illegal payments abroad. United States, 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.

**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 the 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 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
module aims, therefore, also to address this issue by providing multilingual peer tutoring in a systematic manner, parallel to existing language studies modules. Consequently, the module equally provides additional benefit in supporting all UL language students participating in the discussion groups and/or one-to-one sessions.

**Syllabus:** This module will prepare LOTE students to facilitate peer-led discussion groups and one-to-one sessions in their native language. It will particularly focus on the following aspects:
- The role of a facilitator of a discussion group or one-to-one session
- The difference between teaching a language class and facilitating a discussion group or one-to-one session
- The skills and techniques necessary to break the ice within a group or in a one-to-one session
- The feedback which it is appropriate to give to attendees (grammar, vocabulary, pronunciation, register, etc.)
- The role of attendees' language-learning background
- Relevant topics for the discussion-group sessions and one-to-one sessions
- Communication issues which may arise (e.g. cultural differences)
- Key communication strategies necessary to encourage participation in a discussion group
- The main linguistic pitfalls for language learners
- The nature and role of a reflective portfolio.

**LI4211 - LINGUISTICS 1**
**ECTS Credits:** 6

**School of Modern Languages and Applied Linguistics**

**Rationale and Purpose of the Module:** This module introduces students to the various subfields and branches of linguistics which 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.

**LP4203 - PROJECT 1**
**ECTS Credits:** 6

**Law**

**Rationale and Purpose of the Module:** The purpose of the module is to provide the student with an introduction to research as taught on a one-to-one basis by embarking on an extended research project of 8,500 words.

**Syllabus:** The student will initiate a research project on a topic approved by a supervisor. The student will, by a specific date, submit a 500 word brief which will include a resume of the subject matter, the scope of the project, a review of sources and an outline of the methodology required. The student will start the collection of the necessary data.

**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 historical 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 research-based, 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:** Language teaching and learning in Ireland: historical developments; national and EU language policy; the position of languages in Irish society; engendering openness to other cultures and languages; cross-curricular aspects of teaching languages. 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 (JCSP, LCE, LCA, LCVP, TYP).

The practice of language teaching: teaching vocabulary, pronunciation and grammar; balancing productive and receptive skills; culture and language; literature and film; developing cultural awareness; communicating perspectives on development issues; the multi-cultural classroom; sourcing, selecting, evaluating and managing teaching resources; traditional and new technologies in language teaching/learning; levels and differentiation; standard and alternative assessment models; marking, recording and reporting; task and project work; developing strategies for autonomous and collaborative language learning.

Classroom management: teaching through the target language; interaction patterns; elicitation; error correction, mixed ability classes.

**LS4003 - INTRODUCTORY ANATOMY AND PHYSIOLOGY**
**ECTS Credits:** 6

**Biological Sciences**

**Rationale and Purpose of the Module:** To provide the foundation for understanding the anatomy and physiological functioning of the human system so as to assist in the study of the effects of illness and disease on the individual. To acquaint students without a biological background with the basic concepts of general Anatomy and Physiology while providing a detailed introduction into cellular and tissue biology.

**Syllabus:** Introduction to the body as a whole, tissues, organs, system, and cavities of the body, filtration, and simple diffusion. Cells: Cellular structure, the cell surface, cytoplasm, Eukaryotic cell structure and function: Principal components, organelle structure and function, genome organization, cytoskeleton and membrane systems. Cellular differentiation and development: Cell cycle & cell division, specialised cell types, stem cells, morphogenesis and multicellularity. Tissues: epithelial, connective, muscle and nervous. The Integumentary System: Histological structure and
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

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.


Prerequisites: MA4002

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: 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...
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 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.
Exponentials 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.

MA4125 - AN INTRODUCTION TO COMPUTER AIDED DATA ANALYSIS
ECTS Credits: 6

Mathematics & Statistics

Rationale and Purpose of the Module: To introduce the student to elementary statistical analysis of real data using four basic, commonly occurring, statistical models (the Bernoulli, Binomial, Poisson and Normal) using the Statistical Package, SPSS (Statistical Package for the Social Sciences).

Syllabus: The course introduces the mathematical statistical details of the models considered and presents methods of estimation and inference for these at a level appropriate for numerate business students. Contemporaneously, details of the Statistical Package SPSS are presented and developed in the lab until the students are confident enough to run the package independently. The methods of statistical analyses for the four models are then worked up systematically with different data sets until the students can integrate the process of problem recognition, model identification, statistical analysis (using SPSS) and interpretation.

Prerequisites: MA4104, MA4103, MA4102
Mathematics & Statistics

Rationale and Purpose of the Module: To develop some of the foundations of mathematics. To introduce the students to mathematical ideas of crucial importance in computer science. Symbolic mathematics packages will be used to demonstrate many of these ideas.

Syllabus: Real-valued functions: a geometrical approach to calculus through the graphs of functions of one or two variables (use will be made of symbolic maths packages). Convergence of sequences.

Simple numerical methods. Iteration of functions.

Matrices: addition, multiplication and scalar multiplication. Matrices as linear transformations in computer graphics.

Graph theory: basic concepts of vertices, edges, paths, circuits, connectedness and trees. Computer representation of graphs. Graph algorithms.

MA4413 - STATISTICS FOR COMPUTING
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.

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 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.

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: Pearson’s correlation coefficient; Regression analysis.

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.

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.

Prerequisites: MS4404

MA6001 - DATA ANALYSIS FOR BUSINESS DECISIONS
ECTS Credits: 6

Mathematics & Statistics

Rationale and Purpose of the Module: To give students a conceptual introduction to the field of statistics and its applications. To enable students to apply statistical methodologies in their own organisations. To provide students with a full understanding of how statistical inference provides sound evidence for business decisions.

Syllabus: Data and Statistics - various types of data, qualitative and quantitative data, sources of data. Graphical presentation of data - bar charts, pie charts, histograms, ogive curves, box plots. Measures of location and spread - mean, median, mode, range, standard deviation and variance. Introduction to probability - discrete and continuous distributions e.g. Binomial, Poisson and Normal. Sampling and Sampling Distributions - populations and samples, various sampling methods. Point and Interval estimation for means, variances and proportions in one and two sample applications. Hypothesis testing - One and two tailed tests, type I and type II errors, p-values. Analysis of qualitative data - contingency tables, goodness of fit tests. Correlation and Linear Regression - scatter plots, method of least squares, use of residuals to validate model. Analysis of Variance. Multiple Regression - multicollinearity, dummy variables, model assumptions, variable selection procedures. Applications of statistics - forecasting, quality control, index numbers, decision analysis. Non-parametric Statistics - sign test Wilcoxon signed - rank, Mann - Whitney and Kendal - Wallis tests. Spearman-s test for linear correlation. The course will be underpinned by extensive use of Case studies

Prerequisites: MS4404

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.


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.

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**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 $\mathbb{R}$.  
• 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

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**MD2001 - REFLECTIVE PRACTICE PORTFOLIO**  
ECTS Credits: 6

**Humanities**

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**MD4001 - PRACTICUM 1A**  
ECTS Credits: 6

**Humanities**

**Rationale and Purpose of the Module:** Development of student's primary performance interest, whether instrumental, vocal or dance. Also the development of musicianship and body awareness skills.

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**MD4003 - PRACTICUM 3A - MAIN PERFORMANCE INTEREST**  
ECTS Credits: 6

**Humanities**

**Rationale and Purpose of the Module:** Development of the students' 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 will occur in the stylistic context most common to the performance practice of the student. However, tutors will begin to encourage students to look to other styles and repertoires current within a primarily Irish context. This will take place in the context of one-on-one classes and develops from the progress in Practicum 1a and 2a.

The second part of these modules will be related to performance skills and again this element will be divided into two separate streams for musicians and dancers. Musicians will take Keyboard Skills and Aural Training which will include keyboard harmony (vamping, chordal analysis and application, both aural and written), aural skills (transcribing tunes and songs, awareness of traditional forms and styles, sight reading and sight singing). It is important to emphasise that the orientation of this stream of multi-skill development will be towards the needs and realities of traditional Irish music and musicians but with a wider context in mind. Dancers will take Movement Awareness. This will include practical dance workshops to introduce some of the movement principles that inform other dance practices today. It will also include an introduction to techniques and practices designed to promote the release of tension in the body in order to facilitate greater ease of movement. It will also include an introduction to the use of visual imagery as a way to develop an understanding of the correct alignment in movement. Finally an introduction to supplementary practices used by dancers as part of their training eg. Yoga, Feldenkrais, Alexander technique and Pilates. Improvisation will be undertaken in practical workshops to introduce the concept of improvisation as a means of exploring movement possibilities and also expanding movement vocabulary. Improvisations will include working with movement themes, dramatic themes, props, text and visual stimuli.

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**MD4007 - PRACTICUM 6A - MAIN PERFORMANCE INTEREST**  
ECTS Credits: 6

**Humanities**

**Rationale and Purpose of the Module:** The development of a final extensive performance.
Syllabus: In this module students, with relevant tutors and under the direction of course directors, will design and undertake an extensive, hour long recital which will be representative of both their own stylistic interest but also a range of diverse music and/or dance styles (in the case of dance, two to three smaller performances over a similar number of days will be considered).

MD4011 - PRACTICUM 1B
ECTS Credits: 6

Humanities

Rationale and Purpose of the Module: Development of the students' 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. However, tutors will begin to encourage students to look to other styles and repertoires current within a primarily Irish context. This will take place in the context of one-on-one classes and develops from the progress in Practicum 1a.

The second part of these modules will be related to performance skills and again this element will be divided into two separate streams for musicians and dancers. Musicians will take Keyboard Skills and Aural Training which will include keyboard harmony (vamping, chordal analysis and application, both aural and written), aural skills (transcribing tunes and songs, awareness of traditional forms and styles, sight reading and sight singing). It is important to emphasize that the orientation of this stream of multi-skill development will be towards the needs and realities of traditional Irish music and musicians but with a wider context in mind. Dancers will take Movement Awareness. This will include practical dance workshops to introduce some of the movement principles that inform other dance practices today. It will also include an introduction to techniques and practices designed to promote the release of tension in the body in order to facilitate greater ease of movement. It will also include an introduction to the use of visual imagery as a way to develop an understanding of the correct alignment in movement. Finally an introduction to supplementary practices used by dancers as part of their training e.g., Yoga, Feldenkrais, Alexander technique and Pilates. Improvisation will be undertaken in practical workshops to introduce the concept of improvisation as a means of exploring movement possibilities and also expanding movement vocabulary. Improvisations will include working with movement themes, dramatic themes, props, text and visual stimuli.

MD4013 - PRACTICUM 3B - SECONDARY PERFORMANCE INTEREST
ECTS Credits: 6

Humanities

Rationale and Purpose of the Module: To broaden the base of performance skills of the students to include other instrumental, vocal and dance aspects of the tradition

Syllabus: In this module students will be introduced to the practice of a broad range of instrumental, vocal and dance skills they will otherwise be unfamiliar with. Dancers and singers will not be required to undertake elements of this module that relate to their primary performance interest. Instrumentalists will be required to study an instrument apart from their main performance interest. Outside of these requirements students will pursue one hour of instrumental, dance and song classes per week (3 in all). This will be assessed through performance (50%) and continuous assessment (50%).

Also as part of this module, students will undertake ensemble work assessed continuously. Students will be encouraged to develop a creative approach to groupwork as well as develop the interpersonal and musical skills necessary for the successful function of an ensemble.

This module will be a development of progress made in Practicum 1b and Practicum 2b.

MD4017 - PRACTICUM 6B
ECTS Credits: 6

Humanities

Rationale and Purpose of the Module: The development of final extensive performance representative of performance fields studied but not central to the students performance practice.

Syllabus: In this module students, with relevant tutors and under the direction of course directors, will prepare and undertake a performance representative of the three areas of performance skills represented in the second performance stream & those not central to their performance practice. This performance will be at the end of the linked module in the next semester.

Assessment will be on that final performance and continuous assessment.

MD4021 - INTRO TO IRISH TRAD MUSIC AND DANCE STUDIES 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.

MD4023 - IRISH TRADITIONAL MUSIC AND DANCE STUDIES 1
ECTS Credits: 6

Humanities

Rationale and Purpose of the Module: To provide a deeper understanding of the historical development of these Irish traditions.
**Syllabus:** In this module, as in Traditional Music and Dance Studies 2 and 3, students will follow three streams of study concerning instrumental music, song and dance. This module will deal with music, song and dance up to 1900, approaching the historical development of the tradition in pre-twentieth century Ireland and its various roots and equivalent developments abroad. The areas covered will be Song in Ireland & Texts and Manuscripts; Harp Music & Rise and Fall of an Irish Art Music Tradition; The History of Irish Traditional Dance.

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**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.

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**MD4041 - PERFORMANCE STUDIES 1: AN INTRODUCTION**

**ECTS Credits: 6**

**Humanities**

**Rationale and Purpose of the Module:** To introduce students to the academic discipline of performance studies and its underlying principles, as an scholarly approach to research in the performing arts; to provide students with the theoretical tools to engage in discourse around the performing arts of dance, movement, vocal performance and the exploration of creativity through these media.

**Syllabus:** This module provides an introduction to the principles, practices and discourses of performance studies including its interdisciplinary origins, ethical questions and theoretical paradigms of performance, performativity, ritual, social drama, play, performatives, speech acts, trance, masking, gender, global and intercultural performance.

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**MD4043 - PERFORMANCE STUDIES 3: INTRODUCTION TO RITUAL STUDIES**

**ECTS Credits: 6**

**Humanities**

**Rationale and Purpose of the Module:** To introduce students to the academic discipline of ritual studies and its impact on performance and performance studies: to explore research methods developed in ritual studies which are relevant to the study of performance; to engage with the paradigm of ritual towards a creative and reflexive understanding of performance.

**Syllabus:** An introduction to ritual studies and its relevance to performance studies including ritual paradigms of theatre, musical performance, dance performance, social drama, play, sport, games, trance, shamanism, puppetry, masking, liturgy and rites of passage; the exploration of creative research methods generated from the use of symbolism in ritual and the development of nascent rituals.

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**MD4031 - CONTEXTUALISING AND VOCATIONAL STUDIES 1**

**ECTS Credits: 6**

**Humanities**

**Rationale and Purpose of the Module:** Contextualising and Vocational Studies 1

**Popular Music and Dance Studies / Audio/Visual Technology.**

This module has two strands with particular purposes - to contextualise interdisciplinary academic fields of popular music and dance studies and to introduce students to audio/visual technology theory and practice in order to begin to build upon such technical skills

**Syllabus:** In this module students will be introduced to the academic field of popular music and dance studies, examining popular music and dance movements, particularly those relevant to Irish traditions. They will also begin to consider the role of traditional artists as business people, competing in an international market.

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**MD4051 - SOMATICS AND RITUAL PERFORMANCE 1**

**ECTS Credits: 6**

**Humanities**

**Rationale and Purpose of the Module:** This module will provide each student with the opportunity 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 encourage them to develop skills to explore new models for ritualising performance, which will increase their options for engagement in a range of professional practices.

**Syllabus:** An introduction to the history of contemporary somatic practices and their various application in arts practice with particular reference to performance, educational, and therapeutic contexts, with particular reference to the somatic practice of Body Mind Centering, in addition students will study historical, cultural and social aspects of ritual practice with specific reference to performance rituals.

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**MD4053 - SOMATICS AND RITUAL PERFORMANCE 3**

**ECTS Credits: 6**
**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 and to develop healthy and sustainable practices in preparation for performance; it will also provide the opportunity to develop skills to create innovative new models for ritualising performance and increase their options for professional practice.

**Syllabus:** This module will provide each student with the opportunity through 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 so they can develop healthy and sustainable practices in preparation for performance; it will also provide the opportunity for students to develop skills necessary to explore and develop innovative models for ritualising performance and increase their options for engagement in a range of professional contexts.

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**MD4061 - VOICE AND DANCE SKILLS FOR PERFORMANCE 1**

**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 necessary to prepare to perform these dances and songs in range of performance contexts.

**Syllabus:** Students will be required to specialise in voice or dance, and will study and practice a range of different techniques and methods designed to provide them with a strong foundation on which to develop their technical ability in both dance and voice focussing on contemporary dance and voice technique training and including dance techniques and practices from Irish, Asian and African traditions, as well as ear training, sight reading/singing and oral transmission learning to complement the technique of voice production.

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**MD4063 - VOICE AND DANCE SKILLS FOR PERFORMANCE 3**

**ECTS Credits: 6**

**Humanities**

**Rationale and Purpose of the Module:** To provide the opportunity for students to study a broad range of movement and voice techniques in order to develop good understanding and foundation for their practice. The development of a broad base of performance skills will empower the students in professional performance based contexts.

**Syllabus:** Students will be required to specialise in voice or dance, and will study and practice a range of different techniques and methods designed to provide them with a strong foundation on which to develop their technical ability in both dance and voice focussing on contemporary dance and voice technique training and including dance techniques and practices from Irish, Asian and African traditions, as well as ear training, sight reading/singing and oral transmission learning to complement the technique of voice production.

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**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.

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**MD4071 - REPERTOIRE, IMPROVISATION AND COMPOSITION 1**

**ECTS Credits: 6**

**Humanities**

**Rationale and Purpose of the Module:** To develop the understanding in both practice and theory of the works from the canon of western contemporary and world dance and song traditions in order to fully understand their relevance in current performance contexts. To develop skills necessary to prepare to perform these dances and songs in range of performance contexts.

**Syllabus:** Students will be required to specialise in voice or dance, and will study and practice dances and songs from the repertoire of western contemporary and Asian, African and Irish dance; and Gregorian chant, Irish traditional song, western solo and choral, and jazz and pop music traditions; in addition they will study the historical and cultural contexts within which these repertoires developed, and study and practice skills necessary to develop in both solo work and as a member of an ensemble.
MD4073 - REPERTOIRE, IMPROVISATION AND COMPOSITION 3
ECTS Credits: 6

Humanities

Rationale and Purpose of the Module: To provide students with the opportunity to study and practice voice and dance composition so that they can develop the skills and confidence to work towards the creation of voice and dance compositions in a range of contexts, which will broaden their career options in performance.

Syllabus: Students will be required to specialise in voice or dance, and study and practice a range of approaches to composition drawn from the repertoire of western, Asian, African and Irish dance traditions; and Gregorian chant, Irish traditional song, western solo and choral, and jazz and pop music traditions; study the historical and cultural contexts within which these compositional methods and techniques developed; and study and practice skills to create short solo and ensemble compositions.

MD4077 - REPERTOIRE, IMPROVISATION AND COMPOSITION 5
ECTS Credits: 6

Humanities

Rationale and Purpose of the Module: To support students to develop the understanding of the artistic and technical requirements necessary to develop and produce performances in a range of contexts and broaden their understanding of how to produce work as creative artists and performers in professional performances projects.

Syllabus: Students will be required to specialise in voice or dance, and will work under the direction of guest tutors and the course directors to design and produce a number of performance projects to be presented in a range of performance contexts, featuring the student/EEs own work in addition to the works from the repertoires they have studied; the performances will include solo and ensemble works.

MD4083 - ETHNOMUSICOLOGY AND ETHNOCHOREOLOGY THEORY AND PRACTICE

ECTS Credits: 6

Humanities

Rationale and Purpose of the Module: To develop the students skills and knowledge of composition and arrangement in the idioms 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 synthesise their own arrangement and composition practices from those studied.

Students will be provided with written feedback according to BA Irish Music and Dance policy.

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.

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 synthesise their own arrangement and composition practices from those studied.

Students will be provided with written feedback according to BA Irish Music and Dance policy.

MD4117 - PROFESSIONAL SKILLS / FINAL YEAR VOCATIONAL PROJECT
ECTS Credits: 6

Humanities

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.

MD5501 - IRISH WORLD ACADEMY OF MUSIC AND DANCE AUTUMN ELECTIVE
ECTS Credits: 6
Humanities

Rationale and Purpose of the Module: To initiate self-directed study as a means of
(1) deepening one’s knowledge / expertise within a primary specialisation
(2) developing skills and knowledge in a secondary area of specialisation
(3) engaging in creative, cross-platform study / performance through a combination of a variety of areas.

- To allow a variety of project presentation and negotiable assessment weighting, encouraging the student to propose a form of presentation most suitable to the project and the educational journey, as well as a form of assessment capable of accurately evaluating the outcomes.

Syllabus: This module offers students the opportunity to pursue self-directed learning of an academic or performance-based project, under the guidance of the course director and an elective supervisor. The student may wish to use the elective to pursue more specialised study in his / her area of study, or to access the other areas of expertise available at the centre. These currently include Ethnomusicology, Ethnochoreology, Music Education, Community Music, Music Therapy, Irish Traditional Music and Dance Performance, Contemporary Dance Performance and other specialist research interests of faculty and doctoral researchers at the Irish World Academy.

MD6041 - INTRODUCTION TO RITUAL STUDIES
ECTS Credits: 3

Humanities

Rationale and Purpose of the Module: The purpose of this module is to equip students with a knowledge of the emergence and development of ritual studies as an interdisciplinary discourse drawing on anthropology, sociology, religious studies, ethnomusicology /ethnochoreology and performance studies. It also familiarises students with a variety of theoretical approaches to ritual including evolutionary, structural-functionalist, cultural-symbolist and performative understandings. This is grounded with reference to several case studies of ritual practice drawn from historical and cross-cultural practices.

Syllabus: This module provides an introduction to the emergence and development of ritual studies as an interdisciplinary discourse drawing on anthropology, sociology, religious studies, ethnomusicology /ethnochoreology and performance studies. It introduces studies to evolutionary, structural-functionalist, cultural-symbolist and performative theories of ritual. It also discusses a number of ritual case studies including historical and cross-cultural examples of ritual practice. The documentation of live rituals through ethnographic approaches including participant-observation will also be introduced.

MD6061 - INTRODUCTION TO SOMATICS
ECTS Credits: 3

Humanities

Rationale and Purpose of the Module: This module will ensure that students are educated in somatics practices that promote a healthy and mindful approach to movement. The continued development of an integrated mind/body approach will enable students to perform with greater efficiency and will minimize their risk of injury.

Syllabus: Students will attend workshops during which they will study how somatic practices can support them in developing an enhanced awareness of embodied movement. These workshops will be based on principles drawn from: Pilates, Yoga, Feldenkrais, Body-Mind Centering and T’ai Chi

MD6031 - MEDIA TECHNOLOGIES FOR PERFORMING ARTS & ARTS RESEARCH
ECTS Credits: 3

Humanities

Rationale and Purpose of the Module: To provide an introduction into current media technologies as they are used in the fields of performing arts, creative arts therapies, and arts research; to develop essential skills and fluency in these technologies in order to use them competently, creatively, and effectively in one’s own specific discipline.

Syllabus: Students will be introduced to the current media technologies in audio, video and stagecraft/soundcraft/lightcraft as pertinent to the programmes offering the course. Students will study and practise essential skills required to employ technology to create an audio/video project related to their field of study, using stagecraft/soundcraft/lightcraft where applicable.

MD6051 - INDEPENDENT STUDY 1
ECTS Credits: 3

Humanities

Rationale and Purpose of the Module: - To initiate self-directed study as a means of
(1) deepening knowledge / expertise within a primary specialisation
(2) developing skills and knowledge in a secondary area of specialisation
(3) engaging in creative, cross-platform study / performance through a combination of a variety of areas.

- To allow a variety of project presentation and negotiable assessment weighting, encouraging the student to propose a form of presentation most suitable to the project and the educational journey, as well as a form of assessment capable of accurately evaluating the outcomes.

Syllabus: This module offers students the opportunity to pursue self-directed learning of an academic or performance-based project, under the guidance of the course director and supervisor. The student may wish to use the module to pursue more specialised study in his / her area of study, or to access the other areas of expertise available at the centre. These currently include Ethnomusicology, Ethnochoreology, Music Education, Community Music, Music Therapy, Irish Traditional Music and Dance Performance, Classical String Performance, Contemporary Dance Performance, Ritual Chant and Song, Festive Arts, and other specialist research interests of faculty and doctoral researchers at the Irish World Academy.

MD6071 - WRITING AND THE DOCUMENTATION OF ARTS PRACTICE 1
ECTS Credits: 3

Humanities

Rationale and Purpose of the Module: The purpose of this module is to explore a variety of approaches to the documentation of artistic practices, with a focus on documentation through writing.

Syllabus: Students will explore a variety of approaches to the documentation of artistic practices, with a focus on...
documentation through writing. These include forms of documentation emerging from personal memory data, self observation and reflection, as well as the collection of data from external sources including mentors and artistic colleagues. Registers of writing including the poetic, narrative, chronological and critical will be investigated. The role and function of writing in the creative process will be interrogated through creative and critical engagement. Methodological frameworks for the documentation of practice including autoethnography and narrative inquiry will be introduced.

**MD6081 - CRITICAL ENGAGEMENTS WITH IRISH TRADITIONAL MUSIC**

**ECTS Credits: 3**

**Humanities**

**Rationale and Purpose of the Module:** To examine manuscript, printed, audio and visual sources of Irish traditional music. Students will engage trends in current research in the field of traditional music studies.

**Syllabus:** In this module students will examine writings on and sources of Irish traditional music to enhance their understanding of this tradition. They will critically engage with texts relevant to Irish traditional music studies and related fields.

**MD6091 - PROFESSIONAL DEVELOPMENT FOR THE PERFORMING ARTS**

**ECTS Credits: 3**

**Humanities**

**Rationale and Purpose of the Module:** This module is designed to provide an awareness of professional development skills and contexts central to developing a career in the arts. It introduces students to several key facets of planning, arts project management, and career development as part of their professional development.

**Syllabus:** This module provides students with an introduction to core skills and concepts relevant to the development of performing arts careers in the contemporary world. Key issues covered include project development, planning, communications and pitching, as well as collaborative work, legal structures for working individually or in groups, and fundraising.

**MD6101 - INTERDISCIPLINARY IMPROVISATION**

**ECTS Credits: 3**

**Humanities**

**Rationale and Purpose of the Module:** To provide an overview of improvisational processes within the context of current dance and music practices. To introduce the students to a range of aesthetic and technical approaches to improvisation. To provide for students to research improvisational processes and to integrate and apply this knowledge in their own practice.

**Syllabus:** Students will attend a number of workshops in which music and dance faculty will demonstrate and explore improvisational processes and practices. Students will develop improvisational scores based on the materials presented.

**MD6111 - COLLOQUIUM 1**

**ECTS Credits: 3**

**Humanities**

**Rationale and Purpose of the Module:** The purpose of this module is to encourage and facilitate postgraduate students to engage with a community of scholars and practitioners presenting their respective work, from a variety of disciplinary and performance practice perspectives, in a formal, large-scale and medium-scale colloquium/seminar context, drawing from in-house seminars including the Tower Seminar Series, Logos, and other seminars. Students will expand their knowledge from within and outside of their own specialisations, and will tacitly learn about presenting their own work in such a format.

**Syllabus:** This module will expose students to scholarship and performance practices from a wide variety of music and dance and related disciplines, enabling students to broaden their perspectives on their own specialisation as well as experience presentations from scholars and performers in cognate disciplines. Students will be expected to attend five seminars from the various series offered in the Academy (Tower Seminar series and/or comparable events, as approved by participating programme coordinators). As a consequence, engage in self directed inquiry and independent study where they have come across a topic or research/performance approach that stimulates their own research practice.

**MD6121 - FESTIVAL DEVELOPMENT AND PRODUCTION**

**ECTS Credits: 3**

**Humanities**

**Rationale and Purpose of the Module:** To provide students with a foundation in the issues surrounding festival production and sustainable development.

**Syllabus:** This module provides students with a foundation in the issues surrounding festival development and sustainability, covering a range of topics including events production, audience development, feasibility, public relations, media relations, fundraising, stakeholder and partnership development, security, local authorities, and health and safety.

**Prerequisites:** MUS081

**MD6131 - INTRODUCTION TO LOCAL AND GLOBAL FESTIVITY**

**ECTS Credits: 6**

**Humanities**

**Rationale and Purpose of the Module:** To provide students with a contextual, cross-cultural understanding of festival, based on case studies of specific local, national and international festivals.

**Syllabus:** The aim of this module is to introduce students to key perspectives in the study of festivity and its dynamics in society, through an exploration of festival and festivity in different historical and geographical contexts. Through the exploration of case studies and key contextual readings, students develop conceptual, theoretical and methodological frameworks for the study and understanding of festivity in society.

**Prerequisites:** MUS091

**MD6141 - RESEARCH AND DISCOVERY FOR FESTIVAL STUDIES**

**ECTS Credits: 6**

**Humanities**

**Rationale and Purpose of the Module:** To provide students with a contextual, cross-cultural understanding of festival, based on case studies of specific local, national and international festivals.
Rationale and Purpose of the Module: To introduce students to methods for studying public, religious, domestic and civic festivitites, with a particular emphasis on the social roles of festival and the performative dimension of festivity.

Syllabus: This module introduces students to appropriate methods for studying public, religious, domestic and civic festivity with a particular emphasis on the social role of festival and on performative aspects of festive activities. It critically engages with different methods of gathering data and narratives on festival, as well as with core ideas such as the definition of value, of identity and of public space.

Prerequisites: MUS081

MD6151 - MATERIALS, METHODS & CONTEXT FOR WESTERN CHANT 1
ECTS Credits: 6

Humanities

Rationale and Purpose of the Module: To facilitate an understanding of methodologies and theoretical paradigms relevant to the study and performance of Western plainchant, drawing on both historical musicological and ethnomusicological approaches. To introduce Western plainchant from its beginnings until the later Middle Ages, exploring it in its historical, social, religious, liturgical, intellectual and aesthetic contexts. This will include an investigation of its origins and evolution; nature, materials, forms and styles in relation to function, date and place; written sources and their palaeography; notation (general concepts and features; notations of particular regions and periods; principles and techniques of transcription and editing).

Syllabus: This module lays the basis for important research and methodologies that relate to the performance practice of Western plainchant. It will introduce students to fundamental research tools in primary and secondary sources, bibliographic and referencing techniques, historical contextual knowledge, musical palaeography and semiotics. The methodological approach is presented as an interdisciplinary pursuit combining historical musicology, ethnomusicology, semiotics and relevant critical theory.

MD6161 - IRISH TRADITIONAL MUSIC

PERFORMANCE RESEARCH SEMINAR
ECTS Credits: 3

Humanities

Rationale and Purpose of the Module: This module will introduce students to current research in the area of traditional music studies. This research will be engaged through the critical assessment of current publications in the field, examining developments in the epistemology and phenomenology of current critical academic engagement with this historical artistic practice. The module will particularly examine the impact, real and potential, of these developments on the performance practice.

Syllabus: In this module students will study the history, theory and practice of Irish traditional music. They will be encouraged to use theoretical tools from a number of disciplines to enhance their understanding of this practice. They will examine publications and resources that examine Irish traditional music in an exemplary and innovative fashion.

MD8001 - ARTS PRACTICE RESEARCH 1
ECTS Credits: 6

Humanities

Rationale and Purpose of the Module: The aim of this module is to introduce students to a variety of theoretical perspectives on arts practice research, towards the development of a framework suited to the specialist needs of individual research questions.

Syllabus: This module is geared primarily towards the theorising of research problems in an area of study in which practice cannot be easily distinguished from theory. The course is designed as an active meditation of the paradoxes inherent in theorising performance in which students draw on their lived-experience as artists to make the texts meaningful. Through historical readings students will become familiar with the traces left by scholar-performers in the past who have written on this relation. Keywords and concepts will be addressed such as aesthetics, agency, embodiment, everyday life, festival, gender, heritage, identity, liveness, narrative, performance art, performativity, play, poetics, race, representation/mimesis, ritual, spectatorship. Topics proposed for this seminar by current faculty include: the broad spectrum approach to performance, music and dance as social life, the intersection between performance and ritual, concepts and issues in music/dance practice from ethnochoreological and ethnomusicological perspectives, the artist in a globalised world i.e. the relationships among local arts/global lives and global arts/local lives, what are the implications, for arts practice research, of the privileged status of writing in theory production in the academy, examining the concept of disciplinary-mastery in arts practice.

MD8011 - CREATIVE PROCESS 1
ECTS Credits: 6

Humanities

Rationale and Purpose of the Module: The aim of this module is to explore the creative process in artistic and academic work with a view towards investigating resonance, dissonance and synchronicity between method in ones performance practice and in the investigation ones specialist research project.

Syllabus: This module addresses basic questions concerning the design and framing of a research project, including ways of framing research questions, the relationships among theory and practice in research, research ethics and issues of representation in ethno-graphic writing. It also addresses hands on questions concerning the practice of qualitative research, ethnographic fieldwork and field based research methods, the interview process, bibliographical and other resources, documentation and writing strategies. It purposely crosses boundaries between creative process in the arts and sciences in ways appropriate to our population of scholar/artists and research/practitioners. Its subject, then, is research methodology as reconceived for this practice-research programme. Work in this module is explicitly multi-modal in character, Teaching faculty will address, among other topics, challenges facing students doing arts practice research, ethnographic methods in dance, music and performance research, analytical tools for dance, music and performance artists; examination of the role and function of writing and its further integration as a generative strand of the process of invention; what research structure (apparatus) can provide for the crossing of thresholds between the studio-based and text-based strands of arts-practice research.

MD8013 - IWA SPECIALIST ELECTIVE 3
ECTS Credits: 12
International arts festivals; opportunities to share work in the students' own creative media; scholarly engagement with theories of creativity; critical reflexive writing and documentation of one's own artistic practice and experiences on the module.

**Syllabus:**
This module is constructed, delivered and assessed to encourage students to explore their creative process in artistic practice. Through a combination of artistic and scholarly activities, it aims to provide multiple opportunities and approaches towards a reflexive engagement with the students' own creative practice. The work of the module is multi-modal in character and includes postgraduate seminars on creativity and practice methodologies including arts practice research, ethnography, autoethnography and narrative inquiry; personal reflections on creative process from internationally recognized artists and creative practitioners and artistic immersions in a number of identified arts events / venues including international arts festivals and performances. The module will combine discussion-based seminars, site specific artistic experiences / venue visits / conversations / participation, peer learning and mentoring. The module intends to support students in the development and realization of a portfolio of reflexive work documenting their creative process and reflections on their artistic practice.

**Rationale and Purpose of the Module:**
The aim of this module is to facilitate the development of specialist skills, relevant to the research project, through the design of a self-direction programme of study which may integrate performance, composition, choreography, academic writing and collaborative work.

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**ME8021 - IWA SPECIALIST ELECTIVE 1**
ECTS Credits: 12

**School of Engineering**

**Rationale and Purpose of the Module:**
To provide a fundamental understanding of:-

- Principles and techniques of measurement
- Characteristics of instruments and instrumentation systems
- Principles and elements of feedback control systems
- Block diagram analysis and dynamic behaviour of 1st order systems
- Automatic control engineering

**Syllabus:**
1. Sensors, transducers and transmitters
2. Instrument specification
3. Standard instrumentation signal levels
4. Signal transmission
5. Dynamic errors
6. Open and closed loop control systems
7. Control systems components - error detectors, controllers, final control elements
8. Block diagrams and transfer functions
9. Standard process inputs
10. Dynamic response of first order systems
11. Laplace Transforms
12. Dynamic behaviour closed loop control systems
13. Controller design using frequency response criteria
14. Stability of closed loop control systems

**Prerequisites:** ME4714

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**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.

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**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.

ME4047 - FUELS AND ENERGY CONVERSION  
ECTS Credits: 6

School of Engineering


ME4111 - ENGINEERING MECHANICS 1  
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: To enable students to achieve fluency and confidence in the application of Newton’s Laws of Motion to particle and rigid body mechanics problems in which the bodies are in static equilibrium. In particular to become proficient in the use of Free Body Diagrams.

Syllabus: Application of Newton’s Laws to particles and rigid bodies in equilibrium (Statics); equivalent force systems; two-and-three-dimensional force systems in equilibrium; analysis of rigid trusses and frames; centroids, centres of gravity, distributed forces, area and mass moments of inertia; friction.

ME4113 - APPLIED MECHANICS  
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: The objective of this module is to develop an ability to apply the principles of engineering mechanics in solving common problem involving mechanisms such as linkages, cam/followers and gear trains.

Syllabus: 1. Kinematics of Simple Mechanisms and Linkages  
- Four-bar linkages and straight line mechanisms.  
- Position, velocity and acceleration analysis of linkages.  
- Problem solving using velocity and acceleration vector diagrams.  
- Analysis of linkages influenced by Coriolis effects.

2. Cam/Follower Systems:  
- Kinematic analysis of follower motion; velocity and acceleration.  
- Graphical cam design.

3. Gear Trains:  
- Gear kinematics and dynamics  
- Simple and compound trains.  
- Epicyclic gear trains  
- Torque and power transmission.

4. Balancing:  
- Balancing of rotors; static and dynamic balancing.  
- Balancing of reciprocating masses.

5. Oscillatory Motion:  
- Free and forced vibration of particles.  
- Rigid body vibration.  
- Vibration analysis of mechanisms.

6. Gyroscopic Motion:  
- Steady-state gyroscopic precession.  
- Applications of the gyroscopic principle.

Prerequisites: ME4112, ME4111

ME4117 - VIBRATION ANALYSIS  
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: To develop an understanding of the role of vibration analysis in structural design. To apply the techniques of modal analysis and the finite element method to solve structural vibration problems.


Prerequisites: ME4112

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.


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.

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**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

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**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.
Ophthalmic materials. Active implantable devices,
extracorporeal artificial organs. Dressings, sutures, drug
delivery materials/systems.

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**ME4424 - AERODYNAMICS 1**
ECTS Credits: 6

**School of Engineering**

**Rationale and Purpose of the Module:** To provide 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,
aerfoils in compressible flow
Introduction to experimental techniques

Prerequisites: ME4412

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**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.

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**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
Modelling thermal equipment. Heat exchanger
effectiveness and number of transfer units. Advanced
steam and gas turbine cycles

Prerequisites: ME4526, ME4516

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**ME4523 - THERMODYNAMICS 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.

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**ME4611 - COMPUTING**
ECTS Credits: 6

**School of Engineering**

**Rationale and Purpose of the Module:** To provide the
student with a good knowledge of structured program
design for engineering applications
Module through use of freehand orthographic drawing, isometric and realistic sketching, rendering and structured manual drawing techniques.

**Syllabus:** [Responsibilities of the Designer. (Social, Legal, Environmental and Technical)] [Structured Design Methodology.] Problem / Market Research and Problem Definition; Specification Development; Concept Origination / Development; Concept Evaluation and Rationalisation; Decision Making Techniques; Design Tightening; Detail Design Considerations and Practice. [Design Recording and Presentation Techniques.] Data Recording using Freehand and Orthographic Sketching; Concept Development and Presentation; Rendering Techniques; Modelling Technology and Practice. Design Layout / Workout Drawings. ; [Engineering Communications] Assembly Drawings and Structured Parts Lists / Materials Schedules; Manufacturing Considerations and Production Planning Constraints

**Prerequisites:** ME4611, PE4112

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**ME6001 - FUNDAMENTALS OF CONTINUUM MECHANICS**

**ECTS Credits:** 6

**School of Engineering**

**Rationale and Purpose of the Module:** To provide an introduction to the student to the concept and practice of a structured approach to engineering design. The student will be exposed to design philosophy, methodology and management introducing him through from problem definition and specification to finished engineering drawings. Engineering drawing forms a backbone to the

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**ME6031 - ADVANCED STABILITY AND CONTROL OF AIRCRAFT**

**ECTS Credits:** 6

**School of Engineering**

**Rationale and Purpose of the Module:** To provide an appreciation of the critical design issues associated with stability and control of aircraft. To enable students to analyse stability and control or aircraft problems with standard mathematical tools for linear systems, and design simple autopilot and stability augmentation systems.

**Syllabus:** Equations of motion for a rigid body aircraft; physical basis for longitudinal and lateral stability derivatives; solution of the equations for free longitudinal motions, phugoid and short period modes, flight paths, variation of roots with C.O.G. position, flying qualities; free lateral motion; basic control theory, transfer functions, block diagrams, state space to transfer function representations for MIMO systems, the root locus technique; open loop control - response to controls; closed loop control, autopilots with displacement and velocity feedback, stability augmentation systems with velocity feedback and full state feedback.

**Prerequisites:** ME4111, ME4112, ME4116, ME4726

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**ME5031 - DESIGN METHODOLOGY**

**ECTS Credits:** 6

**School of Engineering**

**Rationale and Purpose of the Module:** To introduce the student to the concept and practice of a structured approach to engineering design. The student will be exposed to design philosophy, methodology and management bringing him through from problem definition and specification to finished engineering drawings. Engineering drawing forms a backbone to the
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.

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**ME6071 - NON-LINEAR FINITE ELEMENT ANALYSIS**  
ECTS Credits: 6  
**School of Engineering**

Nonlinear behaviour of solids and structures: geometric and material nonlinearities; problems involving contact; nonlinear dynamics; mathematical idealisation of nonlinear problems; nonlinear continuum mechanics; solution strategies for nonlinear problems, finite element software, experimental verification.  
Finite element (FE) equations in nonlinear analysis: weak and strong forms; general FE equations; incremental form of FE equations; total and updated Lagrange framework. FE solution strategies: linearization of FE equations, incremental-iterative methods; convergence criteria; tangent stiffness matrices.  
FE solution of geometrically nonlinear problems: stability problems, Riks algorithm, FE solution of problems involving material nonlinearities: continuum quantities and approaches; principle of objectivity; displacement-pressure formulations; implicit and explicit integration; consistent tangent stiffness matrices; radial return algorithm.  
FE solution of contact problems: frictionless problems; finite element equations; penalty and Lagrange multipliers approaches; frictional problems.  
Computer implementation of nonlinear FE algorithms: commercial packages; user-subroutines.

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**MF5051 - 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.  
Concept Evaluation - Ranking Methods, Concept Assessment Techniques, AHP. - Pugh's Concept Selector, Convergence and Divergence.  
Design for Assembly (DFA).  
Intellectual Property - Patents, Application Process and requirements. -Copyright, trademarks and design registration.

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**MG4045 - CHANGE MANAGEMENT**  
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.

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**MG4035 - INTERNATIONAL 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.

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**MK4007 - 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.

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**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.

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**MK4007 - APPLIED MARKETING 1**
**ECTS Credits:** 6

**Management and Marketing**

**Rationale and Purpose of the Module:** It specifically focuses upon the development of research skills which are fundamental to understanding and undertaking marketing activities

1. To build upon theoretical frameworks introduced in marketing intelligence
2. To develop marketing research skills that can be applied to range of marketing contexts (e.g. sales, advertising, NPD, customer satisfaction)

3. To equip students with the skills necessary to; develop research instruments, conduct fieldwork and data analysis/ interpretation and present research findings.
4. To encourage and support effective team work and project management

**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 research proposal; Collection, interpretation and analysis of secondary research; Collection, interpretation and analysis of primary research; Research presentation.

**Prerequisites:** MK4002

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**MK4017 - MARKETING LEADERSHIP**
**ECTS Credits:** 6

**Management and Marketing**

**Rationale and Purpose of the Module:** This module aims to underline the strategic importance of marketing. To this end, it aims to investigate the relationship between marketing and the other functional areas within the business. Further, it seeks to delineate the nature of the marketing management process and to explore the role of marketing planning. Finally, the module attempts to critically evaluate the marketing vision.

**Syllabus:** The module addresses the marketing vision and suggests how the marketing planning and management process contribute to and deliver upon such a vision. Next the module addresses the relationship between marketing and the other functional areas, and assesses the role of marketing in the boardroom. The module also considers value-based marketing and the application of marketing techniques internally within the organisation’s marketing. As such the module will critically consider the potential for organisational renewal through marketing.

**Prerequisites:** MK4002

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**MK4025 - MARKETING COMMUNICATIONS**
**ECTS Credits:** 6

**Management and Marketing**

**Rationale and Purpose of the Module:** To introduce
students to communications theory. To establish the fundamentals of marketing communications. To explore the nature and influence of the institutions of consumer culture. To consider different marketing communications techniques and be cognisant of contemporary trends in the field. To investigate alternative understandings of advertising. To demonstrate how different communications techniques can be combined and interrelated to form the basis of positive international marketing communication strategies. To appreciate the impact which marketing communications have on our lives. 

**Syllabus:** Role of communications, communications theory, audiences, how advertising works, the management of marketing communications, the advertising industry, creative aspects of advertising, media aspects of advertising, ethics and advertising standards, communication vehicles—sponsorship, public relations, direct marketing, consumer sales promotions, trade shows and exhibitions, internet marketing communications tool, internal marketing communications, integrated marketing communications, the planning and management of an integrated marketing communications plan, the effects and effectiveness of marketing communications, future developments in marketing communication.

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**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 through 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.

**Prerequisites:** MS4404

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**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.

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: MS4022, MS4122

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: MS4022

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MS4025 - APPLIED ANALYSIS
ECTS Credits: 6

Mathematics & Statistics

Rationale and Purpose of the Module: To introduce the student to standard techniques of complex analysis, integral equations and Green's functions - and to demonstrate applications of these techniques.

Syllabus: [Functions of a complex variable] including the Cauchy-Riemann equations, Cauchy's theorem, singular points, complex integration, residue theorem.

Application of residue theorem to the inversion of Laplace transforms. [Conformal mapping] and its application to solving Laplace's equation in two dimensions.

[Integral equations] including Volterra equations, Fredholm alternative, Fredholm equations with separable kernels, symmetric kernels, numerical solutions.


Prerequisites: MS4013

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MS4033 - METHODS OF LINEAR ANALYSIS
ECTS Credits: 6

Mathematics & Statistics

Rationale and Purpose of the Module: This is a new module that replaces Linear Analysis MS4013. It includes the previous material on Fourier Series and Laplace Transforms as well as new material on orthogonal functions and Green's functions for ODEs.

Syllabus: Introduction to Hilbert spaces, orthogonal sets of functions in Hilbert spaces; Fourier series, Fourier and Laplace transformations; linear operators (adjoint operators and dual spaces, self-adjoint and unitary operators); linear integral equations.

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
Prerequisites: MS4102

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 applications 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 colouring with applications to scheduling. Network flows and matchings. Applications, 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.
Prerequisites: MS4111

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 testing. 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.
**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

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**MS4217 - STOCHASTIC PROCESSES**

**ECTS Credits:** 6

**Mathematics & Statistics**

**Rationale and Purpose of the Module:** The purpose of this module is to 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

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**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. Probabilistic 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 (Cournot, Bertrand), evolutionary game theory.

**Prerequisites:** MS4022

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**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.

**Prerequisites:** MS4404, MS4403

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**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, Bessel's equation.

Sturm-Liouville theory

Nonlinear ODEs: ad-hoc solution techniques, introduction to the concepts of stability and phase plane techniques.

**Prerequisites:** MS4403

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**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, Laplace's method, method of steepest descent, regular and singular perturbations, multiple scales, strained coordinates, boundary layer techniques.

**Prerequisites:** MS4403, MS4404

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**MS4417 - PROJECT 1**

**ECTS Credits:** 6

**Mathematics & Statistics**

**Rationale and Purpose of the Module:** This is the first semester of the fourth year project. The project should synthesise many of the major concepts and ideas encountered in earlier taught modules. It should also bring the student beyond the experience of learning by course-work to the brink of learning by research. While original work is not a sine qua non, it should be encouraged to every possible extent.

**Syllabus:** The student in the first semester will undertake
a programme of reading and research into the project, which will consist of a substantial problem or review in mathematics, computing, statistics, finance or cognate areas. The project will normally commence with a literature review. The main part of the project may require the use of computers or some calculations by hand.

**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

**MS6011 - ADVANCED METHODS 1**
ECTS Credits: 6

**Mathematics & Statistics**

**Rationale and Purpose of the Module:** To review the basic tools of linear algebra.

**Syllabus:**
- Matrix algebra: 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 Green's and Stokes theorems. Multiple integrals in radial, cylindrical and spherical coordinates, scalar and vector potentials, Helmholtz's 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

**MS6021 - SCIENTIFIC COMPUTATION**
ECTS Credits: 6

**Mathematics & Statistics**

**Rationale and Purpose of the Module:** Review of MATLAB, storage allocation, functions and arrays, matrices, operators and flow control, m-files, graphics, input and output. Review of Fortran 90/95, structure, variables, functions, control structures, basic I/O, arrays, procedures.

**Syllabus:**
- Linear algebra: Norms and conditions numbers, linear equations, over and under-determined systems, inverse and pseudo-inverse, factorisations, singular value decomposition, eigenvalue problems, practical case studies.
- Non-linear equations: Root finding, optimisation, practical case studies.
- Mathematical modelling: Non-dimensionalisation, scaling, asymptotic simplification, practical case studies.
- Toolboxes: E.g. Matlab PDE toolbox, NAG toolbox.

**MT4023 - MATERIALS 2**
ECTS Credits: 6

**School of Engineering**

**Rationale and Purpose of the Module:** This course provides a concise introduction to the microstructures and processing of materials (metals, ceramics, polymers and composites) and shows how these are related to the properties required in engineering design.

**Syllabus:** Metals (metal structures, equilibrium
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 systems 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

MT4207 - FAILURE AND DAMAGE ANALYSIS
ECTS Credits: 6
School of Engineering
Rationale and Purpose of the Module: This course provides a comprehensive overview of failure analysis. It allows students to apply their materials knowledge to analyse component failures.

Syllabus: Introduction to failure and damage.
- Gathering information on materials failures
- Features which identify different types of failures
- Types of failures which occur and how: ductile/brittle, fatigue, elevated temperature, wear, different forms of corrosion
- Case studies

MT4943 - MATERIALS PROCESSING
ECTS Credits: 6
School of Engineering
Rationale and Purpose of the Module: To explain how metals and polymers are converted into products and to identify the key features of the processes involved.

Syllabus: The response of polymers to heat, melt processing, material properties affecting melt processing.
Extrusion of plastics, injection moulding and other plastics processing methods. Analysis of process operations.

Metals processing, solidification and nucleation processes. Casting and forging methods, post production treatment, prevention of residual stress, process design and optimisation.

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, ceilidh dancing.

MU5023 - MUSIC THERAPY FIELDWORK PRACTICE 2
ECTS Credits: 12

Humanities

Rationale and Purpose of the Module: To provide students with the opportunity to develop skills in 1. Providing weekly regular clinical work to clients in a health, welfare, community or education setting 2. Learning in context to apply the framework of assessment, programme planning, implementation, evaluation and reporting

Syllabus: Students will continue a fieldwork placement alongside a qualified music therapist in a health, welfare, community or educational setting in Ireland up to two days per week. In this supervised fieldwork placement students will develop competencies in planning and leading sessions with music therapy clients. Students will gain information about the role of the facility in addressing needs of clients and the role of music therapy within the broader operational remit of the facility.

Prerequisites: MU5062

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.

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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.

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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.

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MU5361 - RITUAL CHANT AND SONG PRACTICUM 1
ECTS Credits: 12

Humanities

Rationale and Purpose of the Module: 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.

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 teacher's 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.

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 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.

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**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.

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**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.

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**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
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.

NS3201 - MICROBIOLOGY, IMMUNOLOGY AND INFECTION CONTROL
ECTS Credits: 3

Nursing & Midwifery

Rationale and Purpose of the Module: The aim of this module is to provide the student with a knowledge and understanding of microbiology with application to health care settings nursing and midwifery practice.

Syllabus: Micro-organisms Nature of microorganisms and their growth, basic understanding of bacteria, fungi and viruses, general pathogenesis, portals of entry; cycle of infection, basic epidemiology and how an infectious agent is transferred through a population; control of spread of infection, cultivation and identification of pathogens. Pathogenesis in key infections. Infection control in the hospital and community setting, guidelines in isolation precautions. Carrier status amongst health care

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.

NS3201 - MICROBIOLOGY, IMMUNOLOGY AND INFECTION CONTROL
ECTS Credits: 3

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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.
NS4037 - PROMOTING SUPPORTING AND PROTECTING BREASTFEEDING
ECTS Credits: 6

Nursing & Midwifery

Rationale and Purpose of the Module: To enable students to design knowledge and skills to work in partnership with parents to support them in their adaptation to parenthood education for childbirth.

Syllabus:
- 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 students to design knowledge and implement a programme of skills 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, 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
- 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

NS4046 - INTRODUCTION TO MIDWIFERY
ECTS Credits: 6

Nursing & Midwifery

Rationale and Purpose of the Module: To introduce students to the philosophy, knowledge and skills underpinning midwifery practice.

Syllabus:
- Philosophy, history and regulation of midwifery, practice, - professional identity, accountability and


conduct. Principles of individualised and woman centred care, role of the midwife in normal birth. Structure and provision of maternity services, Introduction to midwifery theories, reflective practice and evidence based practice. The role of the midwife in the provision of care in normal pregnancy, birth and puerperium. Introduction to local national and international breastfeeding policies. Principles of effective study skills.

clinical skills syllabus:

Handwashing
Prevention of infection - hand hygiene, standard precautions aseptic technique
Maternal and infant observations and assessment skills including taking & recording vital signs, obtaining and testing urine specimens
Communicating and recording in midwifery practice
Principle of medication management
Introduction to skills required for caring for mothers and babies in the maternity setting
Skills to support parents to care for their baby - infant care practices, hygiene needs and safety

NS4071 - ADAPTATIONS TO PREGNANCY
ECTS Credits: 6

Nursing & Midwifery

Rationale and Purpose of the Module: To facilitate students to acquire knowledge and understanding of adaptations to pregnancy from a physiological and psychosocial perspective


Clinical skills:
Landmarks and diameters of female pelvis and their fetal skull and their application to midwifery practice
Use of support mechanisms for successful breast feeding
Examination of the placenta
Abdominal examination
Initial antenatal visit
Antenatal assessment, monitoring and investigations throughout pregnancy
Fetal assessment, fetal auscultation; application of cardiotocograph and monitoring throughout pregnancy

NS4081 - CONTEMPORARY NURSING STUDIES
ECTS Credits: 6

Nursing & Midwifery

Rationale and Purpose of the Module: The purpose of this module is to explore the contemporary issues influencing and informing practice and the evolving role of contemporary nursing in meeting health care needs globally.


NS4063 - CARE OF THE NEONATE
ECTS Credits: 3

Nursing & Midwifery

Rationale and Purpose of the Module: To examine provide the midwife's role and responsibility in assessment, planning, implementation and evaluation of student with the care knowledge and skills to assess, plan, implement and evaluate care of the neonate

Syllabus: Adaptations to extraterine life, thermoregulation, initial steps of neonatal resuscitation. Role of the midwife in assessing, planning, implementing and evaluating care for healthy newborn babies from birth to discharge. Thermoregulation...
Prevention of infection in. Meeting the safety needs of the neonate. Nutritional requirements of the term neonate, physiology of lactation,; promoting, supporting and protecting breastfeeding; formula feeding, parent infant attachment and psychology and perception of neonate. Principles of drug administration for the neonate.


Clinical skills:
Examination of the neonate at birth including initial steps of resuscitation. Ongoing
Checking and use of the resuscitaire
On-going assessment and monitoring of the neonate including neonatal vital signs.
Care of the neonate, administration of Vitamin K
Breastfeeding practices. Formula
Expressing and storing of breast milk
Infant feeding practices. Metabolic skills
Newborn bloodspot screening technique

NS4201 - BIOLOGICAL SCIENCES 1, ANATOMY AND PHYSIOLOGY
ECTS Credits: 3

Nursing & Midwifery

Rationale and Purpose of the Module: To provide the foundation for understanding the anatomy and physiological functioning of the human system so as 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, system, and cavities of the body. Cellular structure, the cell surface, cytoplasm, filtration, and simple diffusion. Tissues: epithelial, connective, muscle and nervous. The Integumentary System: Histological structure and function of the skin and subcutaneous tissue. The Skeletal System: Structure and function of the skeleton, the healing of fractures. Joints: Classification, structure, function. Muscles: Structure and function. The Central Nervous System: Meninges, ventricles and cerebrospinal fluid, blood supply and the brain barrier system, structure and function of the spinal cord, the midbrain, the pons varolii and cerebellum, the cerebrum, medulla oblongata, the limbic system. The Peripheral Nervous System and Reflexes: Classification and anatomy of nerves and nerve fibres, the cranial nerves, the spinal nerves, nerve plexuses, the nature of reflexes, components of a reflex arc. The Autonomic Nervous System: Anatomy of the sympathetic and...
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

NS4208 - MUSIC IN NURSING AND HEALTHCARE
ECTS Credits: 6

Nursing & Midwifery
Rationale and Purpose of the Module: This module aims to enhance the student's knowledge of music as a therapeutic medium and potential uses and misuses of music in healthcare environments

Syllabus: A brief history of the uses of music in healthcare; an examination of the research literature pertaining to developing students' knowledge of, the uses of music in healthcare environments the role of music in promoting wellbeing in the healthcare environment, and developing students' skills in exploration of and reflection on the sound environment of health care settings in which they have had practical experience, the ability to discern how music can be offered as a creative and positive stimulus to promote positive outcomes for the individuals.

NS4211 - THE ART AND SCIENCE OF NURSING
ECTS Credits: 6

Nursing & Midwifery
Rationale and Purpose of the Module: The module will introduce students to the core concepts underpinning the art and science of nursing. and the professional nature of nursing

Syllabus: Historical development of nursing. Regulation of nursing profession. Professionalism. Patient safety agenda and quality care. Caring, empathy and care delivery systems e.g. team nursing, multidisciplinary teamwork and the nursing process. Therapeutic relationships and holistic models of care. Models of reflective practice,. Evidence-based practice. Introduction to competencies. Introduction to library skills, study methods skills and the presentation of academic material.

Clinical Skills Syllabus:
Nutritional assessment and management Assisting with oral intake of food and drink
**Weight management**
Oral assessment and hygiene
Enteral and parenteral, naso gastric and PEG

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**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.


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**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.


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**NS4221 - ADULT NURSING CARE**
**ECTS Credits: 6**

**Nursing & Midwifery**

**Rationale and Purpose of the Module:** This module introduces students to the challenges of nursing individuals in the acute hospital and community setting. The process of assessing and identifying needs, planning, prioritising, delivering and evaluating nursing care will be explored. The module aims to discuss evidence based nursing assessment and management strategies supported by current healthcare policies to ensure holistic and safe care for all individuals and their families. The purpose of this module is to facilitate students understanding of the nursing required for the acutely ill adult.

**Syllabus:** Nursing care and management of the acutely ill adult: Altered levels of consciousness, pressure area maintenance. Pain: Definitions, dimensions, measurement, strategies to support and care for the individual experiencing pain. Introduction to peri-operative nursing care: Elective and emergency surgery; altered homeostasis, peri-operative complications e.g. anaphylaxis, malignant hyperthermia, hypovolaemic and neurogenic shock. Psychosocial aspects of the nursing care of the ill adult e.g. stress, sleep and sensory deprivation, altered body image, role of the family and carer's. Nursing care and management of individuals experiencing altered skin integrity e.g. wounds, burns, dermatological conditions. Applied pharmacology

**Clinical Skills Syllabus:**
- Catheterisation, catheter care, catheter removal, Bladder care
- Continence care
- Enema/suppository administration, Stoma care
- Naso-gastric aspiration

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**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 special needs, e.g. child, older person. Applied pharmacology.
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

INTELLECTUAL DISABILITY

Rationale and Purpose of the Module: This module aims to introduce the student to the concept of intellectual disability, nursing practice and a rights based approach to care, and service provision. Within the module the role and contribution of the RNID in caring for people with an intellectual disability is integrated and cognisance is paid to the ever changing paradigm shifts of service ideologies and healthcare provision.

Syllabus: Concepts of impairment and disability: its incidence, causation manifestations., classification criteria and terminology; Differentiation between intellectual disability and mental illness; Historical development of nursing practice, service provision and approaches to nursing care (e.g. holism, person-centred). The role and function of the nurse as a healthcare professional, member of the multi-disciplinary team in wider healthcare service. Organisational philosophy and ethos of service providers., nurse-client relationship and communication. Theory and application of the principles of normalisation, deinstitutionalisation, empowerment and advocacy. Effects of disability on the nuclear, extended family and society

Clinical Skills Syllabus: Principles of hand hygiene Assist with bathing/bed making, Personal hygiene Promotion and maintenance of elimination, Safe positioning of clients, Assessment and maintenance of skin integrity

NS4321 - CONCEPTS AND NATURE OF INTELLECTUAL DISABILITY
ECTS Credits: 6

Nursing & Midwifery

Rationale and Purpose of the Module: The aim of this module is for each student to develop knowledge and skills required to support the person with an intellectual disability through adolescence and adulthood with their family.

Syllabus: Theories of adolescent and adult development. Cognitive, social and personality development. Implications of intellectual disability upon the adolescent

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NS4323 - NURSING ADOLESCENTS AND ADULTS WITH INTELLECTUAL DIS
ECTS Credits: 6

Nursing & Midwifery

Rationale and Purpose of the Module: The aim of this module is 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
and adult.
Rights of the person with an intellectual disability: Education and training opportunities: occupational, vocational and work skills training.
Therapeutic and creative activities including leisure and recreational provision for adolescents and adults. Life skills development. Interpersonal relationships and sexuality; sex education. Moral development: values and spirituality. Relationship between spiritual well-being and physiological/psychological health.

Clinical Skills Syllabus:
- Catheterisation, enema/suppository administration and stoma care
- Assess living skills
- Life skills development
- Interpersonal relationships and sexuality; sex education

Rationale and Purpose of the Module: This module is to develop Mental Health students' appreciation of the importance of a holistic approach to patient care and to develop knowledge and understanding of physical illnesses which are common in mental health care.

Syllabus: The inter-relationship between mental and physical health. The physical health status of persons with mental illness. The role of the nurse in promoting the health of this service user group. The aetiology, signs, symptoms, treatment and management of physical illnesses which commonly present in mental health care e.g. diabetes, thyroid disorders, respiratory and circulatory disorders, urinary tract infections, incontinence and constipation. Somatoform disorders: presenting features and nursing care of persons with somatoform disorders. Applied pharmacology.

Clinical Skills
- Catheterisation, catheter care, catheter removal.
- Enemas, suppositories
- Blood glucose monitoring and techniques in insulin administration
- Assessment and Maintenance of skin integrity
- Oxygen therapy, nebulisers, peak flow measurement and use of inhalers
- Breast awareness

Rationale and Purpose of the Module: The aim of this module is to introduce students to the historical development of nursing within mental health care. To provide an overview of current mental health/psychiatric nursing practice within healthcare settings. Introduce the student to mental health nursing specific terminology, mental health disorder classifications and the Mental Health Act 2001.

Syllabus: Origins and developments of mental health nursing within the context of contemporary nursing practice. Introduction to the philosophy, theories, and models of mental health nursing e.g. institutionalisation and normalisation, person-centred care, recovery. Role of the mental health nurse in a variety of health care settings. Incidence, prevalence, classification, and models of mental health/illness. Promotion and maintenance of safety in practice settings.

Clinical Skills
- Introduction to skills of engagement
- Admission procedures and legal requirements
- Introduction to care planning
- Principles of hand hygiene
- Assisting and promoting personal care
- Bed making

Rationale and Purpose of the Module: The purpose of this module is to develop Mental Health students' appreciation of the importance of a holistic approach to patient care and to develop knowledge and understanding of physical illnesses which are common in mental health care.

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- Catheterisation, catheter care, catheter removal.
- Enemas, suppositories
- Blood glucose monitoring and techniques in insulin administration
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Clinical Skills
- Introduction to skills of engagement
- Admission procedures and legal requirements
- Introduction to care planning
- Principles of hand hygiene
- Assisting and promoting personal care
- Bed making

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Clinical Skills
- Catheterisation, catheter care, catheter removal.
- Enemas, suppositories
- Blood glucose monitoring and techniques in insulin administration
- Assessment and Maintenance of skin integrity
- Oxygen therapy, nebulisers, peak flow measurement and use of inhalers
- Breast awareness

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Clinical Skills
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- Enemas, suppositories
- Blood glucose monitoring and techniques in insulin administration
- Assessment and Maintenance of skin integrity
- Oxygen therapy, nebulisers, peak flow measurement and use of inhalers
- Breast awareness

Rationale and Purpose of the Module: The purpose of this module is to develop Mental Health students' appreciation of the importance of a holistic approach to patient care and to develop knowledge and understanding of physical illnesses which are common in mental health care.

Syllabus: The inter-relationship between mental and physical health. The physical health status of persons with mental illness. The role of the nurse in promoting the health of this service user group. The aetiology, signs, symptoms, treatment and management of physical illnesses which commonly present in mental health care e.g. diabetes, thyroid disorders, respiratory and circulatory disorders, urinary tract infections, incontinence and constipation. Somatoform disorders: presenting features and nursing care of persons with somatoform disorders. Applied pharmacology.

Clinical Skills
- Catheterisation, catheter care, catheter removal.
- Enemas, suppositories
- Blood glucose monitoring and techniques in insulin administration
- Assessment and Maintenance of skin integrity
- Oxygen therapy, nebulisers, peak flow measurement and use of inhalers
- Breast awareness
evidence; strategies to promote quality and safety in promoting quality patient outcomes.

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.

PA4021 - IDEAS AND CONCEPTS IN PUBLIC ADMINISTRATION
ECTS Credits: 6
Politics and Public Admin
Rationale and Purpose of the Module: Aims: This foundation course aims to introduce students to the ideas and concepts used in the study of Public Administration.

Objectives:
To provide an overview of the different principles and theoretical perspectives applied to the study of public administration and underlying recent changes in the scope and management of the public sector.
Indicate the significance and shortcomings of each school of thought.
Illustrate working examples of the various models in different state settings and the challenges facing public administration in the 21st century.
Highlight that accountability and ethics are core values in public administration.
Introduce students to the career development skills module.

Syllabus: Public Administration as a field of study; identity, interdisciplinary character, profession, differences between public management and public governance; growth and role of government; development of civil service systems; origins and theoretical pillars of traditional model of public administration ð Northcote Trevelyan Report, Pendleton Report, Max Weber, Woodrow Wilson, organisational theory; politics-administration dichotomy in Europe; demise of traditional model of public administration; managerialism, entrepreneurial government and public choice theory; New Public Management; results of public sector reforms; accountability; ethics; e-government; globalization.

School of Design
Rationale and Purpose of the Module: Upon completion of this module students will be able to;

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.

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.

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 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.


PD4105 - 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.

Information Gathering, synthesis and delivery
Strategy: human centred approach, Systems Thinking.
Integrative thinking, First Principles.
Communication: Professional presentations skills.

PH4003 - MECHANICAL ENERGY
ECTS Credits: 6

Physics
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.

PH4007 - SOLAR AND NUCLEAR ENERGY
ECTS Credits: 6

Physics
Solar energy and conversion, solar radiation, net radiation flux at the Earth, basic principles of energy conversion. Photovoltaic conversion, solar electricity generation, photovoltaic electric principles, photovoltaic system wiring, batteries, photovoltaic controls. Energy supply systems, simulation of system performance, photovoltaic power production, sizing photovoltaic systems.

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.

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


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**PH4011 - PHYSICS FOR ENGINEERS 1**

**Physics**

**Rationale and Purpose of the Module:** The module is an introductory physics course covering Mechanics, Heat, Electricity and Magnetism for engineering students.


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**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. Transfer 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.

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**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.


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**PH4027 - WIND, OCEAN AND HYDRO ENERGY**

**ECTS Credits:** 6

**Physics**

**Rationale and Purpose of the Module:** This module is proposed to supplement existing modules in the creation of the BSc Energy. This interdisciplinary module seeks to introduce students to wind, ocean, hydro and other renewable energy sources and equip them with the knowledge, and analytical skills necessary to advise on their appropriate use.

**Syllabus:** Renewable Energy Technologies in the Past, Present and Market. Review of energy conversion principles and devices, electric generators (principle of work, classification).

Hydro (pressure head systems, dams, pumped storage, tidal barrages), Wave energy devices (principle of work, classification), Tidal stream devices (principle of work, classification), Offshore wind (principle of work, classification), Energy farms installation operation, Storm defence Ocean Energy Non Renewable, off-shore oil & gas, exploration, drilling, distributed fields, flexible risers, offshore industry technology - sonar and seismic, underwater technology - ROVs, pipelines, production platforms survey vessels. Marine hydrates


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. Electric field; 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.


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.


PH4061 - QUANTUM MECHANICS
ECTS Credits: 6

Physics

Rationale and Purpose of the Module: The purpose of this module is to extend the students understanding of quantum mechanics and to introduce students to applications of quantum mechanics in solid state physics.


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, photore sist), aerial image, latent image, relief image, pattern definition, pattern transfer (etching, deposition, implantation etc.). Optical lithography techniques: optical resist, 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.


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 develop and extend the students knowledge of the principles of fibre optics and introduce the students to contemporary optoelectronics.


Light emission from semiconductors: homojunctions and heterojunctions. Introduction to laser diodes: spontaneous and stimulated emission, degenerate doping, optical feedback, L-I characteristics, double heterostructures, gain-guided and index-guided structures, distributed feedback, quantum well lasers. Compound semiconductor technology.


Optical modulators and switches: electrooptic effect, titanium-diffused LiNbO3 technology, quantum-well electroabsorption modulators. Optical amplifiers.

Prerequisites: PH4041

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 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, Bragg's 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.


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, particularly where these are relevant to spectra including holography.


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.


Prerequisites: PH4131

PH4181 - INTRODUCTION TO ENERGY
ECTS Credits: 6

Physics


Beginning with the vague description of energy as something we pay for, the product of fuel, we proceed to fuller descriptions in which the meaning and measurement and use of energy will become definite. Introduce the historical evolutions of concept of work and energy through the work of the davy, joule, watt etc. Measurement, units for energy, machines and mechanical advantage without energy efficiency. Perpetual motion, first law of Thermodynamics, Carnot cycle. Mechanical equivalent of heat. Forms of energy, gravitational potential energy, elastic or strain energy, kinetic energy, heat and molecules, chemical energy, food, rotational
energy, electric energy, magnetic energy, electromagnetic energy, wave energy, nuclear energy. Conservation of energy. Uses of energy, ordered energy, disordered, entropy.

Every two/three weeks debate between 2 groups over major issues e.g. increase energy production vs change behaviour to save energy, preserve beauty of coast line vs increase quantity of onshore turbine, how do we know that an energy system is reliable, of low risk, economically viable, socially compatible and resilient in the face of natural catastrophes.

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.


Prerequisites: PH4061

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, Bragg's law, the reciprocal lattice, Laue equations, x-ray diffraction (XRD), neutron diffraction, selected area electron diffraction in the transmission optics.
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/NSEXAFS), 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).

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, Moore's 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).

PH5102 - OPTICAL FIBRE AND OPTOELECTRONIC SYSTEMS
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 fibre optics and introduce the students to contemporary optoelectronics.


PH5094 - NANO SCIENCE 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.

PL4017 - REGIONAL DEVELOPMENT
ECTS Credits: 6

Politics and Public Admin

Rationale and Purpose of the Module: Aims:
This module aims to introduce students to the theoretical perspectives, policy and practice of regional development in Ireland and Europe
Objectives:
- To identify challenges stemming from the processes of globalisation and socio-economic restructuring and how they are being dealt with at the European, national, and sub-national levels
- To understand the principles and values that shape definitions of regional development
- To comprehend the conceptual and theoretical frameworks that shape understanding of regional development
- To investigate the main policy interventions and instruments
- To provide an overview of key policy issues and challenges in a spatial perspective
- To observe regional development in practice

Syllabus: The course is divided into four parts: introduction, frameworks of understanding, interventions: instruments and policies, issues. Topics: What is a region? What is regional development?; Rationale for regional development in historical context; Ireland in the 21st century; introduction to issues; Ireland and socio-economic data; Concepts and theory of regional development; Sustainable development; Institutions: government to governance; Regionalism and regionalisation; Indigenous approaches & embedding exogenous resources (TNCs); Regional development in Ireland; historical perspective; EU regional policy; EU regional policy Ireland; National Development Plan & National Spatial Strategy; Environment; Agriculture; Immigration; Health; Transport; Integrated approaches & regional development in practice

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...
Creativity and Innovation at Work
Behaviour: Creative and innovative behaviour
Cognition: Creative problem solving
Motivating employees to be creative: Flow
Creative emotions: Broaden & Build

PM4035 - THE PSYCHOLOGY OF WORK
ECTS Credits: 6
Personnel & Employment Relations

Rationale and Purpose of the Module: The module aims to enable students to 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)

PM4045 - THEORETICAL PERSPECTIVES ON EMPLOYMENT RELATIONS
ECTS Credits: 6
Personnel & Employment Relations

Rationale and Purpose of the Module: To enable students to have an overview of the evolution and contemporary nature of Irish employment relations. To ensure students are cognisant of the demands which modern employment relations place on companies at workplace level. To enable students to understand the nature of discipline and grievances procedures at the level of the workplace. To enable students to analyses cases and to develop report writing skills To understand the role of national partnership in wage determination

Syllabus: Collective and individual approaches to studying and managing the employment relationship. The role and function of trade unions and employer organisations in a societal and organisational context. The roles of employment relations actors: full-time officials, shop stewards, line managers, specialist HR functions and supervisors. The role and operation of state institutions. Voluntarism and legalism in Irish employment relations. The role of rules, especially procedure agreements, including the practical operation of discipline and grievance procedures. The practical operation of dismissals and equality legislation in the workplace. Collective bargaining and individual alternatives. Conceptual frameworks and management approaches to employment relations. Public sector employment relations. The nature of conflict in employment relations, including strikes. National and workplace partnership, including the role and performance of national pay agreements. Recent legislation on trade disputes and trade unions, especially the Industrial Relations Act 1990. The impact of the 1937 Constitution. Contemporary developments in employment relations.

PO4011 - INTRODUCTION TO GOVERNMENT AND POLITICS
ECTS Credits: 6
Politics and Public Admin

Rationale and Purpose of the Module: This module provides an introduction to the study of politics and establishes a foundation for other politics modules that may be taken by students in the future. It is intended as a practical guide to some of the main concepts and vocabulary of political science. As such, the module provides an introductory guide to important themes and issues related to the study of politics, such as the state, regime types, and political change and behaviour. It also
introduces students to some of the study skills that they need to complete assignments and assessment in the area of politics.

**Syllabus:** The module is taught through a combination of lectures, classes and on-line exercises that each introduce students to justifying power: the legitimation of authority; The origins of the modern state; researching politics; Essays and essay conventions; State power and its critics; State failure and its problems: revolution; State failure and its problems: state failure in the modern world; Democracy - the basic principles; Democracy - the basic types; Where does democracy come from?; Forms of democratic government and their outcomes; Political parties and their functions; Electoral systems and parties; Pressure politics in democracies: who has influence and why? Non-democratic regimes - authoritarianism, totalitarianism and the rest. Concepts and methods of political analysis including

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**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

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**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 commonalities and, secondly, the particularities, of politics and government among West European states 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 both of which are areas of study in third-year courses.

**Prerequisites:** PO4011

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**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 international 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

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**PO4033 - POLITICAL THEORY**  
**ECTS Credits:** 6  
**Politics and Public Admin**

**Rationale and Purpose of the Module:** This course 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

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**PO4041 - THE POLITICS OF OIL**  
**ECTS Credits:** 6  
**Politics and Public Admin**

**Rationale and Purpose of the Module:** This module looks at the domestic and international politics of oil production and consumption. The module introduces students to the role that oil has played in the development of the international system, how it has shaped political institutions and conflicts in contemporary states, and what policy issues will emerge over the next few decades if predictions about peak oil prove to be true. In doing so it introduces students to key debates and concepts in contemporary comparative and international politics such as the resource curse, rentierism, and new wars.

**Syllabus:** 1. The hydrocarbon age the emergence of oil
as a driver of modern political and economic growth and the development of oil as a strategic resource; 2. petroleum and the organization of capitalism; 3. the international organization of the petroleum economy: OPEC; 4. oil wealth and regime survival: the monopolarch rentier state and the issue of whether oil help autocracies to endure; 5. theoretical perspectives on the resource curse: does oil hinder democracy and growth?; 6. case study of the resource curse: Venezuela; 7. case study of the resource curse: Nigeria; 8. case study of the resource curse: Russia; 9. oil wars: resource rents and conflicts; 10. case studies of oil wars as forms of new wars; 11. the contemporary geo-politics of oil; 12. peak oil and beyond: the policy problems of the transition to the post-oil age.

**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:**
- Politics and Public Admin
- Political Economy and the Organization of Capitalism
- The International Organization of the Petroleum Economy: OPEC
- Oil Wealth and Regime Survival: The Monarchic Rentier State
- Theoretical Perspectives on the Resource Curse: Does Oil Hinder Democracy and Growth?
- Case Study: Venezuela
- Case Study: Nigeria
- Case Study: Russia
- Oil Wars: Resource Rents and Conflicts
- Case Studies of Oil Wars as Forms of New Wars
- The Contemporary Geo-Politics of Oil
- Peak Oil and Beyond: The Policy Problems of the Transition to the Post-Oil Age

**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 Ireland's role in the EU and beyond.

**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.

**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
theory, diversionary war theory, death watch theory, public opinion-based theories, regime-based theories
hegemonic stability theory, balance of power theory, offence-defence theory, cultural realism, power preponderance theory, status discrepancy theory, power transition theory

Environmental theories of armed conflict: greed-based theories vs. grievance-based theories, environmental degradation-based theories, environmental disaster-based theories.
Theories of genocide and the motivations for humanitarian interventions.
The future of wars and other armed conflicts.

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

POS0127 - 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

POS013 - CONFLICT ANALYSIS
ECTS Credits: 9
Politics and Public Admin

Rationale and Purpose of the Module: This module will undertake a comprehensive review of the literature on armed conflict in the international and domestic arenas. Much of this literature is from the field of political science but this module will also draw upon insights from other disciplines. Students will analyse leading and critical theories of armed conflict, their variables, their causal claims, and, of central importance, their ability to explain contemporary and historical cases of conflict and predict possible future conflicts. This survey of the literature on this topic will utilize scholarship employing both qualitative and quantitative methodologies. This module is designed primarily for postgraduate students who seek to understand (and, through their own scholarship, contribute to) the literature on armed conflict.

Syllabus: Defining war and other forms of armed conflict. Levels of analysis.
Individual level theories of armed conflict: misperception theory, evoked sets, national role conceptions, historical analogies, prospect theory
Group level theories of armed conflict: organizational process model, group think, bureaucratic politics model
State level theories of armed conflict: democratic peace theory, diversionary war theory, death watch theory, public opinion-based theories, regime-based theories
Systemic level theories of armed conflict: neorealism, hegemonic stability theory, balance of power theory, offence-defence theory, cultural realism, power preponderance theory, status discrepancy theory, power transition theory
Environmental theories of armed conflict: greed-based theories vs. grievance-based theories, environmental degradation-based theories, environmental disaster-based theories.
Theories of genocide and the motivations for humanitarian interventions.
The future of wars and other armed conflicts.

POS014 - 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.
complex intellectual arguments. The module content will be particularly valuable to students when they come to construct the theoretical framework for their dissertation.

Rationale and Purpose of the Module: This module will introduce students to the work of leading contemporary political theorists and to some prominent debates within recent political theory. The module blends conceptual analysis, normative reasoning and the close reading of complex philosophical arguments in order to enable students to develop their analytical skills in reading, understanding, interpretation and argument.

Syllabus: Political Concepts (Political Authority and Obligation; Liberty; Equality; Rights) - Theories of Justice (Liberal Egalitarianism; Libertarianism; Socialism; Communitarianism) - Democratic Theory (Representation; Deliberation; Legitimacy)


POS016 - GRADUATE SEMINAR IN INTERNATIONAL RELATIONS
ECTS Credits: 9

Politics and Public Admin

Rationale and Purpose of the Module: The main aim of this module is to examine some of the more significant theories, issues, and debates in the study of International Relations, such as those pertaining to the schools of thought known as realism, liberalism, feminism, and constructivism. This will be achieved through a close reading of a number of international relations texts, each of which cover theories, issues, and debates that are core to our understanding of international affairs.

Syllabus: The assessment is set up so that students can begin to specialise in certain aspects of IR, while keeping an eye on the wider history and theoretical context of the discipline. The reading lists have been designed to familiarise students with the various approaches that are used to explain IR, and the seminar discussions will apply these theories to events in the international sphere. As a result it is important for each student to read the required readings before class.

By the end of the module students will have developed a strong grasp of the nature of IR theories, and be able to use their understanding of these theories to construct complex intellectual arguments. The module content will be particularly valuable to students when they come to construct the theoretical framework for their dissertation.

Rationale and Purpose of the Module: The aim of this module is to develop students’ understanding of how the European Union formulates and adopts policies. Special attention is given to the roles and organisational structures of the different institutions involved in the EU policy-making process. The module presents theories of integration and policy-making, the internal organisation, functions, and powers of the main institutions of the EU, and the inter-institutional decision-making process through which those institutions interact to shape the content of policies.

Syllabus: The module introduces students to the institutions and policies of the European Union. The first part of the module is devoted to the description and explanation of the internal workings of the European Commission, the European Parliament, and the Council of the European Union. It will also cover the interaction of those institutions in the EU’s legislative decision-making process.

The second part of the module focuses on how policy decisions are made in different policy sectors, highlighting distinctions in institutional structures and actor configurations. Theories are developed from explaining important sector-specific decisions and developments, and these are also discussed. Examples will be drawn from a variety of policy areas, such as the common agricultural policy, justice and home affairs, the internal market, environmental policy, and economic and monetary policy.

PR4010 - ANATOMY 1
ECTS Credits: 12

Clinical Therapies

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 respiratory 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.

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**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

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**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.

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**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 of the case study approach and animal research.

**Prerequisites:** PS4042, PS4021

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**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 students' 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

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**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 students' 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.

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**PS4045 - ADVANCED RESEARCH METHODS**  
ECTS Credits: 6

**Psychology**

**Rationale and Purpose of the Module:** Extend students knowledge of the academic discipline of psychology through extending range of design and analysis skills and examining the fundamental assumptions of psychological research and practice.

**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.

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**PS4087 - POLITICAL PSYCHOLOGY**  
ECTS Credits: 6

**Psychology**

**Rationale and Purpose of the Module:** To extend students knowledge of psychology into the area of political psychology and to improve students understanding of the role that social and political structures can have on human behaviour.

**Syllabus:** The specific focus of this module is political psychology. Political psychology is an interdisciplinary area of psychology. The course provides an introduction to the psychological foundations of political life. Psychological theories are applied to particular political problems including the formation of belief systems, moral reasoning and ideology, colonialism, political socialization, political culture, mass hysteria, psychohistory. In doing so, it is demonstrated how psychology informs political behaviours and actions, the behaviour of politicians and the effects of social and political structures on behaviour.

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**PS4087 - ABNORMAL AND CLINICAL PSYCHOLOGY**  
ECTS Credits: 6

**Psychology**

**Rationale and Purpose of the Module:** Abnormal psychology is the study of mental illness and distress, as well as psychological dysfunction. The aim of this module is to foster a critical appreciation of some key topical issues at a theoretical level in abnormal psychology, as well as how this is applied in the practice of clinical psychology.

**Syllabus:** Through a series of lectures, students will be introduced to the theoretical perspective on several categories of mental health disorders, including mood and anxiety disorders. In addition, other topics in abnormal psychology, such as dysfunctional behaviour, will be examined from a range of perspectives, including cognitive, behavioural, and neurological. The focus is on how psychological models, particularly cognitive ones, can aid our understanding of psychological disorders. The course will also examine how the theoretical understanding of disorders translates into practice in clinical settings. Contemporary models of clinical practice and psychotherapeutic intervention will be introduced, including scientist and reflective practitioner models, and formulation and assessment models of clinical psychology. The link between clinical psychology and health care settings will also be explored. In this way we will demonstrate that psychological models have considerable application to clinical practice. This provides a valuable introduction to key issues and concepts that will be experienced in clinical practice, by students who decide to move into clinical work after graduation.

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**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.

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 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.

PS6061 - 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.

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.

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**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.

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**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

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**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.

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**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.

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**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...
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 spreadsheet 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.


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 modeling, 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.


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.

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

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, little's 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, Baldrige, 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 Planning. Operations reference models, ARIS and enterprise integration views. Interoperability at technical and organisational levels.

Human factors


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.

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 - 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.

**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.  

**PT4315 - PRODUCTIVITY METHODS 3**  
ECTS Credits: 6

**School of Engineering**

**Rationale and Purpose of the Module:** part of production activity planning stream - focusing on integration and organisation of work ('point' work has been dealt with in a prior work design module), covering three main domains: production control at its lowest level - the scheduling/dispatching domain; its integration through the layout domain; and its implementation through the project planning and control domain. There is an overall emphasis on performance, generating alternative and innovative solutions, evaluating them and selecting the more appropriate.

**Syllabus:** part one: lectures, tutorials part two: lectures, labs.

**PT4317 - PRODUCTIVITY METHODS 4**  
ECTS Credits: 6

**School of Engineering**

**Rationale and Purpose of the Module:** to develop students formal planning capability in optimisation domain within context of production planning and resource utilisation and performance

**Syllabus:** LP is vehicle for optimisation (Taha), proceeding to stochastic simulation (Simul8 demo) and heuristic based line balancing, and dual-objective stochastic tradeoffs demonstrated by simple variability-utilisation-time queuing models (Hopp and Spearman). Mathematical level appropriate to BSc. Breadth appropriate to underpin scientific process improvement practice.

**Prerequisites:** PT4317

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**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 setups; 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; tolerated 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

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**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 setups; 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; tolerated 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

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**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:**


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**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.


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**PY4055 - SOCIOLOGICAL CONCEPTS OF TEACHING AND LEARNING IN PHYSICAL EDUCATION**  
**ECTS Credits:** 3

**School of Physical Education & Sport Sciences**

**Rationale and Purpose of the Module:**

- To introduce socialisation into and through physical education and the role of the physical educator. Students are encouraged to reflect on their own socialisation into the role of physical education student and how this impacts on their understanding of physical education. This module also focuses on issues of social development (e.g. gender, race & ethnicity, disability and racism). These topics are examined in light of how they have affected and are currently affecting the teaching of school physical education.

**Syllabus:**

- Topic include: socialisation, roles, interaction, identity and sociology of the body. Issues of social development are included such as: gender, race & ethnicity, religion, sexuality, family support, socio-economic status, social power. Also included is an
introduction to the sociology of sport, with an emphasis on violence in sport and the implications on teaching school physical education.

PY4065 - INTEGRATED AND INCLUSIVE PHYSICAL EDUCATION  
ECTS Credits: 6

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.


PY4071 - PEDAGOGY OF OUTDOOR AND

ADVENTURE EDUCATION  
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 Basket ball, 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.

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

PY4081 - PEDAGOGY OF INVASION GAMES  
ECTS Credits: 6

Physical Education & Sport Sciences
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/instructional 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.

PY4125 - PHYSICAL ACTIVITY, HEALTH, GROWTH AND DEVELOPMENT
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 Education 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, task 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.

PY4133 - PEDAGOGY OF DANCE AND GYMNASTICS
ECTS Credits: 6

Physical Education & Sport Sciences

Rationale and Purpose of the Module: This proposed module is a distance eLearning format of PY5021 which will permit students to opt either to complete a module on evidence based practice via lectures and tutorials on campus in semester 2 of the academic year, or by eLearning in Semester 1. Module PY5021 Evidence based practice is a mandatory requirement for the post graduate certificates offered by the Department of Clinical Therapies. The module equips students with the skills and knowledge to adopt evidence based practice (EBP). High quality service provision requires that the most current relevant research is combined with experiential learning and service users preferences. This module will enable students to source and critically appraise the research, reflect on their practice and synthesise this knowledge to address service requirements. The students will also gain an understanding of the barriers and facilitators in implementing EBP in the workplace.

Syllabus: Introductory day on campus to ensure students are able to access and use electronic resources. Series of keynote topics delivered on-line and supported by a discussion forum, group work and tutorials on the different facets of EBP; defining a service question, searching for and appraising the most current literature, integration and synthesis of information to address service needs and the implementation in practice. Evaluation of changes in work practices.

PY5021 - EVIDENCE BASED PRACTICE
ECTS Credits: 12

Clinical Therapies

Rationale and Purpose of the Module: This proposed module is a distance eLearning format of PY5021 which will permit students to opt either to complete a module on evidence based practice via lectures and tutorials on campus in semester 2 of the academic year, or by eLearning in Semester 1. Module PY5021 Evidence based practice is a mandatory requirement for the post graduate certificates offered by the Department of Clinical Therapies. The module equips students with the skills and knowledge to adopt evidence based practice (EBP). High quality service provision requires that the most current relevant research is combined with experiential learning and service users preferences. This module will enable students to source and critically appraise the research, reflect on their practice and synthesise this knowledge to address service requirements. The students will also gain an understanding of the barriers and facilitators in implementing EBP in the workplace.

Syllabus: Introductory day on campus to ensure students are able to access and use electronic resources. Series of keynote topics delivered on-line and supported by a discussion forum, group work and tutorials on the different facets of EBP; defining a service question, searching for and appraising the most current literature, integration and synthesis of information to address service needs and the implementation in practice. Evaluation of changes in work practices.

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. Students will 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.

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.


SO4043 - 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
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 

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 socio-political 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. 

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: 

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 

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. 

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.

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 normalising 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 Bourdieu’s conceptual arsenal students will be facilitated to consider the hierarchical ordering of the process of exclusion and the multi-layered nature of domination, privilege and exclusion.

SO6031 - FEMINIST APPROACHES TO RESEARCH
ECTS Credits: 3
Sociology
Rationale and Purpose of the Module: 1. 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, class, ability, sexuality. 5. To identify how notions like identity, self, nation are gendered and culturally constructed.

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.

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.

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 Úthen 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 students’ 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 students’ 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.

SP4133 - SPANISH FOR BEGINNERS 3  
ECTS Credits: 6  
School of Modern Languages and Applied Linguistics  

Rationale and Purpose of the Module: 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: 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: The course is designed to:  
* Revise and broaden the student’s knowledge of the structures of Spanish grammar.  
* Expand the student’s range of Spanish vocabulary.  
* Improve pronunciation and patterns of intonation in Spanish.  
* Further develop the student’s language skills by exposing them to different situation and registers, both formal and informal.  
* Facilitate the student’s understanding of various 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.
cultural aspects within the Spanish-speaking world.
* Foster autonomous language learning.

**Syllabus:** 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:** 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:** 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:** 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:** 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

**SP4241 - SPANISH LANGUAGE, CULTURAL AND SOCIETY 1**
**ECTS Credits:** 6

**School of Modern Languages and Applied Linguistics**

**Rationale and Purpose of the Module:** 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.

**Prerequisites:** SP4232

**SP4243 - SPANISH LANGUAGE CULTURE AND SOCIETY 3 (BEGINNERS)**
**ECTS Credits:** 6

**School of Modern Languages and Applied Linguistics**

**Rationale and Purpose of the Module:** 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:** 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:** The course is designed to:
- Revise and broaden the studentÆs knowledge of the structures of Spanish grammar.
* Expand the student/E's range of Spanish vocabulary.
* Improve pronunciation and patterns of intonation in Spanish.
* Further develop the student/E's language skills by exposing them to different situation and registers, both formal and informal.
* Facilitate the student/E's understanding of various cultural aspects within the Spanish-speaking world.
* Foster autonomous language learning.

**Syllabus:** 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

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**SP4243 - SPANISH LANGUAGE, CULTURE AND SOCIETY 3**
ECTS Credits: 6

**School of Modern Languages and Applied Linguistics**

**Rationale and Purpose of the Module:** 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:** 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

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**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.

**Prerequisites:** SP4246

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**SP4247 - SPANISH LANGUAGE, CULTURE AND SOCIETY 5**
ECTS Credits: 6

**School of Modern Languages and Applied Linguistics**

**Rationale and Purpose of the Module:** 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:** 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:** SP4242

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**SP4627 - TWENTIETH CENTURY TRENDS IN HISPANIC LITERATURE**
ECTS Credits: 6

**School of Modern Languages and Applied Linguistics**

**Rationale and Purpose of the Module:** AIMS AND OBJECTIVES:
* To analyse the major cultural developments in Hispanic literature of the twentieth century and to focus in particular on four major trends:
  - Latin American modernismo and its legacy in Spain.
  - Surrealism in art and literature.
  - Magical realism.
  - The 1980s boom in women's writing with particular regard to the relationship between feminism(s) and popular culture.
* To further develop students' analytic and interpretative skills.
* To develop students' critical skills when analysing cultural production.

**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:
2. Surrealism: Rafael Alberti, Federico García Lorca and Marquez, Isabel Allende.

**Prerequisites:** SP4625

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**SS4145 - PERCEPTION AND COGNITION IN ACTION**
ECTS Credits: 6
SS4305 - QUANTITATIVE BIOMECHANICAL ANALYSIS  
ECTS Credits: 6

**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, endocrine, immune and digestive systems.

SS4312 - QUALITATIVE BIOMECHANICAL ANALYSIS  
ECTS Credits: 6

**Physical Education & Sport Sciences**

**Syllabus:** SYLLABUS:

* Apply 3D analysis techniques to selected sporting and exercise activities

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*

**Syllabus:** SYLLABUS


SS4403 - COACHING SCIENCE AND PERFORMANCE  
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.


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 training 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
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.

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.

SS6011 - ANALYSIS OF MOTOR SKILL PERFORMANCE AND LEARNING
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.

SS4417 - HUMAN PERFORMANCE EVALUATION
ECTS Credits: 6

Physical Education & Sport Sciences

Rationale and Purpose of the Module: To give 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.

TE4011 - ENGLISH AS A FOREIGN LANGUAGE 1 (INTERMEDIATE)
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: 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: 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 conditional; 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: To give 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.

SS6011 - ANALYSIS OF MOTOR SKILL PERFORMANCE AND LEARNING
ECTS Credits: 6

Physical Education & Sport Sciences

Rationale and Purpose of the Module: To give 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.

TE4011 - ENGLISH AS A FOREIGN LANGUAGE 1 (INTERMEDIATE)
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: 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: 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 conditional; 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.
Rationale and Purpose of the Module: 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: 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.

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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 decouple 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: manuals, brochures etc. To develop the students' expertise in using the tools of the profession.

Syllabus: Introduction to technical communication: audience analysis; writing style for technical and professional communication.

Introduction to information design: typography; colour; graphics and illustrations, page and screen layout.

Document genres: writing manuals; designing and writing brochures; writing for new media.

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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.

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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
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

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

WT4305 - MACHINING TECHNOLOGY 3
ECTS Credits: 6
School of Engineering

Rationale and Purpose of the Module: To enable the student to effectively analyse and solve problems associated with complex product manufacture in the context of advanced manufacturing processes and systems CAD/CAM programming, R.F. and Glulam. To explore the potential of current technology in respect of value added processes for Irish grown timber.

Syllabus: Lean manufacturing
Production systems-plant layout
Group technologies
Gluing
Manufactured boards
Glulam
Radio frequency gluing
Analysis of tool design û variable angled cutter block.
Advanced CNC manufacture
Jig design

Prerequisites: WT4304

WT4405 - WOOD TECHNOLOGY 2
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: To introduce the student to wood protection and finishing technology in respect of wood and wood based materials.

Syllabus: Analysis of factors governing the weathering of wood based materials - chemical, colour and physical changes. Preservatives - analysis of factors governing their selection and application. Surface finishing - analysis of factors governing selection and application of the finishing agent.

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 students’ personal, university and professional lives.
* To demonstrate the value of learning from engineering failures.
Syllabus: Reasons for failures in engineering; Modes of failure; Risk; Failure case histories in concrete, steel, masonry, foundations and timber etc; Common pitfalls, Feld&Es 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 overall project management process and principles and how they apply to construction projects.


Prerequisites: WT4401, WT4502, WT4003

WT4705 - BUILDING PRODUCTION
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 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.


Prerequisites: WT4804, WT4704

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.


Prerequisites: WT4401, WT4502, WT4003