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

Normal course load is 5 modules per semester.

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

Example: CU4051

CU is the subject area.

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

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

05 is just the departmental way to distinguish between classes.

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

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

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

1 and 2 are first year classes.

3 and 4 are second year classes.

5 and 6 are third year classes.

7 and 8 are fourth year classes.

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

Faculty Key

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<tr>
<th>BUS</th>
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<td>SEN</td>
<td>Science &amp; Engineering</td>
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<td>HUM</td>
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Modules Featured in this Booklet

All modules are in alphabetical order by module code.

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

*Only open to Journalism Majors
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AC4002 - MANAGERIAL ACCOUNTING
ECTS Credits: 6

Accounting & Finance

Rationale and Purpose of the Module: The aim of the module is to introduce students to the basic techniques, language and principles of management accounting. The module provides students with an insight into the role of management accounting as a provider of information supporting the financial decision making process of an organisation.

Syllabus: The syllabus covers fundamental issues including basic cost terms, concepts, and definitions before introducing costing systems such as full costing and Activity Based Costing. In addition to preparing basic budgets, the difficulties that are inherent within any budgeting system are presented. Students learn to analyse and explain the major causes of differences between budget and actual performance, including basic standard costs and variances. The relationship between accounting information and managers decisions in a competitive environment is demonstrated. Students learn to conduct a financial analysis to support a range of business decisions such as pricing, make v buy, limiting factor of production, discontinuation of product line, customer or market etc. Strategic management accounting is introduced. Techniques such as target costing, value chain analysis and total life-cycle costing are discussed in addition to tools for measuring performance such as the balanced scorecard.

AC4018 - CORPORATE TRANSPARENCY AND BUSINESS ETHICS
ECTS Credits: 6

Accounting & Finance

Rationale and Purpose of the Module: 1. Understand the control mechanisms of governance and financial transparency that infer the credibility of financial reporting.
3. Explore the elements of a professional judgement as an approach to making ethical decisions in business.
4. Understand that corporate compliance is fundamental to corporate social responsibility.


Prerequisites: AC4001, AC4004, AC4305

AC4024 - FINANCIAL ACCOUNTING AND 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 theoretical framework of accounting. It introduces the student to the translation of accounting theory, concepts and principles into accounting regulation and practice. It encourages the student to evaluate selected international accounting standards.

Syllabus: The module will consider the theory and practice of selected international accounting standards and issues. Focus will be on the preparation and reporting to external users of financial information, especially, but not exclusively, equity investors. The 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.

Prerequisites: AC4001, AC4002

AC4034 - AUDITING AND ACCOUNTING FRAMEWORKS
ECTS Credits: 6

Accounting & Finance

Rationale and Purpose of the Module: The purpose of this module is to present the regulatory, legislative and governance requirements for financial reporting. The assertions contained in the resulting financial statements are challenged by the student availing of the principles of auditing to determine the adequacy of accompanying disclosures. In this way, the student comprehends the audit process led by a accounting professional as underpinning the credibility of the financial reporting process. As business transactions, be it local or global, rely hugely on this credibility, the role of the accountant as a responsible and ethical professional is emphasised.

Syllabus: Knowledge is imparted through lectures and tutorials and the completion of a case study requiring an analysis of the annual report of an assigned publicly traded company. The first series of lectures covers accounting regulation and its conceptual underpinning of accrual basis, going concern and accounting policies relating to revenue recognition and fair value. This is followed by lectures covering auditing principles and concepts, the internal control system (ICS) and auditing procedures that examine the ICS and finally the auditor’s opinion. A third series of lectures introduces corporate governance, its key functions of accountability, responsibility and transparency and the governance mechanisms that deliver corporate transparency. Study of the audit-performance expectations gap with an emphasis on professional and ethical responsibilities of the auditor completes the module.

Prerequisites: AC4001, AC4002

AC4418 - MANAGEMENT ACCOUNTING 2
ECTS Credits: 6

Accounting & Finance

Rationale and Purpose of the Module: This module further enhances students 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:** This module will cover inventory costing; information and the decision process; cost accumulation information for decision-making; relevant costs and revenues for decision-making; Process costing; Cost allocation and customer profitability analysis; Performance measurement; Transfer pricing and multinational considerations; Pricing; Balanced scorecard.

**Prerequisites:** AC4417

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**AR4002 - DESIGN STUDIO 1B**

**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 design process and to value and catalogue their own work. As the year progresses the student is encouraged to become increasingly responsible for organising and developing their own work process.

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

**Prerequisites:** AR4001

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**AR4004 - DESIGN STUDIO 2B**

**ECTS Credits:** 15

**School of Design**

The focus of this term is housing: through analysis, research, visits, lectures, and project work students will explore the problem of housing conceptually, functionally, and spatially, as a basic human need, as a social construct, as an economic system, and as a physical thing.

- Spatial model study of housing in a specific cultural context.
- Aspects to be studied: spatial relation to land, territory, climate, privacy, social interaction, interior spatial organisations.
- Means of study: intuitive and structured modelling in mix, studies in situ and sketching.
- Histories, characteristics, contemporary situations, investigations through site visits, lectures, mapping, free sketching, birds eye perspectives.
- Land, structure, climate and materials:
- Spatial logistics and spatial politics.
- Geometry and human occasion. Types, patterns, and spatial logistics: The maisonette, the dwelling unit, patterns of repetition, link to Irish house and housing traditions.

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**AR4006 - DESIGN STUDIO 3B**

**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 second term is on developing a project to a high level of detailed design. The pedagogical focus is on developing, in each student, a capacity to interrogate the project through different inputs and to push the project ahead. At the end of the semester the student should have developed an architectural project by interrogating a range of inputs through disparate means and successfully resolved these.

**Prerequisites:** AR4003

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**AR4006 - DESIGN STUDIO 3B**

**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 second term is on developing a project to a high level of detailed design. The pedagogical focus is on developing, in each student, a capacity to interrogate the project through different inputs and to push the project ahead. At the end of the semester the student should have developed an architectural project by interrogating a range of inputs through disparate means and successfully resolved these.

**Prerequisites:** AR4003
Prerequisites: AR4005

AR4008 - DESIGN STUDIO 4B
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 will develop a method of research and allocate significant time to the research part of the curriculum. The architectural project will be tightly allied to construction and the physicality of building; construction technology will be an important part of the years' work.

In the spring semester students are expected to measure their design ability against tightly drawn demands and conditions. Qualitative analysis: Frames, deflected shapes, tension zones in bending, axial force, shear force. Students will Construct:
(a)* A cantilever truss with a 1.0kg point load and a slender braced bottom chord. 1.0m long 200mm deep (2 groups).
(b)* A simply supported beam and a fixed ended beam (same section) with mid span point loads 1.0kg approx. * Measure deflections (2 groups).
(c)* A cantilever beam 1.0m long with a 1.0kg end point load. A cantilever beam (same section) 2.0m long with a 1.0kg end point load measure deflections (1 group).

Prerequisites: AR4011

AR4014 - GRAVITY AND REACTION 4
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 will be studied directly in the laboratory will be portal frames, crane structure; 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:
(d) Materials in the studio and in a site context.
(e) Materials in structural design and their relevant components
(f) Design and build in model form a bridge with calculated design loads and span.

Prerequisites: AR4015

AR4022 - REPRESENTATION / DRAWING 2
ECTS Credits: 3

School of Design

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

- Studio based exercises will, by degrees shift their focus from training the craft of technique in drawing toward using drawing as an analytical and representation technique. Colour, composition, documentation of different sites with some visits to specific sites - , typography and basics of graphic design will be subjects of the course. Ink and pastels will be introduced as drawing materials, wood, Plexiglas and metals as model making materials.

The idea of transformation introduced in the first semester of the course will be extended to include digital
School of Design

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

Syllabus:

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

- Surveying using the sketchbook, pencil and the body to observe and record buildings, proportions, scale, and distances of objects. Surveying using careful notation of dimensions through careful observation, and detailed measuring using a tape measure and triangulation.

Drawing, with pencil, the results of the survey carefully bringing all information to the same level of detail and consistency on a well organised composed drawn document.

AR4024 - REPRESENTATION / DRAWING 4
ECTS Credits: 3

School of Design

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

Syllabus:

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

- Surveying using the sketchbook, pencil and the body to observe and record buildings, proportions, scale, and distances of objects. Surveying using careful notation of dimensions through careful observation, and detailed measuring using a tape measure and triangulation.

Drawing, with pencil, the results of the survey carefully bringing all information to the same level of detail and consistency on a well organised composed drawn document.

AR4026 - REPRESENTATION / DRAWING 6
ECTS Credits: 3

School of Design

Rationale and Purpose of the Module: In this module students develop skills in 3-dimensional modelling using the computer, in conjunction with continuing studies in physical modelling. Switching between digital and analogue modes of representation, e.g. models, drawings, digital photography, FormZ, Rhino, and SketchUp, 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, 3-dimensional modelling is taught as a tool of spatial investigation and 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 model making skills.

AR4032 - HISTORY AND THEORY OF ARCHITECTURE 2
ECTS Credits: 3

School of Design

Rationale and Purpose of the Module: to expand students horizons of knowledge about architecture while teaching the foundational skills in reading and writing in the discipline. Even though students at the School of Architecture are expected to be 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 contemporary ways of thinking about the field.

Syllabus: The theme for the spring workshop is Building. Just as students need to learn to describe a site and objectify their reactions to it, as architects it is essential that they also learn to discuss buildings at a high level. Seminars will address Skin, Program, Circulation, Structure, and Codes, introducing both historical and contemporary material to challenge students. Throughout, students will explore architectures intersection with the material and social realms. As in the first semester, students will undertake close readings of the most significant works in modern and contemporary architecture. Projects likely to be discussed will include Joseph Paxtons Crystal Palace, Otto Wagners Postparkasse, Mies van der Rohe's 860-880 Lake Shore Drive and Seagram Buildings, Le Corbusiers La Tourette, Eero Saarinen's IBM Headquarters, Bernard Tschumis Parc de la Villette, FOA's Yokohama Terminal, MVRDV's WoZoCos Housing Project. Readings by authors such as Robin Evans, Colin Rowe, Anthony Vidler, Otto Wagner, Alain Colquhoun, Le Corbusier, and Walter Gropius will explore the diverse ways by which buildings can be discussed.

We will visit nearby sites first-hand in order to learn how to read buildings. Afternoon workshops will focus on describing these sites. The writing projects introduced in the fall semester will be built upon in order to ensure that students have a high degree of skill in thinking about architecture through writing by the end of the term. This course will be teamed with a series of workshops by Elizabeth Hatz that will introduce students to ways of attaining close readings of buildings through drawing.

AR4034 - HISTORY AND THEORY OF ARCHITECTURE 4
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. In the second semester 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 second year program revolves around intensive workshops and seminars.

Syllabus: Continuing the survey from the first term, the period covered will be from 1945 to the present day, course will survey not simply the history of modern architecture, but the history of environmental, structural, and social systems in such terms. The course is composed of Lectures, seminars, writing workshops, together with research papers.

Prerequisites: AR4031

Prerequisites: AR4033
AR4036 - HISTORY AND THEORYOF ARCHITECTURE
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 urban history.

Syllabus: Through lectures, discussion seminars, field trips, and writing the course will survey urban history from prehistory to the present day. The course is a broad introduction to urbanism throughout the ages, from the Palaeolithic to the present day both in critical texts and first hand. Students will be exposed to the complexity of collective human inhabitations throughout the ages, both in Ireland and abroad.

Prerequisites: AR4032

AR4042 - ASSEMBLY AND TECHNIQUES 2
ECTS Credits: 3

School of Design
Rationale and Purpose of the Module: Study of building elements and their design origins. Introduction to constructional detail in drawings and models

Syllabus: This course will consider the physical realisation of design aspirations through the detailed study of various building elements; structure roof window, entrance etc. This study will be formed by a combination of case study seminars, site visits, as well as the individual students detailed developed of some aspects of their design studio project. The students will be introduced to methods of describing and analysing constructional assembly through drawings and model at scales 1:10 to 1:1.

Prerequisites: AR4043

AR4044 - MATERIALS 1
ECTS Credits: 3

School of Design
Rationale and Purpose of the Module: The aim is to introduce students to the properties and uses of groups of materials, such as timber, glass, plastics, mineral materials, stone, metals, fabrics, others in architecture, to give students a physical, technological, and analytical basis from which to approach materials in architecture.

Syllabus: The content of the course is focused on material research, practical tests, experimentation with built works, and lectures/seminars by renowned individuals. A wide-ranging collection for students’ use and inspiration will be built in the studio, working together to develop a system to show and organize this collection in the studio.

Studio exercises are construction based project work, build a skin for 1m space out of different materials, one from each group, understanding the characteristics by touching and assembling different materials, analysing the models.

There is a lecture series from external architects and artists known for dealing with one specific material, fabrics, wooden constructions. Second block: Lectures with focus on the physical characteristics of materials, together with a review of the research results of the students so far. Exercise: Material tests of samples in respect of light, heat, and other physical stresses
Third block: Lectures with focus on assembling techniques of different materials

AR4046 - ASSEMBLY AND TECHNIQUES 5
ECTS Credits: 3

School of Design
Rationale and Purpose of the Module: The aims of this class are:
á to introduce students to making a comprehensive set of working drawings of a third year design studio project.
á to develop further the student’s own intuitive skills in technique alongside knowledge of available construction technology today.
á to introduce students to the Irish Building Regulations
á to carry out a dissertation on a construction system of personal interest

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

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

LECTURE COURSE: A weekly lecture will introduce students to developed construction principles, systems and methods. Students will be asked to choose a construction system/method at the start of the year. Each student will complete a short dissertation on the chosen topic for the end of the module.

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

Prerequisites: AR4051

AR4052 - ENVIRONMENTAL SYSTEMS AND FORCES 2
ECTS Credits: 3

School of Design
Rationale and Purpose of the Module: Continuation of first term’s work, to give students a 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 it’s 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: AR4051
AR4054 - ENVIRONMENTAL SYSTEMS AND FORCES 4  
ECTS Credits: 3  
School of Design  
Rationale and Purpose of the Module: Development of sustainable principles in design with particular emphasis placed on the house, and achieving balanced solutions in relation to energy and sustainability. Understanding comfort in terms of the cultural and social relations that influence its affect.  
Syllabus: Study of all environmental systems required to create a built environment that is in-balance with nature, with particular emphasis placed on the energy and sustainability needs of housing. Students will conduct experiments, research, and learn methods to analyse, design, and text the environmental aspects of the built environment including, U-Values, building envelope integrity tests, daylight tests. Students will construct from actual data (weather data, etc.) models realistic assessments of a buildings environmental performance.  
Prerequisites: AR4032

AR4055 - CULTURE, PLACE AND ENVIRONMENT 1  
ECTS Credits: 3  
School of Design  
Rationale and Purpose of the Module: In most cases nowadays, one cannot simply go out and start building. Things must be planned, consents sought, materials organised. The overall architectural project will take time, and will move through a series of modes, and a series of technological, regulatory and economic inputs. The module offers a critique of this parts-based approach, which, it seems, interferes with and determines our capacity to generate spatial, or pictorial, order through a greater understanding of visual world as inhabited by artists, with a particular focus on their means of engagement.  
Syllabus: In the history of art and architecture, there are moments when a new order emerges. This module, through an examination of drawings, built work and work practices, traces the links between the emergence of a new order and the practice of the person who brings it into being. This module investigates in some detail the work of several practitioners through time, and as a specific example, will also examine the relationship of three practitioners, the painter Bridget Riley, the sculptor Donald Judd and the architect Kazuyo Sejima, to the progress of their work and situates this in the context of the work of Ludwig Mies van der Rohe.  
Prerequisites: AR4053

AR4058 - PROFESSION AND SOCIETY  
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 (full scale) 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 phenomenological 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. Students test radical and experimental alternatives to the conventional processes of building because architecture is facing unprecedented pressure to reinvent itself in response to a new set of economic and environmental realities. The responsibility to pre-empt the needs of future built environments demands new approaches. The modules provide an overview of advanced building construction at an industrial scale and with respect to contemporary, emerging and innovative technologies. Students study the design implications of new construction technologies, and investigate precedents and potential applications.

AR4310 - ADVANCED CONSTRUCTION 4  
ECTS Credits: 3  
School of Design  
Rationale and Purpose of the Module: An extended and clearly structured curriculum in construction design to induce a more innovative and imaginary approach to materials and details. In order to ensure the expected high level of competency in advanced building construction (at an industrial scale and with respect to contemporary and innovative technologies) SAUL introduces a set of Advanced Construction modules throughout Y4 and Y5 in close relation to and in support of the Design Studio projects.  
Syllabus: The series of modules in Advanced Construction expands the scope of students competencies in building technologies and construction beyond traditional methods and their related familiar scale. In the final year, students engage in a tested dialogue with concerns of design, structure, environment, history and theory, representation, digital media, and other related areas and interests. Students undertake a Technical Design Thesis, contextualised as part of a broader dialogue in which the technical and architectural agendas that arise within the year are synthesised. The constructional or technological proposition is pursued critically and developed imaginatively through case studies, material experiments, extensive research and consultation.

AR4367 - Digital Technology  
ECTS Credits: 6  
School of Design  
Rationale and Purpose of the Module: Students are offered the opportunity to tailor their education to a larger degree in fourth and fifth year, with the invitation to focus on their professional development and career planning.
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, workshops and applied technology laboratories. The subject matter can change depending on the interest and availability of academic staff.

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

**AS2402 - INTRODUCTION TO ENGINEERING**
**ECTS Credits:** 6

**School of Engineering**

**Rationale and Purpose of the Module:** To understand the role of engineers in society and the different types of engineering. To understand the basic techniques of problem solving in engineering. To understand the basis of forces and moments in analysing structures. To understand the basics of linear and angular motion when analysing dynamic problems.

**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. Using a calculator correctly, Introduction to Engineering Units, Conversion Factors, Dimensional Consistency, Significant Numbers, Newtonian Mechanics, Forces, Vectors, Resolution of Forces, Moments of Forces, Free Body Diagrams, Reaction Forces, Linear Motion, Angular Motion, Mass, Weight, Momentum, Conservation of Energy.

**Prerequisites:** AS2391

**AW4006 - PEER-TUTORING IN ACADEMIC WRITING**
**ECTS Credits:** 6

**School of Culture and Communication**

**Rationale and Purpose of the Module:** This module recognises the centrality of writing in higher education and the importance of writing as a means of learning. Writing fosters metacognitive thinking about writing leading to the development of transferable generic and complex-thinking skills for students in all disciplines, which in turn generates better writers in both academic and professional settings. Better writers, critical thinkers and researchers are better equipped to sustain the knowledge economy. In this context, the module responds to the University’s ongoing need to create better writers in all disciplines. Peer-tutoring is a step towards providing a coordinated and systematic approach to writing development that is sustainable and cost effective as it will produce a cohort of fully trained, confident graduate and postgraduate student-tutors from a wide variety of disciplines.

**Syllabus:** Students will develop an awareness and command of the metalanguage to discuss their own writing process. This will be developed through reflecting on existing and past writing assignments. Through small group discussion and writing-focused workshops, students will be engaged in activities to develop themselves as writers and writing tutors, including critical and reflective evaluation of their own writing; familiarity with the conventions honoured and the criteria used by other disciplines for the evaluation of writing therein; development of tutoring strategies; observations of experienced peer-tutors; engagement in regular peer-tutoring activity; managing diverse tutoring situations; and professional development. Students will read, write and talk about argumentation, arrangement of ideas, coherence, discipline-specific style conventions and values, grammar, and ethical concerns.

**AW6012 - ACADEMIC LITERACIES FOR INTERNATIONAL POSTGRADUATE STUDENTS 12**
**ECTS Credits:** 3

**School of Modern Languages and Applied Linguistics**

**Rationale and Purpose of the Module:** This module is intended to replace EF6002, which provides language support at Proficiency Level for students on the MA TESOL programme whose L1 is not English. This modification requires broadening EF6002 to offer support to all international students undertaking PG programmes with the aim of enabling students to adapt better to their new learning environment, and foster the linguistic skills necessary to do so. 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, and foster the linguistic skills necessary to do so. This module aims to: Equip International students with the linguistic 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; Equip International students with a repertoire of linguistic features to participate effectively in the academic community; Encourage students to become autonomous/independent learners; Enhance the learning experience of students

Syllabus: International students often face linguistic challenges and this module offers strategies for managing this experience and for providing a rich and engaging learning environment for such students. This module will focus in particular on academic writing for International students. This will include a focus on paragraph organisation (paragraph structure; development of ideas; cohesion and coherence); paraphrasing; forming and articulating arguments and discussion (discussion vocabulary; counter-arguments; the language of discussion), academic style; and academic vocabulary.

Proposed Content: (1 x 12 lecture; 1 x 12 tutorials)
Session 1: Paraphrasing and Organising Paragraphs
Session 2: Argument and Discussion
Session 3: Academic Style
Session 4: Academic Vocabulary
Session 5: Preparation for Writing an Academic Dissertation

BC4002 - INTRODUCTORY BIOCHEMISTRY
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: To provide an understanding of the structure and function of the major biological molecules


BC4008 - IMMUNO AND DNA DIAGNOSTIC TECHNIQUES
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: To provide an overview of the immune system, structure and function of antibodies and usage of Immune and DNA diagnostics.


BC4201 - VALIDATION PRINCIPLES AND PRACTICES FOR THE MEDICAL DEVICE INDUSTRY
ECTS Credits: 9

Chemical Sciences

Rationale and Purpose of the Module: This module is a standalone module offered as Continuing and Professional Education course by Chemical Sciences in collaboration with the Irish MedTech Association.

It will be offered as a University Certificate of Study in any semester, it is not on a programme therefore not associated with specific year.

This module is aimed at professionals who need to demonstrate practical knowledge of the Validation Principles and Practices for the Medical Device Industry.

Validation & verification is required as part of designing and developing a medical device, as part of implementing a manufacturing production process or an automated system, as part of ensuring the appropriateness of a design, production or other process change, and as part of ensuring that a corrective or preventative action is effective and does not adversely impact product.

The course content will follow the following themes:
- Quality Management Systems and where validation & verification aligns to the Quality Management Systems.
- Regulatory and certification bodies’ requirements within Validation Affairs.
- Writing best practice protocols and documentation.
- Risk and risk management and compliance within Validation and verification practice.

Validation and verification professionals are critical to making safe and effective medical products available to patients worldwide. These professionals ensure compliance to international medical device regulations for safety and efficacy.

Validation professionals are one of the most in-demand professions in the Medical Device Industry. This module allows for professionals in the medical device industry and those with an interest in validation affairs to develop the fundamental skills to contribute as effective members of a validation team in the medical devices sector.

Syllabus: Introduction; Validation and verification in the context of Quality Management Systems, Benefits of,
Current trends and regulatory expectations. difference between validation and verification.


Strategy; Validation Master Plans, Applying a Risk Based Process. Impact of Maintenance, Review of Equipment and Maintaining a Validated State; Change Management, Data Integrity, Software Validation.

Computer System Validation; Theory and Regulations, Tools, Good Documentation Practices, Project Practice Qualification Protocols (IQ, OQ, PQ), Planning Documentation; Generation and Execution of Best in Validation, Sampling and Statistics.

Parameters, Critical Quality Attributes, Verification & Qualification, Process Validation, Cleaning Validation.

Current trends and regulatory expectations. difference self-directed learning.

themes and to provide scope for a measure of student critical analysis of issues/topics pertaining to these industrial enzymes/proteins and their uses. To facilitate environmental regulation. To present an overview of major practical aspects of pharmaceutical manufacture, quality systems and pertinent environmental regulation. To present an overview of industrial enzymes/proteins and their uses. To facilitate critical analysis of issues/topics pertaining to these themes and to provide scope for a measure of student self-directed learning.


BC4705 - INDUSTRIAL BIOCHEMISTRY 1
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: To present an overview of (a) animal cell culture and (b) pharmaceutical biotechnology in the context of underlining science and industrial/medical applications.

To present an overview of patenting as applied to biotechnology.

To provide the scope for a measure of student self-directed learning and problem-based learning.

Syllabus: Animal cell culture; Overview and introduction to animal cell culture. Animal cell culture, media, methods and apparatus. Animal cell culture; production of industrially useful products. The drug development process; Regulatory route for new drugs in USA & EU. Biopharmaceutical manufacture; Patenting and biotechnology. Principles of patentability. The patent application process. Sources of biopharmaceuticals. Upstream processing. Downstream processing. Post translational modifications and their significance. Product QC and the range and significance of potential product impurities. Nucleic acid-based biopharmaceuticals; The theory underpinning gene therapy, antisense based products and aptamers. Specific biopharmaceuticals; Students will be provided with 2-3 specific biopharmaceutical products/product families, along with bibliographic details of at least 1 reference source material for each. Students will be expected to source the references, along with any additional pertinent references and undertake self-directed study of the biochemistry and biotechnology of the representative biopharmaceuticals.

Prerequisites: BC4904, BC4905, BC4903

BC4904 - PROTEINS AND DNA
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: To develop advanced topics in cell and molecular biology and utilise these to probe modes of intervention in developing targeted approaches to future diagnoses, pharmaceuticals and biopharmaceuticals. To show how an in-depth understanding of molecular biochemistry can aid this.

Rationale and Purpose of the Module: To develop themes in protein chemistry and enzymology. To develop a fundamental understanding of enzyme kinetics, catalysis and purification. To understand the relationship between nucleic acids and proteins leading to gene structure and expression. To back these concepts up with practical skills.


Prerequisites: BC4903

BC4718 - INDUSTRIAL BIOCHEMISTRY 2
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: To develop threatened approaches to future diagnoses, pharmaceuticals and biopharmaceuticals. To show how an in-depth understanding of molecular biochemistry can aid this.

BC4907 - CELL BIOCHEMISTRY
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: To introduce current advanced topics in cell and molecular biology and utilise these to probe modes of intervention in developing targeted approaches to future diagnoses, pharmaceuticals and biopharmaceuticals. To show how an in-depth understanding of molecular biochemistry can aid this.

**Prerequisites:** BC4905, BC4905

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**BC4968 - FUNDAMENTALS OF REGULATORY AFFAIRS (MEDICAL DEVICE INDUSTRY)**

**ECTS Credits:** 9

**Chemical Sciences**

**Rationale and Purpose of the Module:** This module has been designed to accredit a twelve day course, offered over four months on the Fundamentals of Regulatory Affairs to be offered by the IMDA for professional development.

The regulatory affairs professional is critical to making safe and effective medical products available to patients worldwide. These professionals ensure compliance to international medical device regulations for safety and efficacy. Regulatory Affairs is one of the most in-demand professions in the medical device industry.

The aim of the module is to introduce participants to the Fundamentals of Regulatory Affairs, providing them with basic knowledge of the regulations as they apply to the medical technology industry. This module will cover international regulatory requirements with emphasis on the US, European Union, Japan, Australia, Canada and other global territories with market implications. Regulatory requirements for each system will be presented including classification, marketing submissions and post-approval requirements. Developing regulatory strategies for global market introduction and organising for the challenges of global regulation will be considered.

**Syllabus:** Quality systems for regulated industries, introduction to Regulatory Affairs, Regulatory Body overview, Role of RA Professional, Regulatory Responsibilities, (Pre-Approval, Maintenance and Post Approval), Legal Basis for Regulation.

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**USA:** FDA Case Law/Statute, Product classification, PMA/510(k) regulation, Design, Path to Market, Intro to the FDA Investigator, QSR Part 820

**EU:** Current Regulatory Framework, Medical Device Directives, CE Marking, Product Classification & Certification (Class I, IIa, IIb & Class III), Design dossier versus Technical File, Essential Requirements & Conformity Assessment, Guidance Documents & Standards. MDR/IVDR changes, Clinical Trial Design, Clinical Trial Lifecycle, Good Clinical Practice (GCP), Global Process & Design Paradigms, Clinical & Regulatory Partnership, Clinical Evidence Reports (CER).

**Global Regulatory Affairs:** Canada, Australia, Japan, Emerging Markets, Other Territories, Global Regulatory Expertise, IMDRF/M edical Device Single Audit Programme ISO 13485:2016.


**Regulatory Reporting and Post Market Surveillance:** Reports, Remedial Actions, Recalls, FSNs, Inspection Watch-outs.

**Device Changes Post Approval and Re-Certification:** Change Control, Change Assessment, RA Determinations, Regulatory body notification, Technical File updates, Re-certification & changing environment, Annual/Supplementary reports.

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**BR4002 - BROADENING: ENGLISH AS WE SPEAK IT IN IRELAND**

**ECTS Credits:** 6

**School of Modern Languages and Applied Linguistics**

**Rationale and Purpose of the Module:** This module contributes towards UL’s broadening the curriculum strategy by offering participants the opportunity to explore a shared resource - language – in a learning environment which will involve working interactively and collaboratively in a cross-disciplinary context. It is designed to engage participants by drawing their attention to something often taken for granted, how language is used, and sensitise them to the nuances of language as it is spoken every day. The module introduces participants to the scholarship of what will be for most ‘their’ English, and for others the dominant form of English they are surrounded by everyday - spoken Irish English. Irish English, its development, history and characteristics, is used as a focus for discussion of broader questions relating to language in use in society:

**BR4001 - BROADENING: SOCIAL AND CIVIC ENGAGEMENT**

**ECTS Credits:** 6

**Centre for Teaching and Learning**

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

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

The campaign element of the module would involve research in an area of social importance (with a focus on students) such as Road safety, mental health, sexual health, social responsibility, alcohol awareness, drug abuse, equality and many more working with the Students Union on the many issues and campaigns they take on. The campaign will have to have an online element and a visible element on campus, a public speech and talk is encouraged and as much engagement with UL and or external bodies is also envisaged.
issues of power and legitimacy; how language is constructed and used in various media; the relationship between language, identity and community; how language is used to communicate and construct knowledge in an academic context; how it is used creatively for self-expression and enjoyment; how it is used and interpreted differently by different users in different contexts. There is no specialist knowledge of language required to access the content of the module, and the very fact that participants will share access to the variety at issue, Irish English, will mean that all participants start off on an even footing, and they will be invited to apply the new perspective on language that develops as a result of completing this module to their own use of language in their private and public lives, as well as the academic discipline they are studying. For example, thinking critically about how language is instrumental in marketing and management, how professional specialists in an area use language in ways that are distinct from everyday language. Introducing spoken Irish English as an important and robust variety is intended to give participants a sense of ownership and control of their variety of English, and, using spoken Irish English as a baseline, participants are invited to become conscious users of language, challenged to think critically about how language works in different contexts, and how it impacts on their lives and the lives of others.

Syllabus: The purpose of this module is to give participants an insight into how language is really used, rather than how we think it is used or how we think it should be used. For many analysts of language, spoken conversational language is an effective baseline against which to investigate how language is used in distinctive ways in different contexts. We focus on Irish English, the way the English language is spoken in Ireland, and what makes it a distinct, rich and interesting variety of English. The materials used for the module are designed to be engaging, enjoyable and relevant. The syllabus covers the development of Irish English, its history and present-day characteristics - this will involve learning new terms to talk about spoken language in order to describe it, and so terms such as phonology, syntax, lexis, pragmatics and discourse will be introduced for non-specialists. Many of the concepts critical to understanding and analysing spoken language, such as the concept of the turn, or vagueness in language are very accessible. The syllabus will also include learning about how corpora are used in the contemporary study of spoken and written varieties of language, and hands-on experience of using corpus analysis software to investigate language. Naturally occurring language from everyday sources, such as newspapers and social media will also be used as practical examples of language, as well as fictional representations of Irish English in film, television and literature.

BR4012 - BROADENING: COMMUNICATION ACROSS CULTURES
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

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

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

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

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: The module will offer students who would otherwise not engage in European Studies an opportunity to engage in European Union Studies. While imparting factual information to key aspects of the history, institutions and politics of the European Union will be most prominent in the first half of the module, the second half aims to actively engage students in discussions about topical issues, such as migration, climate change and Brexit, but also, and perhaps more importantly, in reflections about the future of the European Union, which the students themselves will help to shape in their later careers. The module is interdisciplinary in nature and include and integrate the areas of politics, cultural studies and language studies. It aims to counteract the perception of the European Union as a top-down political enterprise by encouraging students to see it as one dependent on the active engagement of citizens. The module will also address the role of ERASMUS, in which many students will participate, in shaping a sense of EU citizenship.

By reserving one-quarter of the places on this module to ERASMUS students from as wide a range of member states as possible the
module will bring the multilingual and multi-cultural European experience into the classroom and make the different national perspectives an integral part of the debate. It will consist of an academic part and - as part of the UL Engage initiative - an off-campus element in which students engage both Limerick schools and the general public in Limerick City in discussions about what it means to be an EU citizen today.

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

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

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

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

**Part IV**
One full day in week 12 (Friday/Saturday) will be dedicated to Community Engagement: four groups will engage with pupils in one secondary and one primary school and two with passers-by in selected locations in Limerick city centre (Schools: Mannix McNamara / City: Scully).

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**BR4031 - BROADENING BY UNDERSTANDING AND CONFRONTING CRISIS AND RISK**
**ECTS Credits: 6**

**Management and Marketing**

**Rationale and Purpose of the Module:** The topics of risk and crisis are very much intertwined, and have a profound impact on individuals, institutions and society as a whole. Crisis is risk realised, and both are central factors affecting decision making. In addition, how a crisis is managed and portrayed in the media affects risk perceptions. This module gives a background of risk and crisis from multiple interdisciplinary perspectives including; economics, communications, journalism, history, neurology, and risk management. Students will understand the magnitude of risk and crisis within society, and how it transcends multiple contexts, and disciplines. This can only be achieved by an holistic examination of risk and crisis through multiple lenses. The students will learn how risk is portrayed, quantified, and processed. After this module, students will have an awareness of risk and risk information processing, how crises impact risk assessments, how risk is communicated in the popular media, and understand crisis response strategies. This course will have potential appeal and interest across the university, as it transcends disciplines. In the majority of courses, students have to debate and consider the issues of risk/crisis in their own primary discipline (e.g. engineering, politics, public health & medicine, psychology, business, law, sociology, maths, life sciences, etc.).

**Syllabus:** Risk and crises are powerful forces that affect and shape human behaviour, and society, defining the lives of people and institutions in the 21st century. Crisis is risk realised, and both are central factors affecting decision making. Students will understand the magnitude of risk and crisis within society, and how it transcends multiple contexts, and disciplines, analysing the topic from several different perspectives.

Students will gain knowledge of how individuals and organizations quantify and perceive risk, broadening their understanding of risk and crisis portrayed from a physiological, historical, economic, scientific, and communications perspective. The module comprises of six learning units; Risk in Society; Historical Perspectives of Risk & Crisis; Economic Perspectives of Risk & Crisis; The Neurobiology of Risk; Portrayal of Risk & Crisis in the Media; Risk and Crisis Communications. This module brings together insights from the fields of business, economics, communications, history, journalism, and medicine.

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**BR4041 - BROADENING: SOCIAL MEDIA FOR SOCIAL GOOD**
**ECTS Credits: 6**

**Management and Marketing**

**Rationale and Purpose of the Module:** This module takes undergraduate students from as wide a range of programmes as possible, places them in groups mixed by discipline, age, culture, experience etc., and gets them working on questions of social responsibility and ethical practice, using social media techniques. They connect to self-selecting social entrepreneurs and non-profit groups and work in partnership with them to develop a social media strategy which will enhance their overall effectiveness.

This module is designed to engage students in five ways for the wider social good. The idea is to get them working in a highly-interactive and self-driven way (1) with each other across the university; (2) with theory and practice around ethics and responsibility; (3) with new and evolving mobile technology; (4) with creative techniques (using social media and ‘gamification’ elements); and (5) with social entrepreneurs, not-for-profit organisations and communities. The module will address goals one and four of the University’s Strategic Plan, Pioneering and Connected by enhancing the student experience and increasing useful engagement with the community.

The module is proposed as a cross-disciplinary UL broadening module. The design team is: Gabriela Avram, CSIS, Science & Engineering; Sheila Killian, Accounting & Finance, KBS; John Lannon, Management & Marketing, KBS; Liam Murray, LLCC, Arts, Humanities and Social Sciences; additional input from James Corbett, Social Entrepreneur

**Syllabus:** The 'Social Media for Social Good' module allows students to develop both practical skills and a good theoretical grounding in the relevant fields. Students will gain a grounding in stakeholder theory, business ethics, corporate social responsibility and social entrepreneurship. They will learn practical skills in the application of social media, as well as their sociological and psychological contexts. They will engage with a social entrepreneur or community/voluntary group external to the university, and working in groups, apply
what they have learned to develop for them a social media strategy.

The module is suitable for first and second year students from all disciplines and courses. Note, however, that in the first pilot year intake will be restricted to first year students only.

BR4051 - BROADENING THROUGH CREATIVITY AND PROACTIVITY
ECTS Credits: 6

Personnel & Employment Relations

Rationale and Purpose of the Module: This Broadening the Curriculum module is designed to developed students skills and meta competencies with regard to two of the UL Graduate Attributes, namely:
1. Creativity
2. Proactivity

This is an innovative module that will train students in the skills of creativity and proactivity. It will provide students with the opportunity to understand their own personal style of creativity and allow them to practice their creative and proactive skills using a process that is utilized by many of the top innovation companies in the world.

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

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

Physical Education & Sport Sciences

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

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

BR4091 - BROADENING THROUGH SUSTAINABLE DEVELOPMENT
ECTS Credits: 6

School of Design

Rationale and Purpose of the Module: This interdisciplinary module facilitates the Broadening Agenda and the University of Limerick’s Strategic Plan as it seeks to introduce students to sustainable development and equip them with the knowledge, skills, values and literacy for assuming a responsible and informed position as ethically-minded citizens. By addressing the three principal strands of sustainable development - economic, environmental and social - the module will build awareness and coherency around questions of global and local connectedness and interdependency, equity and the fragility of eco-systems. Pedagogically, the module will enhance analytical and critical thinking skills by applying theory to practice and cultivate a community of learners able to develop community led solutions for a sustainable future. The module is taught by an interdisciplinary team from across all University Faculties to ensure multiple and often conflicting perspectives on Sustainable Development are presented to the students.

Syllabus: Definitions and contexts for understanding social and human aspects of sustainable development, critical thinking, challenging assumptions, examination of knowledge creation and semiotics.

Climate change, the physical science and international politics, energy, energy use in everyday living, transport, sources of energy and GHG emissions for different sources, energy dependence, renewable energy (wind, biofuel, solar, wave), efficiency and conservation, peak oil.

The economics of sustainability, does sustainable innovation enable sustainable growth? Consumption and production, environmental impact of everyday things, how marketing influences behaviours, life cycle thinking, behavioural thinking, systems change and intervention, creativity and innovation, corporate social responsibility, ethical investment and economic.

Food, sustainable food production, energetics of food production, sustainability of the food chain.

Sustainability and public policy, sustainable development in the national context, the public policy making process, horizontal policy issues, regional and local, European
Community and the environment. Sustainability metrics, using scientific analysis to quantify sustainability as guidance for policy makers, environmental taxes, non-environmental subsidies. Sustainable communities, building sustainable community action, bottom up approaches, role of local democracy and environmental and social movements, local agenda 21.

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**BR4101 - BROADENING THROUGH PLACEMAKING**

**ECTS Credits:** 6

**Humanities**

**Rationale and Purpose of the Module:** The aim of this module is to introduce students from a range of disciplines to ideas and issues in placemaking. Placemaking is a collaborative and interdisciplinary way of thinking about place and sustainable development. It is among the emerging methods of thinking and working in social and regional development and regeneration, community building and urban and rural planning. It includes connected and collaborative working and thinking around what makes successful places for living and working. Given that placemaking is based on bringing together several different perspectives on place and development, it is an ideal subject for a broadening module, and will appeal to students from a broad range of disciplinary perspectives.

The module will be offered to both undergraduate and postgraduate students, as a 6-credit module to undergraduates and as a 3-credit module for postgraduates, with appropriate learning outcomes, teaching and research and assessments for each level. This teaching structure for the module is outlined below. The proposed module will be taught by staff from the contributing faculties. Innovative models of teaching, learning and assessment will be built into the module structure.

The overall module assessment will be based on the creation of group portfolios and presentations on a key issue relating to placemaking in a specific identified location of their choice, demonstrating collaborative a research approach, relevant research and creative proposals for solutions and ideas for change.

This module is designed to be delivered through a number of teaching modes. The module can be delivered as a fully online module, as a module delivered in the classroom on a 12-week or 1 week intensive/lab model, or via a blended approach, utilising both online and classroom delivery. These modes of delivery have been approved by the advisory board for Placemaking. The module will consist of a series of seminars (providing students with key information and perspectives on thinking about placemaking and sustainable development from a range of relevant viewpoints, including sociology, urban design, festival and cultural participation, linguistics, geography, economic growth and sustainable community development. These seminars will be provided together with labs (again, either online or in the classroom) that will provide students with skills and perspectives to work collaboratively and proactively, to identify and articulate key issues relating to placemaking, and to creatively and knowledgeably propose solutions. The module also promotes social and civic responsibility as it stresses a collaborative and connected approach to creating successful and sustainable places for life and work, rather than devolving responsibility to one particular group or agency.

The core seminar areas will include (but are not limited to):

- Understanding public space
- Building strong communities through participation
- Urban design
- Language, landscape and public space
- Transportation, public space and quality of life
- Regeneration and community organising
- Cultural participation
- Soundscapes and the public environment
- Festival, parade and protest in public spaces
- Rural public spaces - design and development
- Economic development within urban and rural environments
- Sustainable development
- Building strong relationships between stakeholders in public places
- Policy for strong and connected places
- Public art, amenities and parks - design and management
- Ritual studies and place

The core labs will include:

- Design thinking - introduction and methodology
- Project development and management
- Market research
- Strategic uses of social media
- Project pitching and articulation

**Syllabus:** The proposed module is a 6-credit module taught by staff from the contributing faculties. Innovative models of teaching, learning and assessment will be built into the module structure.

The overall project assessment will be based on the creation of group portfolios and presentations on a key issue relating to placemaking in a specific identified location of their choice, demonstrating collaborative a research approach, relevant research and creative proposals for solutions and ideas for change.

The module will consist of a series of seminars, providing students with key information and perspectives on thinking about placemaking and sustainable development from a range of relevant viewpoints, including sociology, urban design, festival and cultural participation, linguistics, geography, economic growth and sustainable community development. These seminars will be provided together with labs that will provide students with skills and perspectives to work collaboratively and proactively, to identify and articulate key issues relating to placemaking, and to creatively and knowledgeably propose solutions. The module also promotes social and civic responsibility as it stresses a collaborative and connected approach to creating successful and sustainable places for life and work, rather than devolving responsibility to one particular group or agency.

Within the undergraduate module there will be a strong emphasis on developing skills for working in interdisciplinary teams, and in presentation skills and portfolio development and articulation.

The core seminar areas will include (but are not limited to):

- Understanding public space; Building strong communities through participation; Urban design; Language, landscape and public space; Transportation, public space and quality of life; Regeneration and community organising; Cultural participation; Soundscapes and the public environment; Festival, parade and protest in public spaces; Rural public spaces - design and development; Economic development within urban and rural environments; Sustainable development; Building
strong relationships between stakeholders in public places; Policy for strong and connected places; Public art, amenities and parks - design and management; Ritual Studies and Place

The core labs will include:

Design thinking - introduction and methodology; Project development and management; Market research; Strategic uses of social media; Project pitching and articulation; Team working and creative project development within teams; Key ideas in social entrepreneurship; Presentation skills (visual, verbal, use of IT resources etc.)

BR4104 - SPRING PRACTICUM (AHSS - 6 CREDITS)
ECTS Credits: 6

Politics and Public Admin

Rationale and Purpose of the Module: The UL Practicum provides a mechanism to broaden the curriculum through action-oriented research and service-learning. It is designed to facilitate students to work in interdisciplinary teams, on real-world problems, identified with external partners. Students on this module will take part in faculty designed, multi- and/or inter-disciplinary applied research projects in collaboration with external community stakeholders (civic, public, private). As with any project, Practicum projects will comprise a varied number of work packages, which may require a variety of levels of experience and/or skills. This experiential and disciplinary diversity will be provided by a team of students with different disciplinary and programme expertise, in terms of their competence levels (e.g. undergraduate or postgraduate) and the extent of their involvement in the project (e.g. as part of a programme, as an elective or as dissertation).

This practicum module reflects student input and work that is equivalent to one undergraduate module at 6 ECTS.

Syllabus: This module will provide students with practical experience, generic skills development (such as applied research work, team work, problem-solving and project work) as well as the experience of being part of a multi- or inter-disciplinary team. It will enable them to apply the disciplinary knowledge that they have learnt to multi-faceted real-world problems. Students will: take part in problem identification and ideation; develop a deeper understanding of academic issues areas and problems in consultation with external stakeholders; work towards solutions in collaboration; implement identified changes and evaluate outcomes. A reflective practice will underpin the student experience throughout.

BR4911 - BROADENING: BEGINNERS FRENCH
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

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

Syllabus: This module aims to introduce students to French and gradually develop their ability to the level of A1 as outlined by the Common European Framework for Languages. Students should develop a basic understanding of everyday vocabulary, understand the rules of pronunciation and have a basic grasp of the relevant grammar for that level. The module will allow students gain sufficient proficiency in French to: manage to pronounce very short, isolated mainly ready-made grammatical structures; use a very basic repertoire of words related to personal details; use a limited range of vocabulary to talk about particular concrete situations; use a small range of ready-made expressions and phrases related to everyday topics (introductions, leave-taking, apologies); write simple isolated phrases and sentences on everyday topics.
**Rationale and Purpose of the Module:** In line with the UL strategy to broaden the curriculum, this module will offer students in a range of different disciplines an opportunity to engage in learning German. In our increasingly multicultural and multilingual society, it is crucial that students have opportunities to learn about and appreciate other languages and cultures. To this end, the module aims at developing students’ competence in German and is targeted at those who have not studied German previously. The module is mapped on to the A1 level of the Common European Framework for Languages where the emphasis is on achieving a basic level of communication in all four skills (listening, speaking, reading and writing). It will also aim at developing confidence and a degree of accuracy when using the language in a limited range of situations. The module also aims to stimulate students’ interest in the German-speaking world and deepen their knowledge and understanding of German society and culture.

**Syllabus:** This module aims to introduce students to German and gradually develop their ability to the level of A1 as outlined by the Common European Framework for Languages. Students should develop a basic understanding of everyday vocabulary, understand the rules of pronunciation and have a basic grasp of the relevant grammar for that level. The module will allow students gain sufficient proficiency in German to:

- manage to pronounce very short, isolated mainly ready-made expressions; show a limited control of a few simple grammatical structures; use a very basic repertoire of words related to personal details; use a limited range of vocabulary to talk about particular concrete situations; use a small range of ready-made expressions and phrases related to everyday topics (introductions, leave-taking, apologies); write simple isolated phrases and sentences on everyday topics.

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

**Syllabus:** This module is for students who have studied German previously and wish to expand their knowledge of the language. The emphasis is on developing students competence to the level of B1/B2 outlined by the Common European Framework for Languages. The module includes a portfolio of independent work and a mini-research project which provides the opportunity to research an area related to a German-speaking country and/or the student’s area of study through the medium of German. Communication skills which will be developed include discussion, interview techniques and presentation skills, reporting skills and writing a report.
**BR4961 - BROADENING: ADVANCED SPANISH**  
ECTS Credits: 6

**School of Modern Languages and Applied Linguistics**

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

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

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**BS4008 - INTERNATIONAL BUSINESS CONFIRMATION PAPER 2**  
ECTS Credits: 6

**Management and Marketing**

**Rationale and Purpose of the Module:** This double module will give students an opportunity to conduct an independent research project in the area of international business while being supported by a series of seminars on how to conduct research. The main objectives for students undertaking this research paper are to gather information in a rigorous manner, integrate relevant theories and evidence to produce reasoned arguments, work independently, explore one area of international business in-depth, produce a coherent, useful and literate report and present and defend the final paper.

**Syllabus:** Working closely with a Faculty Supervisor, students will complete the independent research paper. Students will identify an appropriate area for secondary investigation and establish a plan of work for the researching and writing of the confirmation paper. Faculty will run additional seminars as necessary to suppose students’ progress.

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**BY4002 - BIOLOGY 2**  
ECTS Credits: 6

**Biological Sciences**

**Rationale and Purpose of the Module:** The purpose of this module is to introduce students to fundamental concepts in cellular reproduction and genetics; diversity of life, introductory plant physiology, evolution and ecological principles.

**Syllabus:** Cellular reproduction; binary fission, mitosis and meiosis. Introduction to genetics; Mendelian inheritance, chromosomes and genes, mutations. DNA; structure, replication and organisation in cells. Gene activity; the genetic code, transcription, translation and expression. Plant structure and function; transport in plants, reproduction, seed structure, germination, growth and development, plant adaptations.

Introduction to taxonomy and classification. Introduction to animal kingdom (Protozoa, Porifera, Cnidaria, Platyhelminthes, Nematoda, Annelida, Mollusca, Echinodermata, Arthropoda, Chordata). Introduction to fungi, algae and plants (Bryophyta Pterophyta, Coniferophyta, Anthophyta). Evolutionary theories, evidence for evolution, evolutionary process, origins of life. Principles and scope of ecology; ecosystems; cycles in nature; energy flows; population and community dynamics; limiting factors; food chains: succession, environmental concerns.

**Prerequisites:** BY4001

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**BY4014 - MICROBIOLOGY AND IMMUNOLOGY**  
ECTS Credits: 6

**Biological Sciences**

**Rationale and Purpose of the Module:** This module provides an introduction to Microbiology and Immunology. Students are introduced to the concepts of microbes as mutualists, commensals and pathogens. The module serves to introduce students to the nature of the host pathogen relationship and how the innate and adaptive immune system maintain host defences.

**Syllabus:** Microbiology: introduction to micro-organisms; major structural components of bacteria; mutualism, indigenous microbiota; determinants of virulence; Pathogen-associated molecular patterns; Virology: virus structure and classification; viral pathogenesis, viral interactions and immune evasion.

Immunology: introduction to immunity; innate defences against infection; pattern recognition receptors; cell biology of the specific immune system; humoral specific immunity; cell mediated specific immunity; generation of immunological diversity.
BY4016 - ANIMAL PRODUCTION SYSTEMS  
ECTS Credits: 6

Biological Sciences

Rationale and Purpose of the Module: The purpose of the module is to educate the students in animal production, health and welfare so that they are able to teach it as part of agricultural science at leaving certificate level

Syllabus: - Animal Welfare
- Five freedoms of animal welfare, Animal Welfare Law; principles of animal welfare; body condition scoring of cattle, sheep and pigs; major categories of animal diseases; zoonotic and notifiable diseases.
- Sheep Flock Management
Sheep production systems; sheep breeds; sheep breeding; rearing and feeding of sheep and lambs; sheep diseases; building and handling facilities for sheep.
- Beef Herd Management
Breeds of beef cattle; rearing and production of steer, heifer and bull beef; feeding of beef cattle; carcass grading systems for beef cattle; diseases of beef cattle; housing and handling facilities for beef cattle.
- Dairy Herd Management
Breeds of dairy cattle; spring and autumn calving dairy herds; life cycle of a dairy cow; the lactation curve; diseases of dairy cows; rearing of dairy calves; feeding of dairy cows; milking machine and milking parlour operation; housing and handling facilities for dairy cows.
- Pig Production
Breeds of pigs; the pig production cycle; diseases of pigs; feeding of pigs.
- Poultry Production
- Poultry management of production of meat and eggs; poultry housing.

Prerequisites: BY4015

BY4102 - BIOLOGY FOR BIOSCIENCES  
ECTS Credits: 6

Biological Sciences

Rationale and Purpose of the Module: The purpose of this module is to introduce students to fundamental concepts in cellular reproduction and genetics; diversity of life, introductory plant physiology, evolution and ecological principles.

Syllabus: Cellular reproduction; binary fission, mitosis and meiosis. Introduction to genetics; Mendelian inheritance, chromosomes and genes, mutations. DNA; structure, replication and organisation in cells. Gene activity; the genetic code, transcription, translation and expression. Plant structure and function; transport in plants, reproduction, seed structure, germination, growth and development, plant adaptations.

Introduction to taxonomy and classification. Introduction to animal kingdom (Protozoa, Porifera, Cnidaria, Platyhelminthes, Nematoda, Annelida, Mollusca, Echinodermata, Arthropoda, Chordata). Introduction to fungi, algae and plants (Bryophyta Pterophyta, Coniferophyta, Anthophyta). Evolutionary theories, evidence for evolution, evolutionary process, origins of life. Principles and scope of ecology; ecosystems; cycles in nature; energy flows; population and community dynamics; limiting factors; food chains; succession, environmental concerns.

Prerequisites: BY4001, BY4002, BY4003

BY4214 - PRINCIPLES OF HUMAN NUTRITION  
ECTS Credits: 6

Biological Sciences

Rationale and Purpose of the Module: To introduce students to the basic concepts and principles of Human Nutrition

Syllabus: This module will examine nutrients, their function, metabolism and food sources as well as discuss the latest research in the role of nutrition for the promotion of optimal health and prevention of disease. The absorption, digestion and essential functions of the macronutrients (carbohydrate, protein and lipids) and the micronutrients (vitamins and minerals) will be explored. Changes in nutritional requirements at different stages of the life cycle will be discussed as well as special needs during pregnancy, lactation and aging. The impact of nutrition and food on the promotion of health and the prevention of disease will be fully explored. Topics covered include: energy requirements, carbohydrates, protein, lipids, absorption, digestion and metabolism of nutrients, vitamins, minerals, water, dietary standards, heart disease, cancer, obesity, maternal nutrition/lactation, infant/childhood/teenage nutrition

Prerequisites: BY4001, BY4002, CH4102
CE4024 - STRUCTURAL STEEL AND TIMBER DESIGN
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: This module introduces the student to the structural design and detailing of elements in steel and timber with the following key objectives:

Key objectives
* To master the concepts of structural design in steel and timber.
* To develop the skill of detailing structural connections in steel and timber.
* To develop an awareness of the structural uses and limitations of steel and timber.

Syllabus: * Structural Steel
Manufacture and composition  a review, section properties tables, design of fully restrained, partially restrained and un-restrained beams, truss design, design of long and short columns; axial and combined loading conditions, design of pinned and moment connections, baseplate and splice design, structural detailing and fire & durability issues.

* Timber Design
Properties and conversion of timber  a review, beam design, column design; axial and combined loading conditions, truss design and stability issues, Introduction to diaphragm & shear wall design, bolted, nailed and stapled connections, glulam, LVL and I-beam design, structural detailing and fire & durability issues.

Prerequisites: CE4002

CE4025 - TRANSPORT PLANNING AND DESIGN
ECTS Credits: 6

School of Engineering

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

Syllabus: History and Contemporary Picture and Trends: Physical, social, political and economic contexts, sustainable transport and settlement, current policies and trends.

Data Collection and Analysis: Use of demographic data, survey design and implementation.

Appraisal and Forecasting: Demand drivers, mode choice and behaviour, an overview of multi-modal macro and micro modelling, modelling uses and limitations, demand and capacity forecasting, impact assessment.

Road Design: Road construction details and geometric guidelines, road junction analysis.

CE4028 - ENERGY EFFICIENT BUILDINGS: MODELLING AND DESIGN
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: Building energy design is now a primary driver of overall building design. Understanding building energy physics is now essential for all design team members. Aims and objectives: Train students how to design and model energy-efficient buildings; Equip students with the knowledge required to quantify the energy-efficiency of preliminary designs and propose building and material design modifications; predict thermal performance within building zones; understand how building design, occupancy and use interacts with thermal energy systems, solar irradiance and weather conditions as well as their effect on human comfort and energy consumption.

Syllabus: Building design and energy use: historical trends, current status and future trends Building energy policy at national and EU level; factors affecting human comfort; Steady-state and transient thermal physics of buildings; heat transfer mechanisms; performance metrics; typical metric values for building including exemplar low-energy and passive builds; design related and environmental performance drivers overall form, aspect ratio, surface-to-volume ratio, percentage glazing, orientation, site context, solar irradiance, prevailing winds, shelter, design features including insulation, solar shading, low-e coatings, automated shading and ventilation.

Overview of strategies for modelling building thermal physics; thermal resistance networks; lumped capacitance; steady-state vs. transient; dimensionless scaling parameters and empirical correlations; compiling input data - building fabric, thermal mass, weather data, building use, active, passive and mixed mode ventilation, thermal sources, heating & cooling systems, control
strategies and feedback.

Design thermal model, build and digitise model, configure inputs, configure outputs, solve and interpret outputs; describe scope and limitations of model; suggest modifications to enhance energy usage, update model, analyse response and appreciate cost benefit of improvements.

CE4044 - FLUIDS AND ENERGY
ECTS Credits: 6

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

CE4058 - PROJECT PLANNING AND CONTROL FOR THE BUILT ENVIRONMENT
ECTS Credits: 6

School of Engineering
Rationale and Purpose of the Module: The aim of this module is to build on the learning from the module Construction Management and Technology. The module will bring together the management and technology learning to date and provide students with challenges that require both individual and teamwork skills to solve, enabling students to understand the dynamics of project planning and control in the built environment.

Develop a project plan for a significant construction project from concept to completion. Manage integration of project elements. Provide knowledge of goal seeking, coordination, reporting, risk assessment Practice control on emulation projects; emulate changes in resources, unexpected discoveries, client modification expectations

Practical experience controlling a construction project.

Syllabus: Planning: Developing Goals and Requirements, evaluating resources, estimating timelines, risk assessment, project partitioning, interface management, developing test requirements and procedures, data management. Control: Monitoring progress, calculating critical and near critical paths, change control, change notification, Managing third party suppliers/contractors, reporting

CE4068 - PROCUREMENT AND CONTRACTING II
ECTS Credits: 6

School of Engineering
Rationale and Purpose of the Module: This module builds on the construction contracting and procurement topics provided in Procurement and Contracting 1 and further develops the procurement and contracting fundamentals as they apply to the various aspects of the construction industry: including civil, structural, mechanical, electrical and plant elements. In particular the causes and remedies for construction disputes are covered such that the following key objectives are met:

To become familiar with the relevant terminology as it applies to the construction industry.
To develop a strong understanding of the standard forms of construction contracts in use in the industry, both domestically and internationally and making specific reference to the work carried out under the aegis of the various multilateral development banks.
Create an understanding of the role of the construction manager as an agent for the prevention and successful management of disputes.
Develop an ability within aspiring construction managers to appreciate and take full account of the ramifications of their, and other parties, actions in the context of successfully leading and managing complex construction projects.
To reflect the role of ethics in professional practice.

Syllabus: Construction contracts: formation, tendering, conditions, standard forms; areas of dispute and liability; certification process; claims and the importance of the programme in the management of time-related claims; dispute resolution: traditional forms, dispute boards, adjudication, alternative dispute resolution; design liability of professionals and contractors.

CE4206 - OPERATING SYSTEMS 2
ECTS Credits: 6

Electronic & Computer Engineering
Rationale and Purpose of the Module: Study of multitasking operating systems. Study will be confined to single processor systems. A Unix or WIN-32 operating system will be selected as the prime example operating system. The module lab work will teach the student to develop concurrent program solutions. The module includes: concurrency, states, queues, scheduling. Process inter-communication. Memory management. File systems to support multitasking. File sharing, file protection, performance issues. Conditions for deadlock and solutions. I/O devices and device drivers. File security and protection.

Syllabus: 1) Processes: Concurrency, states, queues, scheduling. 2) Process Communication: Mutual exclusion, race conditions, busy-waiting solutions, Test/Set locks, semaphores, monitors, simple message passing, pipes, classical problems. 3) Memory Management: Swapping, virtual memory, paging, segmentation, performance and protection issues. 4) File systems to support multitasking: File sharing, file protection, performance issues. The UNIX i-node system. 5) Deadlock: Conditions for deadlock and solutions. 6)Input/Output: I/O Devices for multitasking environments, need for design of re-entrant drivers. 7) Computer Security and Protection: User authentication; protection matrix; ACL: capabilities. 8) Case Study: The UNIX Operating System: Origins; Standards; Shells; Utilities; Process Management; Memory Management; File Management; Programming in the Unix environment (Or, equivalent study based on a WIN-32 operating system.)

Prerequisites: CE4204

CE4208 - 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.

Syllabus: To introduces application design principles and techniques using available web-based technologies. (e.g SOAP, Microsoft.NET, Java Services). Reliability and security issues of distributed applications are addressed. Use of cookies and the covert use of applications to provide a community-wide service.

Characterization of Distributed Systems. Tools and technologies used to develop distributed applications. Mechanisms to secure applications from malicious
attacks and errant processes. Component based software development (e.g. CORBA, JavaBeans). Service portability via virtual servers. Replication and Fault Tolerance. Study of evolving Web services. The role of the hidden internet for intelligence gathering. Remotely hosted application environments.

Prerequisites: CE4607, CE4206

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**CE4702 - COMPUTER SOFTWARE 2**  
**ECTS Credits: 6**

**Electronic & Computer Engineering**

**Rationale and Purpose of the Module:** Further the students' knowledge of a modern object oriented programming language with particular emphasis on classes, objects and Graphical User Interfaces. Understand the concepts of inheritance and polymorphism. Develop the ability to produce moderately complex event driven programs with user interfaces developed using a graphical toolbox.

**Syllabus:** The following topics will be covered:
- In depth study of the object oriented principles, abstraction, inheritance and polymorphism.
- Abstract data types including interfaces, abstract classes. 
- Input and output including files and streams.
- Introduction to the use of regular expressions to manipulate text files
- Introduction to algorithms - efficiency, simple analysis and comparison
- Error handling techniques
- Binary trees
- Recursion
- Graphical user interfaces and development of event driven applications
- Unique global class naming and creation of class libraries
- Code documentation and code reviews
- Use case analysis

Prerequisites: CE4701

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**CE4717 - LANGUAGE PROCESSORS**

**ECTS Credits: 6**

**Electronic & Computer Engineering**

**Rationale and Purpose of the Module:** To introduce the theory of compiler design and show its application in a simple compiler. An important part of the module is the implementation of a compiler for a simple, Pascal-like, language.

- LL(1) table-driven parsers. Shift-reduce parsers. LR parsing. The LR(0) Characteristic Finite State Machine. LR(1). SLR. LALR(1). The use of a parser generator such as yacc. 
- Code generation for register architectures. Introduction to code optimisation techniques.

Prerequisites: CE4703

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**CH4002 - PHYSICAL CHEMISTRY 1**  
**ECTS Credits: 6**

**Chemical Sciences**

**Rationale and Purpose of the Module:**  
- i. To facilitate the student in understanding of the fundamental thermodynamic laws and its qualitative and quantitative applications to chemical systems  
- ii. To familiarise the students with the energy terms and relations that applicable to chemical thermodynamic systems.  
- iii. To introduce the students to the basic chemical kinetics including the quantitative expressing of the rate of chemical reactions and key kinetic parameters in the chemical kinetics

**Syllabus:** [Introduction to Chemical Thermodynamics; Heat; Work; Reversible and Irreversible Systems; State functions.]  
[First Law of Thermodynamics; Internal Energy; Enthalpy; Standard Enthalpies.]

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**CG4008 - PROCESS TROUBLESHOOTING**  
**ECTS Credits: 6**

**Chemical Sciences**

**Rationale and Purpose of the Module:** To provide the student with skills and knowledge in the field of chemical and biochemical process troubleshooting. To provide the students with a working knowledge of a commercial Computational Fluid Dynamics code via practical computer laboratory sessions.
CH4004 - PHYSICAL CHEMISTRY 3
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: i. To facilitate students in understanding the fundamental thermodynamic laws and functions that rule a process of change in a physical chemical system.  
ii. To provide students with requisite knowledge of analysing physical chemical systems, such as the phase transformation of a pure substance, the mixing and phase transformation of two components, using thermodynamic and derived thermodynamic functions. 
iii. To familiarise the students with the phase diagrams and the use of these to analyse the above-mentioned physical chemical system.
iv. To provide the students with basic knowledge of electrochemistry, electrochemical cell and their thermodynamic account.

Syllabus: - 1st Law of Thermodynamics; Enthalpy
- Entropy; 2nd and 3rd Laws of Thermodynamics; Clausius Inequality
- Helmholtz and Gibbs Energies
- Chemical Potential; Fundamental Equation of Chemical Thermodynamics
- Physical Transformations of Pure Substances: Phase Diagrams; Phase Stability and Phase Transitions; The Physics of Liquid Surface
- Simple Mixtures: Gibbs-Duhem equation; Raoult’s and Henry’s Laws
- Phase Diagrams: Phase Rule; Two-Component Systems
- Equilibrium Electrochemistry: Thermodynamic Properties of Ions in Solution; Electrochemical Cells; Nernst Equation

Prerequisites: CH4003, CH4002

CH4008 - ORGANIC PHARMACEUTICAL CHEMISTRY 2
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: To build on the functional group chemistry covered in CH4102, CH4103, CH4104 and CH4007. To extend the students’ comprehension and working knowledge of functional group chemistry; to expand the range of reagents, reactions and associated mechanisms; to detail how structure and reactivity can be quantitatively correlated; to detail quantitative aspects of acid and base catalysis.

Syllabus: Section A: Regiochemical control: addition of HBr by ionic and radical mechanisms, alcohol formation by acid catalysed hydration and via hydroboration; Chemoselective control: Lindlar catalyst and dissolving metal reduction; hydride reducing reagents, Reformatsky reaction; use of protecting groups. Stereochemical control: asymmetric induction, diastereomeric selectivity, Felkin-Anh model; enantioselective reactivity, chiral hydride reagents (Alpine Borane and Alpine Borohydrides), chiral catalysts -Monsanto catalyst for L-Dopa production. 
Section B: Quantitative structure activity relationships: development and use of the Hammett equation; definition of general and specific acid and base catalysis, use of buffers and kinetic data to distinguish between general and specific catalysis, quantitative analysis of data.

Named (and other) Reactions: Oral presentation by students on reactions such as Hydroboration, Reformatsky, Dihydroxylation, Mannich Reaction, Reductive Amination, Birch Reduction, Michael Addition, Allylic bromination, Sharpless Epoxidation, Mitsunobu Reaction, Suzuki Coupling, Heck Reaction, Benzene chemistry.

Prerequisites: CH4008

CH4017 - CHEMICAL NANOTECHNOLOGY
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: The Chemical Nanotechnology module will: Provide the student with a broad understanding of the principles that underpin nanoscience and nanotechnology; To acquaint the student with synthetic methods for formation of nanostructures and new physical properties that arise; To enable the student to solve problems relating to size dependent physical, optical and electrical properties at the nanoscale.

Syllabus: Course will cover: (1) Chemical and physical properties as length scales vary from the macroscale through microscale to the nanoscale. (2) Chemical synthesis and modification including 0D, 1D and 3D incorporating II-VI colloidal nanocrystals. Study of carbon nanotubes, wrapping vectors, tensile strength and electronic properties (3) Kinetics of nanocrystal growth and the organic/inorganic interface. (4) Chemical functionalisation of inorganic nanostructures with organic molecules and the bio/nano interface (5) Industrial applications of nanochemistry, nanosizing of pharmaceuticals etc.(7). Introduction to crystal engineering with emphasis upon the following subjects: Supramolecular chemistry, especially hydrogen bonding Types of crystalline solids and their characterization (8) Pharmaceutical materials especially multi-component crystals (cocrystals) – (9) Coordination polymers especially porous metal-organic materials.

CH4027 - NANOTECHNOLOGY
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: To provide a specialist module in nanotechnology. The Nanotechnology module will provide the student with a broad understanding of the physical and chemical principles that underpin nanoscience and nanotechnology. 
Acquaint the student with synthetic methods for formation of nanostructures and new physical properties that arise; Enable the student to solve problems relating to size dependent physical, optical and electrical properties at the nanoscale.

Syllabus: Course will cover: (1) Chemical and physical properties as length scales vary from the macroscale through microscale to the nanoscale. (2) Study of fundamental properties of nanomaterials such as carbon nanotubes and nanoparticles in terms of geometries, tensile strength, and electronic properties (3) Functionalisation of inorganic nanostructures with organic molecules and the bio/nano interface (4) Molecular driving forces including quantum interactions and molecular dynamics (5) Application to design and synthesis of advanced materials for renewable energy, medical diagnostics, and food production.

Prerequisites: CH4701, BY4001, CH4252, PH4131, PH4102
CH4054 - PHYSICAL CHEMISTRY  
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: To teach key principles of physical chemistry. To carry out practical work to support and reinforce some of the theoretical aspects encountered.

Syllabus: Thermodynamics, heat, work, reversible and irreversible systems; First law of thermodynamics, internal energy, enthalpy, standard enthalpies, second law of thermodynamics, entropy, Gibbs free energies, Chemical equilibrium; effect of temperature, pressure, concentration, Le Chateliers Principle; Ions in aqueous solution; electrochemical cells, electrolytic conductivity, Reaction kinetics: zero, first and second order reactions and enzyme kinetics-Michaelis-Menten.

CH4102 - ORGANIC CHEMISTRY 1  
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: To impart to the student an understanding of, an enthusiasm for, and a basic working knowledge of organic functional group chemistry.

Syllabus: Alkanes, cycloalkanes, alkenes, alkynes: structural formulae; shape and bonding; nomenclature; isomerism; conformational analysis; free radical and ionic reactions; mechanism of reactions; electrophilic addition; primary, secondary and tertiary carbonium ions. Haloalkanes: nomenclature; substitution and elimination reactions; mechanism of reactions û SN1, SN2, E1, E2. Alcohols, ethers and epoxides: methods of preparation; typical reactions. Aldehydes and ketones (part 1): methods of preparation; typical reactions û nucleophilic addition, Grignard reaction as a carbon-based nucleophile; keto-enol tautomerism and reaction (bromination) at the a-position.

Prerequisites: CH4102

CH4104 - ORGANIC CHEMISTRY 3  
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: To build on and extend the foundation chemistry covered in CH4102 and CH4103; to highlight heterocyclic chemistry as a key part of this extension; to develop the associated chemistry, reactions, biological importance of various heterocyclic compounds; to give the student a basic working knowledge and comprehension of the biomolecules û amino acids, peptides and carbohydrates; to carry out practical work to support and reinforce some of the theoretical aspects encountered.

Syllabus: Protein Chemistry:
Amino Acids; structure; synthesis and resolution; stereochecmy; isoelectric point; preparation from a-haloaminoacids; Gabriel Synthesis; Strecker Synthesis. Peptides: Sequence determination: N and C terminal analysis; strategy for synthesis, use of protecting groups and activating agents, solid state synthesis using Merrifield resin.
Carbohydrate Chemistry:
Monosaccharides: aldoses and ketoses; structure and stereochecmy; hemiacetal and hemiketal formation; Fischer Projections, Haworth representation, chair conformation; oxidation and reduction reactions. Disaccharides: Glycosides (sugars as acetals and ketals); structure; reducing and non-reducing disaccharides. Polysaccharides: structure and occurrence.
Heterocyclic Chemistry:
5-Membered ring aromatic heterocycles: structure, aromaticity; electrophilic aromatic substitution reactions-reactivity and orientation; 5-membered ring non-aromatic heterocycles: structure and synthesis. Basicity of aromatic/non-aromatic N-heterocycles. 6-membered ring aromatic and non-aromatic N-heterocycles: Structure, properties; electrophilic and nucleophilic aromatic substitution reactions of pyridine; reactivity and orientation; basicity. Azoles and Fused 5-membered ring aromatic heterocycles; Structure, basicity (where relevant); Azines. Nucleic acids. Occurrence/application of all types of heterocycles encountered above. Current trends.

Prerequisites: CH4102, CH4103

CH4252 - INORGANIC CHEMISTRY 1B  
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: To introduce students to the importance of structure and bonding in determining the properties of substances, and to consider the bonding in molecules and in solids, particularly ionic solids.


Prerequisites: CH4701

CH4304 - ANALYTICAL CHEMISTRY 2  
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: To provide students with an understanding of some key elements of the theory of separation science and their application to analytical techniques.

Syllabus: Introduction to separation science Solvent extraction. Counter current extraction. Introduction to chromatography, modes of separation. Gas Chromatography. Liquid Chromatography. HPLC, Ion Chromatography, Size exclusion chromatography Mass Spectrometry. Hypenated techniques, GC-MS HPLC-MS

Prerequisites: CH4303
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: To review and extend the student's existing knowledge and comprehension of fundamental spectroscopic techniques encountered in CH4303, CH4304 and CH4305; to provide the student with an in-depth working knowledge and comprehension of various advanced spectroscopic techniques; to emphasise the interpretation of spectral data in an integrated manner through the use of combined spectroscopic techniques; to highlight various applications of the techniques encountered; to encourage self-directed learning through the use of some recommended websites and software.

Syllabus: Mass Spectrometry: Brief review of some basic principles; Fragmentation Patterns; Rearrangements; Interpretation of spectra; Hyphenated techniques. NMR Spectroscopy: 1-D 1H NMR: Review of some basic principles; Relaxation Processes; Homotopic, enantiotopic and diastereotopic systems; Nuclear Overhauser Effect (NOE); Second-Order Spectral Interpretation. 13C NMR: Theory; DEPT 13Cnmr; NOE, Quantitative13Cnmr; Interpretation of spectra. Solid State 13C nmr (brief). 2-D 1H NMR: COSY (1H-1H connectivity); NOESY, ROESY (through space 1H-1H proximity), HOSEY; HECTOR (1H - 13C connectivity); INADEQUATE (13C - 13C connectivity); TOCSY (1D and 2D); Interpretation of spectra.

Laser Raman Spectroscopy: Theory; Comparison with FT-IR spectroscopy; Spectral interpretation of simple organic molecules and carbon allotropes (diamond, graphite and carbon nanotubes). Problem Sessions/Lab. Prerequisites: CH4305, CH4304, CH4303

CH4354 - ANALYTICAL CHEMISTRY FOR THE ENVIRONMENT
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: * To convey that spectroscopy (the interaction of light with matter) provides both a qualitative and quantitative method to determine molecular/atomic structure and concentration

* To introduce analytic instruments and instrumental techniques

Syllabus: SYLLABUS
SPECTROSCOPIC METHODS: AAS ATOMIC ABSORPTION SPECTROSCOPY AES ATOMIC EMISSION SPECTROSCOPY UV/VIS ULTRA-VIOLET/VISIBLE SPECTROSCOPY IR INFRARED SPECTROSCOPY (& FTIR)
CHROMATOGRAPHIC METHODS: PARTITION (GLC, HPLC, TLC) ABSORPTION (GC) ION-EXCHANGE SIZE EXCLUSION (GEL PERMEATION)

ELECTROMETRIC METHODS: POTENSIOMETRIC (PH, ISE)
CONDUCTOMETRIC

CH4404 - PROCESS TECHNOLOGY 1
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: To introduce students to important aspects of safety, process control, and process modelling in chemical and biochemical processing systems.


Introduction to process control: basic control modes e.g. P, PI, PID; control system architecture and dynamic behaviour for SISO processes; controller tuning; control system hierarchies for chemical/biochemical processing plants.

Equipment and instrumentation used in chemical and biochemical processing operations: sensing and measurement; signal transmission; controllers; final control elements.

Process modelling; application of material and energy balances in the formulation of quantitative process models; process characteristics and dynamic response behaviour of first and second order systems.

CH4554 - ENVIRONMENTAL CHEMISTRY
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: To provide a basis of understanding the chemical processes occurring in the environment, with particular reference to biogeochemical cycles and the chemical ideas underlying environmental problems.

Syllabus: Chemistry of the earth: overall structure, composition, energy flow, inter-relation of the different spheres. Definitions. Concentrations. The hydrosphere: composition; the water cycle; equilibria in aqueous systems, distribution diagrams; water pollution. The lithosphere: composition and structure; weathering; leaching and soil chemistry; mineral resources and pollution; geochemistry; solubility, pH; E-pH diagrams. The atmosphere: composition, chemical processes in the atmosphere, solubility in water; chemistry of acid deposition, greenhouse effect, ozone depletion, photochemical smog. The biosphere: composition, major and minor elements; sources, utilisation and disposal; toxicology of heavy metals and organics, bioaccumulation. Biogeochemical cycles for nitrogen, carbon, sulphur, phosphorus, etc

Prerequisites: CH4253, CH4252, CH4701

CH4608 - PLANT AND PROCESS MANAGEMENT 2
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: To provide the student with an understanding of a number of key topics in the management of chemical and biochemical processing operations.

Syllabus: Methodologies for the identification, assessment, and control of risks and hazards associated with processing operations, including HAZOP analysis.

Costing of chemical & biochemical plants; stages of costing, methods of cost prediction, exponential, factorial etc. Cost updating. Economic evaluation of chemical and biochemical processing projects; pay-back, ROI, NPV, etc. Sensitivity analysis.
Plant location and layout: principles and application.
Environmental impact assessment of chemical and biochemical production facilities.

Industrial sustainability: concepts and practice. Case study of the application of sustainability metrics to chemical and biochemical processing plants.

CS4005 - PERCEPTUAL SYSTEMS AND MULTIMEDIA
ECTS Credits: 6

Computer Science & Information Systems

Rationale and Purpose of the Module: Creating an awareness and understand how our senses work in order to perceive the world around us.

Syllabus: Fundamentals of physical dimensions used by human sensation and perception - light, sound, heat, pressure;
Fundamentals of the senses of hearing, seeing and touch: physiology and function;
Psychophysical measures and correlates of perception;
Introduction to Signal Detection Theory;
Theories of perception, perceptual organisation, attention, object recognition, depth perception and motion perception; Navigation and Spatial Cognition; Multimodal integration;
Memory and training; introduction to theories of mind and their relationship to theories of mediation, communication and perception.

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.

CS4030 - DIGITAL ARTS 2
ECTS Credits: 6

Computer Science & Information Systems

Rationale and Purpose of the Module: This module builds upon the curriculum of a range of modules especially Digital Arts 1. It deepens the engagement with this field by introducing the perceptual and aesthetic ramifications of the digital arts and situates the wide range of practices within cultural, psychological, political and economic models. It provides a foundation enabling students to situate, develop and specialise their digital arts practice as well as a context to which digital arts research can be related.


Prerequisites: CS4019

CS4043 - GAMES MODELLING DESIGN
ECTS Credits: 6

Computer Science & Information Systems

Rationale and Purpose of the Module: The aim of the module is to provide students with knowledge to use an appropriate methodology in order to develop a digital game. On successful completion of the module the student will be able through use of appropriate tools and techniques to construct a model, design a digital game prototype and document it.

Syllabus: The game idea: starting points, intended audience, limitations;
The elements of a game play: non-linearity, game mechanics, controls and inputs, output and feedback, modelling reality; game elements: characters, items, objects and their behaviour, functionality, mechanisms; Challenge, Fantasy, Fun, Depth and Focus;
Gaming genres;
Linear storytelling character versus non-linearity of the game play: places for storytelling, story scripting;
The Game Development Life Cycle: Conceptual phase: base architecture, base game play and story lines, game mechanics and flow, conceptual game model; Detailed Game Design phase: game play, scenes and screens, game flow and progression, levels in different games (order, components, and goals), navigation, user interface, interactivity and immersion, game technology (hardware, software and limitations, tools and techniques to integrate props, media objects, special effects, storage and retrieval), platform and genre-specific design issues of 3D games;

Development phase and playtesting, refining and aesthetics;

Game Documenting phase: the Design Document and its elements;

Prerequisites: CS4012, CS4512

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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**CS4052 - FOUNDATIONS OF INTERACTION DESIGN**
ECTS Credits: 6

**Computer Science & Information Systems**

**Rationale and Purpose of the Module:** This module provides an overview of the discipline of Interaction Design, and of its origins and conceptual and methodological basis. The topics discussed include:
- Overview of literature dealing with issues related to designing interaction (multidisciplinary, variety of conceptual approaches, etc.).
- Exploration and analysis of various approaches to interaction design as a discipline.
- In depth discussion of notions of interactivity and interaction, and of the role of the interaction designer.
- Discussion of notions of narrative and narrativity.
- Analysis of different media and their interaction capabilities.
- Discussion of interaction design methodologies (data analysis, concept generation and development techniques, interaction design communication).

**Syllabus:** This course will provide the student with an understanding of the key elements required for the design of interaction. After a consideration of basic principles of design, the key features of narrativity and interactivity will be explored and analysed. The potential of different kinds of media to support interactivity will be studied. Methods of involvement of participants in the creation of new media will also be covered.

Prerequisites: CS4031

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**CS4056 - MOBILE APPLICATION DESIGN**
ECTS Credits: 6

**Computer Science & Information Systems**

**Rationale and Purpose of the Module:** To introduce students on digital media and music technology programmes to the creation of content and the development of applications for mobile devices.

**Pre-Requisite Modules:**
(CS4061 Media Programming 1 & CS4082 Introduction to Web Development)

OR
(CS6221 Programming Protocols for Musical Systems)

**Syllabus:**
- Challenges of designing applications for mobile devices.
- Design dimensions for mobile applications: scenario-related dimensions, interaction-related dimensions, user-related dimensions, data/content related dimensions and communication-related dimensions.
- Designing for multiple mobile platforms and multiple displays: practical guidelines, techniques, standards and best practices.
- Content optimization and design skills for mobile application development.
- Creation of raster and vector visual assets for mobile applications using a variety software products.
- Creation of applications for mobile devices using a development environment suited to the programming skills and abilities of the students that will take this module.
- Applications will work with images and sound; the creation of animated applications; list manipulation; parsing comma-delimited files and XML files; work with databases; text-to-speech and speech-to-text; read and respond to sensors, communicate with web APIs.

Prerequisites: CS4061, CS4082, CS6221

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**CS4072 - MEDIA PROGRAMMING 2**
ECTS Credits: 6

**Computer Science & Information Systems**

**Rationale and Purpose of the Module:**

This module is intended to familiarise media students with computer programming. Students will learn how to write their own programs to manipulate images, sound files, movies and text.

**Syllabus:**
- Vector and bitmapped image formats;
- Drawing simple shapes and drawing text on existing images;
- How we digitize/encode sounds; Nyquist theorem; manipulating samples;
- Using iteration and selection constructs to increase/decrease sound, normalizing sound;
- Creating sound clips, splicing sound, reversing and mirroring sound;
- Composing and blending sounds;
- Encoding, manipulating and creating movies;
- Reading from and writing to text files; string manipulation;

Prerequisites: CS4061

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**CS4076 - EVENT DRIVEN PROGRAMMING**
ECTS Credits: 6

**Computer Science & Information Systems**

**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 processes, 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.

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**CS4078 - APPLIED INTERACTION DESIGN**
ECTS Credits: 6

**Computer Science & Information Systems**

**Rationale and Purpose of the Module:**

This module will provide the student with knowledge of and practical experience in using techniques for the design of engaging interaction.

Building on the design knowledge and technical skills the students have acquired at this stage of their course, applied interaction design problems will be presented to
the students for analysis, reflection and intervention. Adaptation of Interaction Design methods will be discussed, and the particular perspective of Participatory Design will be examined in detail.

**Syllabus:** This module deals with topics and methodologies for Interaction Design work. The topics include:
- Overview of the latest literature and current practical projects in interaction design
- Exploration and evaluation of practical approaches to interaction design as a discipline in a variety of current settings, and particularly of Participatory Design methods.
- Exploration of novel interaction modalities around tangible, ubiquitous and wearable devices.
- Application and adaptation of interaction design methodologies to specific design settings.
- Discussion and review of sensitive design settings such as healthcare, safety-critical environments, education, etc
- The role of high-fidelity prototypes in developing the interaction design process. The discussion and analysis of these topics will be based around practical interaction design assignments.

**CS4082 - INTRODUCTION TO WEB DEVELOPMENT**

**ECTS Credits:** 6

**Computer Science & Information Systems**

**Rationale and Purpose of the Module:** To provide an introduction to the world wide web, focusing on the design and the development of web applications, including HTML syntax, tags, text formatting, colours, images, and hypermedia.

**Syllabus:** Introduction to the world wide web: web browsers, web servers and clients, uniform resource locators, the hypertransfer protocol (HTTP), processing HTTP requests and responses, world wide web consortium (W3C), static and dynamic content. Hypertext MarkUp Language (HTML); standard HTML document structure, HTML syntax, tags, text formatting, colours, images, hypertext links, absolute and relative referencing, list, tables, frames and forms. Considerations when including audio, video and graphics; differentiating between file formats. Embedding PHP in HTML; assigning and using variable values, saving form input in variables, simple data types, detecting the data type of a variable, using operators: arithmetic, relational, logical; string operators, auto increment/decrement operators, operator precedence; selection and looping constructs. Sessions and cookies: creating a session and registering session variables, destroying a session; setting cookies, retrieving cookie data, deleting cookies. File manipulation: reading data from and writing data to files. Introduction to relational databases: tables, records, fields, primary keys and foreign keys. Introduction to Structured Query Language (SQL); creating tables: specifying field data types, retrieving, inserting, editing and deleting records. Connecting to a database in PHP and executing SQL commands.

**CS4115 - DATA STRUCTURES AND ALGORITHMS**

**ECTS Credits:** 6

**Computer Science & Information Systems**

**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.

**CS4157 - SOFTWARE QUALITY**

**ECTS Credits:** 6

**Computer Science & Information Systems**

**Rationale and Purpose of the Module:** To provide an understanding of the processes and techniques used to develop and maintain quality software.

**Syllabus:** Software quality assurance and standards; Software Inspections; Process versus Product quality and quality characteristics; Software testing techniques and strategies; Software Maintenance; Quality metrics; Evolution of software process; Introduction to ISO15504; Configuration Management.

**CS4174 - PERFORMANCE TECHNOLOGY 1**

**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 digital musical instruments through a combination of laboratory based small group project work and lecture based learning.

**Syllabus:** This module will focus on the design and the creation of digital musical instruments. Students will design and build a musical instrument - a complete system encompassing musical controller, algorithm for mapping input to sound, and the sound output itself. Students will focus on improvisation techniques as they prepare their prototypes for live performance. The module will culminate in a musical performance where students will demonstrate their instruments.

Key topics will include:
- Sensor system implementation for live music performance.
- Software implementation of real time performance systems.
- Aesthetic issues in digital musical instrument performance.
CS4182 - FOUNDATIONS OF COMPUTER SCIENCE 2  
ECTS Credits: 6

Computer Science & Information Systems

Rationale and Purpose of the Module: To introduce students to formal ways of thinking about programs, in terms of their terms of their syntactic structure, their design, and formal assertions about the progress of a computations.

Syllabus: - Review of set theory. Union and intersection of sets, Cartesian, product functions as sets of ordered pairs. Review of logic propositions and logical connectives  
- Review of difference between variables in mathematics, and in imperative Programming Languages. Constructing mathematical/assertions about individual statements, and program fragments. Preconditions and Post conditions Proof by induction of assertions about simple while programs.  
- A semi-formal approach to structural induction, as a generalisation of induction over the natural numbers, together with its use in describing syntax of arithmetic and Boolean expressions.  
- Using Grammars to describe formal languages or notations, regular grammars and context free grammars. BNF and EBNF, Syntax charts. Detailed application to specifying syntax of selected Programming language.  
- Introducing static-semantic constraints into programming languages.  
- Data Type Constructors, enumerated type, record, tagged and untagged variants, arrays, and sequential files, and their underlying sets of values as finite sets, Cartesian products, disjoint and normal Union, finite maps. Type completeness Copy semantics. Parameter-passing mechanisms and reference variables.  
- Formal basis of some commonly-used simple design patterns such as extending a binary operation to an n-ary operation, composing a function with another function, including a function whose domain has been restricted, and grouping functions defined over the same domain into a single function.

CS4178 - PROFESSIONAL ISSUES IN COMPUTING  
ECTS Credits: 6

Computer Science & Information Systems

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

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

CS4227 - SOFTWARE DESIGN AND ARCHITECTURE  
ECTS Credits: 6

Computer Science & Information Systems

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

Syllabus: Topics presented include: Challenges facing the Object Oriented (OO) and Component Based Development (CBD) paradigms. Characteristics of good software focusing on modular decomposition, coupling, cohesion, interfaces, encapsulation and architecture centric component based development. Modelling of architectural use cases. Object Oriented Design (OOD) with a focus on extensibility and performance using a generic OO method in conjunction with the Unified Modelling Language (UML).

Design of software architecture focusing on architectural patterns such as those presented in the volumes on Pattern Oriented Software Architecture series. Detailed design focusing on 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.

CS4232 - MUSIC AND COMPUTERS  
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. (Existing module CS4021 “Digital Media Software & Systems 1” is part of a suite of module core to LM114 (Music, Media & Performance Technology). The course board has decided that the titles of this suite of DMSS modules do not adequately describe the course content and therefore wish to change the titles to better communicate the content. The content itself of these modules remains the same - only the title itself is changed.


CS4358 - INTERACTIVE MULTIMEDIA  
ECTS Credits: 6

Computer Science & Information Systems

Rationale and Purpose of the Module: To understand the principles and techniques of Interactive Media. Content creation, processing and management. High-level authoring. Distribution methods. Intellectual Property Rights.
Rationale and Purpose of the Module:
- Authoring: introduction to high-end authoring tools and management.
- Computer Science & Information Systems: deciding factor for success or failure; responsibilities for managing such systems.
- Rationale for successful implementation of computer-based information systems are managed, and the processes by which the development of such systems is undertaken.
- Interfacing high-end authoring systems: extending the synchronisation.
- Design of plugins.
- Image, Video and Sound Processing: introduction to high-end processing tools such as Adobe Photoshop, Adobe Premiere, Sound Forge, etc.; media asset management.
- Authoring: introduction to high-end authoring tools such as Macromedia Director, Authorware, Flash, etc.; synchronisation.
- Interfacing high-end authoring systems: extending the functionality of authoring systems through plugins; design of plugins.
- Distribution: CD, DVD, Web, DAB, DVB; quality and bandwidth considerations; compression; streaming.
- Intellectual Property Rights, Copyright.

ECTS Credits: 6

CS4457 - PROJECT MANAGEMENT AND PRACTICE
ECTS Credits: 6

Computer Science & Information Systems

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

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

CS4458 - COMPUTER SUPPORTED COOPERATIVE WORK
ECTS Credits: 6

Computer Science & Information Systems

Rationale and Purpose of the Module: This module will introduce students to the CSW and groupware field. It will cover basic concepts in the field and include an examination of software systems designed to support cooperative work - their design, use and evaluation. Issues such as peripheral awareness, ownership of information, common information spaces, media spaces, group support systems, coordination mechanisms and contextual factors in the workplace will be studied.

Syllabus: The limitations of traditional HCI; Understanding the work context; Cooperative work; Methods for observing work - field studies and ethnography; Coordination mechanisms; Examination of variety of commercial and research collaborative systems; Constructing common information spaces; Examining collaborative learning in the workplace; Evaluation methods for CSCW; Open issues in the field.

ECTS Credits: 6

CS4566 - REQUIREMENTS ENGINEERING

Computer Science & Information Systems

Rationale and Purpose of the Module: System and software requirements exist at the boundary between the often conflicting needs and expectations of stakeholders and the myriad capabilities and potential of software to fulfil them. Special rare skills are essential in order to adequately elicit, specify, verify, validate and then manage both the scope of the system and the software requirements themselves.

This module aims to introduce students to the necessary skills and make them aware of the real challenges that are presented by the requirements task.

Syllabus: - System and software requirements
- The Requirements Engineering Process
- Stakeholders and their role in RE
- Requirements and Design
- The elicitation and discovery of requirements: RAD, Task Analysis
- Elicitation techniques: Prototyping and Scenarios, Viewpoints
- Discovering and Inventing Requirements: CRC Cards
- The modelling and analysis of requirements
- Problem Frames and modelling
- A comparative review of modelling techniques
- Perspectives and values in modelling methods
- Requirements Documentation: Standards and Templates
- Quality Measures of Software Requirements
- Documenting Functional Requirements
- Techniques for writing requirements
- Writing non-functional requirements
- Communication techniques
- Management of requirements; Change control
- Requirements Management Tools: Requisite Pro; DOORS, etc.
- Organisational and Social Issues
- Requirements validation: reviews and walkthroughs
- Negotiation and agreement of requirements

Prerequisites: CS4125

CS4815 - COMPUTER GRAPHICS
ECTS Credits: 6

Computer Science & Information Systems

Rationale and Purpose of the Module: Given the role of graphical user interfaces in the computing devices today this programme should include at least one module relating to computer graphics.

Syllabus: Physical devices for graphics systems: Input and Output devices, Raster Scan devices, RGB colour systems, Video Memory Models; Implications of these for interactive graphics systems.

General structure of Interactive Graphics systems:
Issues involved in digitising analogue information:
antialiasing techniques; Design and implementation of drawing algorithms for basic shapes: Issues and techniques; Establishing Device, Language and Application Independence: Conceptual levels in graphics systems; Frames of reference and Viewing systems;

Control and manipulation of graphics elements: Input and Output primitives, Clipping functions, Transformation (rotation, scaling, translation, reflection, shears) and Segmentation functions; Transformations in 3-D; Projections; Viewing in 3D; Drawing Curves: Techniques, Properties of different types of curves;

Basic Modelling: Representation of surfaces via polygons; Realism; Hidden surface removal; Surface generation via bi-cubic curves; Rendering.

ECTS Credits: 6

CS4566 - REQUIREMENTS ENGINEERING

Computer Science & Information Systems

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Basic Modelling: Representation of surfaces via polygons; Realism; Hidden surface removal; Surface generation via bi-cubic curves; Rendering.
CS4826 - HUMAN-COMPUTER INTERACTION  
ECTS Credits: 6

Computer Science & Information Systems

Rationale and Purpose of the Module: The objective of this module is to develop an understanding of the issues involved in the increasingly important area of human-computer interaction. The module will provide a broad introduction to a variety of topics concerning user requirements, user interface design, usability studies, integrating human factors in software development, and social and organizational factors involved in implementing systems. It will examine guidelines and standards, as well as emerging interaction paradigms. The widespread adoption of graphical user interfaces (GUIs), and the potential afforded by new developments such as groupware, multimedia, hypertext, and virtual reality systems all require that even greater attention be paid to how these technical developments can be packaged and presented suitably to the “user”.

Syllabus: The module addresses the nature of HCI. Specifically it covers the topics of: understanding the user, human information processing, perception, interfaces and interaction, input and output devices, user & design, the design process, requirements, evaluation, usability methods and tools, empirical and analytical methods, standards & guidelines, mobile technology, information appliances, social and organizational constraints, intelligent agents, and future trends.

CU4018 - EUROPEAN CINEMA FROM THE 1960s TO THE PRESENT  
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: To give students a comprehensive overview of the major currents and trends in European cinema in the post Second World War period with the advent of the French Nouvelle Vague being considered as a watershed event. To build on students prior knowledge and exposure to language, film, critical approaches and how major theoretical movements have been influential in their work. It will lastly consider the impact of the digital revolution on film making and the film industry.

Syllabus: This module will build on students prior experience of film studies and will involve a comprehensive overview of the major cinematic movements in contemporary Europe over the last fifty years with an introduction to some of the major directors of this period and their oeuvre. The module will also examine the techniques of film as employed by these directors, their critical approaches and how major theoretical movements have been influential in their work. It will lastly consider the impact of the digital revolution on film making and the film industry.

CU4026 - HOW TO READ A FILM: INTRODUCTION TO FILM STUDIES  
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: * To introduce students to the field of film studies.  
* To give students the theoretical tools to analyse film.  
* To give a European perspective on the film industry.

Syllabus: This module will make the distinction between knowing a lot about films and being able to address the question what is cinema. To this end the module will examine the techniques of film, critical approaches and how major theoretical movements have been applied to this field.

Prerequisites: CU4025

CU4112 - CULTURAL STUDIES 2: LANGUAGE AND CULTURE  
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: * To give students the opportunity to study, in depth, the writings of key cultural theorists of the 20th century. To develop an awareness of the place in theory in cultural practice. To develop skills of presentation, appraisal and comparison of material of high theoretical complexity.  

Syllabus: This module will cover a number of different theorists and theoretical positions in sequence. The relevant theorists will include Matthew Arnold, Friedrich Nietzsche, Sigmund Freud, Laura Mulvey, Karl Marx, Thedor Adorno, Roland Barthes and Jean Baudrillard. The theoretical positions covered will include humanism, psychoanalysis, feminism, Marxism, neo-Marxism, structuralism, post structuralism, semiotics and postmodernism.

Prerequisites: CU4111

DM4006 - ENGINEERING DESIGN  
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: To introduce the student to product engineering design systems and techniques. To provide experience in product design and concurrent engineering. To develop skills in developing automated process plans using variant and generative approaches. To provide the students with experience in the use of finite element methods as part of the design cycle. To focus on the engineering of the solution by providing hands-on experience in the analysis of case studies, supplemented by an overview of the theoretical analysis.
Syllabus: Overview of the design process and innovative approaches in product design.
Concurrent engineering as a product development approach.
Design for manufacture, assembly, disassembly and service.
Computer aided process planning.
Product design and analysis tools Solid Modelling and Finite Element Analysis.
Analysis Types: Static, Dynamic, Stress, Thermal, Contact stress, Buckling, Fatigue. Design Optimisation, Processing and Post processing - theoretical and practical issues.
Practical Case studies: static stress analysis, modal analysis, thermal analysis, basic fluid/structure interaction analysis.
Use of the SolidWorks Simulation software package.

DM4016 - PRODUCT AUTOMATION
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: To inform the student of the various automated components contained within typical industrial products.
To provide the student with an understanding of pneumatic and hydraulic systems used within the production of products.
To establish how product design can impact on industrial robotics.
To illustrate how product design can impact on production line feeding mechanisms.

Syllabus: Mechanics
Velocity, displacement, angular velocity, torque, power, work etc.

Circuitry:
DC Circuits, AC Circuits, - involve making simple circuits, PCB manufacturing etc.

Motors
DC, AC, Stepper motors, how they work, picking the correct type, sizing the motor.

Industrial Robotics
Robot anatomy, joints and links, drive systems, control systems, grippers, sensors, applications material handling, assembly linked to product design design for manufacture. Numeric Control, features of CNC, applications of CNC, Robot programming, CNC programming.

Pneumatics & Hydraulics
Sizing systems, control of systems, design of systems, electro-pneumatics.

Automated Assembly
Linked to the DFM module, tools techniques, quality requirements, tolerances, feeding mechanisms, magazines feeders, vibratory bowl systems.

Vision Systems
Operating principles, industrial applications, advantages, disadvantages.

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DM4028 - ENGINEERING SUSTAINABLE PRODUCTS
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: To inform the student of the need to design and manufacture products in an environmentally sustainable manner.
To illustrate the use of life cycle analysis software to ensure that the lowest impact material selection, manufacturing processes etc. are adhered to.
To identify the various recycling/recovery processes available to ensure that the student designs a product with these solutions in mind at end of life.
To identify key alternatives to existing fossil fuels in energy creation and thereby help promote a more sustainable manufacturing environment.

Syllabus: Design for Environment
Strategies, tools, key fundamentals such as design for dematerialisation, design for product recovery and design for capital protection and renewal.

Sustainable Manufacturing
Alternative energy supplies, solar, wind, geothermal, alternatives to oil such as bio-diesel, gaining energy from recycling materials or waste e.g. incineration, pyrolysis. Material properties, material property charts, material selection, case studies.

Recycling Technologies
Magnetic separation, shredding, eddy current separation, infra-red separation, examination of waste streams, destruction disassembly versus step by step disassembly. Design obstacles to disassembly, design techniques to encourage disassembly and thereby encourage effective recycling/recovery.

Lifecycle Assessment
Overview of total product life cycle, from raw material selection to transport to manufacturing processes and systems to packaging and the impact individual decisions regarding the product have on the environment. Using LCA software to calculate the cost to the environment.

Reverse Engineering
Techniques, systems of approaching systematic reverse engineering to enable design for the environment and to learn from previous mistakes. Product redesign can take the form of incremental or radical changes.

Legislation
WEEE directive, RoHS directive, ISO 14062 environmental aspects to product design, ISO 9000.

Design for End of Life
Examination of fastening technology, standardisation of techniques, placement of access points, location of high value/hazardous materials.

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EC4014 - INTERNATIONAL ECONOMICS
ECTS Credits: 6

Economics

Rationale and Purpose of the Module: The world economy is becoming increasingly integrated and interdependent in terms of the economics ties linking countries and regions. Three ways in which countries are linked are trade, investment flows and migration (labour mobility). This module builds on introductory micro and macro-economic principles in order to provide students with the tools of analysis necessary to examine the international economy and to explore the key issues that are shaping our global economy. The emphasis is on current issues in international economics. In this module we examine why international trade and factor mobility, as well as concentrating on how economics and politics interact to understand the existence, or absence, of certain policies at an international level.

Syllabus: The module is divided into six sections set out below. Each topic will have a corresponding problem sheet which students should work through as an aid to understanding the material presented in lectures. Further detailed references and readings for each topic, where relevant, will be given in lectures.
EC4018 - MONETARY ECONOMICS
ECTS Credits: 6

Economics

Rationale and Purpose of the Module: This course in Monetary Economics covers topics in Financial Markets, Financial Institutions, Central Banking, International Finance and Monetary Theory. These topics are discussed at various stages in the course. The central theme is to develop a dynamic monetary model of a small, open economy. The Course Outline (see below) explains how this is achieved and at what point the other topics are examined. Among the policy issues discussed are: economic adjustment to asymmetric shocks given the constraints of monetary union; the operations and policies of the European Central Bank; the transmission of monetary policy in the Euro-area; and the determination of interest rates.

Syllabus: 1. Introduction to the Theory of Income Determination; Equilibrium in the Goods and Services Market; Deriving the SRAS model; Adjusting to Demand-side Shocks; Adjusting to a Supply-side Shock
2. Money and Banking
Money Creation in a Modern Economy; The money multiplier; The Role of a Central Bank; Seigniorage; Lender of last resort; High-powered Money and the Money Multiplier; Instruments of Monetary Policy
3. Money and Interest Rates in a Closed Economy; The Demand for Money; Money Market Equilibrium; Aggregate Demand and Interest Rates; Monetary Policy and the Keynesian, Classical Debate; Monetary Financing
4. The IS-LM Model
5. The Phillips Curve and the Inflation-Unemployment Trade-off
The expectations-augmented Phillips curve; Deflation, Expectations and Credibility; The sacrifice ratio; The Augmented Phillips Curve: Evidence from the Euro-area; Estimates of the natural rate of unemployment; Recent Developments Relating to the Phillips Curve; The Phillips Curve and the AD-AS Model
6. The Mundell-Fleming Model
Internal and External Balance; Introduction to the Mundell-Fleming Model; The Model Under Fixed Exchange Rates; The Model Under Floating Exchange Rates; Exchange Rate and Country Risk; Economic Policy, Output and the Current Account; The Aggregate Demand Curve
7. European Monetary Union and the European Central Bank
The Political Benefits of EMU to Ireland; The Economic Benefits of EMU to Ireland; The Economic Costs of EMU; The European Central Bank; ECB Independence; How Interest Rates Are Set in the Euro Area; Monetary Policy in EMU; The Euro Area Inflation Record; One Monetary Policy Fits All?
8. A Dynamic Monetary Model of Aggregate Demand and Aggregate Supply
The Dynamic Model of Aggregate Demand and Aggregate Supply; The Dynamic Aggregate Supply (DAS) Curve; The Dynamic Aggregate Demand (DAD) Curve; Deflationary Demand-side Shock; The Central Bank’s Inflation Target; An Expansionary Demand-side Shock; The Labour Market and the Adjustment Process
9. Savings, Investment and the Balance of Payments
Savings and Investment in a Closed Economy; Saving, Investment and the Balance of Payments; The Interest Rate and Capital Flows; The Real Exchange Rate and Net Exports; Savings and Investment in the Small, Open Economy; The Effects of Fiscal Policy; The Effects of a Change in the World Interest Rate; Applying the Model to the Irish Economy in EMU
10. The Economic Crash of 2008 and Its Aftermath
The Property Boom; Displacement; Credit expansion; The European Central Bank; ECB Independence; How the ECB responded to the financial crisis? Long term refinancing operations (LTRO) and Outright Monetary Transactions (OMT).
11. Monetary Policy Framework; National Central Bank’s and the Liquidity Position of Commercial banks.; Forecasting Liquidity Facilities; Reaction of Central Bank’s to the Financial Crisis.

EC4044 - APPLIED ECONOMIC ANALYSIS
ECTS Credits: 6

Economics

Rationale and Purpose of the Module: This module broadens and deepens the knowledge of intermediate micro and macro economics gained from EC4004, Economics for Business, as well as introducing key tools for applied analysis of economic data.

Guest Lecture Dr Alan Ahearne NUI, Galway
How has the Federal Reserve responded to the financial crisis? Long term refinancing operations (LTRO) and Outright Monetary Transactions (OMT).
How has the Federal Reserve responded to the financial crisis? Long term refinancing operations (LTRO) and Outright Monetary Transactions (OMT).
Guest Lecture John Rowe Financial Markets Division, Central Bank of Ireland
Monetary Policy Framework; National Central Bank’s and the Liquidity Position of Commercial banks.; Forecasting Liquidity Facilities; Reaction of Central Bank’s to the Financial Crisis.

Prerequisites: EC4102, EC4004

Guest Lecture Dr Alan Ahearne NUI, Galway
How has the Federal Reserve responded to the financial crisis? Long term refinancing operations (LTRO) and Outright Monetary Transactions (OMT).
How has the Federal Reserve responded to the financial crisis? Long term refinancing operations (LTRO) and Outright Monetary Transactions (OMT).
Guest Lecture John Rowe Financial Markets Division, Central Bank of Ireland
Monetary Policy Framework; National Central Bank’s and the Liquidity Position of Commercial banks.; Forecasting Liquidity Facilities; Reaction of Central Bank’s to the Financial Crisis.

Prerequisites: EC4102, EC4004
**Syllabus:** The objective of this module is to deepen and broaden students' knowledge from the intermediate micro and macroeconomics learned in EC4004.

**Lectures:** Week 1 Consumer Theory
Week 2 Producer Theory
Week 3. Markets, exchange
Week 4. General Equilibrium, Computable General Equilibrium
Week 5. Game theory and Policy
Week 6. Asymmetric Information
Week 7: Long Run 1: The "Solow Model" with Human Capital
Week 8. Long Run 2: The Ramsey Problem
Week 9: Medium and Short Run: IS/LM/PC Model with uncertainty
Week 10: Policy Application: Open economies in monetary unions
Week 11: Policy Application: funding pension systems in ageing societies
Week 12: Policy Application: Hyperinflations, deflations.

**Prerequisites:** EC4101, EC4102, EC4004

**ECTS Credits:** 6

**Rationale and Purpose of the Module:** Economics underlying the Macro economy. This is the study of how this course is to introduce the student to the principles of the Irish economy.

**EC4102 - MACROECONOMICS**

Income, consumption and savings, personal income, consumption and savings in Ireland, the Keynesian multiplier.

**Syllabus:** Topic 1. Introduction to Macroeconomics
Irish macro economy, political economy, macroeconomic constraints, globalization, macroeconomic models and the time horizon, a brief history.

Aggregate production function, measuring the output of nations, the national income accounts, adjusting for inflation, the business cycle, the long-run performance of the Irish economy.

Topic 3. Inflation
Measuring inflation, the Irish inflation record, the effects of inflation, deflation.

Topic 4. The Labour Market and Unemployment
The labour market, the natural rate of unemployment, frictional and structural unemployment, cyclical unemployment, why doesn't the labour market clear?, the costs of unemployment, reducing unemployment, unemployment in Ireland, unemployment in the Euro area.

Topic 5. Introduction to the Theory of Income Determination
Macroeconomic models, Keynes's General Theory, equilibrium in the goods and services market, aggregate demand, aggregate supply, equilibrium, adjusting to demand-side shocks, adjusting to supply-side shocks, real GNP and unemployment.

Topic 6. Consumer Theory and the Income Determination
Income, consumption and savings, personal income, consumption and savings in Ireland, the Keynesian multiplier.

Topic 7. Introduction to the Theory of Fiscal Policy
Fiscal policy, assessing the stance of fiscal policy, problems in implementing stabilization policy, taxation and the supply-side of the economy, the dynamics of debt stabilization.

Topic 8. Fiscal Policy and Economic Planning in Practice:
The Irish Record
Economic planning, Irish fiscal policy in historical perspective, is there such a thing as Expansionary Fiscal Contraction?, the end of history.

Topic 9. Money and Banking
What is money?, types of money, functions of money, creation of money, the role and functions of a Central Bank, control of money, the credit-fuelled property bubble and the crash.

**Topic 10. Money and Interest Rates in a Closed Economy**
The demand for money, money market equilibrium, nominal and real interest rates, aggregate demand and interest rates, monetary policy in a closed economy, crowding-out, government monetary financing.

**Topic 11. The Balance of Payments and the Exchange Rate**
Balance of payments, the significance of the current account balance, the foreign exchange market, the exchange rate of the Irish pound and the euro, the determinants of exchange rates, factors influencing exchange rates in the medium term, exchange rate regimes.

**Topic 12. Inflation and Interest Rates in Open Economies.**
Purchasing power parity (PPP), PPP and the real exchange rate, harmonized competitiveness indicators, relative PPP, uncovered interest rate parity theory.

**Topic 13. The Long-Run Performance of the Irish economy.**
The growth of population, the standard of living, interpreting the record 1922-'61, the 1960s, the record since 1971, the property and construction bubble 2001-'07, the great recession and its aftermath.

**Prerequisites:** none

**ECTS Credits:** 6

**Economics**

**Rationale and Purpose of the Module:** The purpose of this course is to introduce the student to the principles of the Irish economy.

**Topics:**

1. **Introduction to Macroeconomics**
   - Birth, growth and death of money
   - The monetary sources of demand
   - The demand for real money balances
   - The role of banks and financial intermediaries
   - The effects of inflation, deflation

2. **National Income and Economic Performance**
   - Aggregate production function
   - The national income accounts
   - Adjusting for inflation and the business cycle
   - Introduction to the long-run performance of the Irish economy

3. **Inflation**
   - Measuring inflation
   - The Irish inflation record
   - The effects of inflation and deflation

4. **The Labour Market and Unemployment**
   - The labour market
   - Natural rate of unemployment
   - Frictional and structural unemployment
   - Cyclical unemployment
   - Why doesn't the labour market clear?
   - Costs of unemployment
   - Reducing unemployment
   - Unemployment in Ireland
   - Unemployment in the Euro area

5. **Introduction to the Theory of Income Determination**
   - Macroeconomic models
   - Keynes's General Theory
   - Equilibrium in the goods and services market
   - Aggregate demand
   - Aggregate supply
   - Equilibrium
   - Adjusting to demand-side shocks
   - Adjusting to supply-side shocks
   - Real GNP
   - Unemployment

6. **Consumer Theory and the Income Determination**
   - Income
   - Consumption and savings
   - Personal income
   - Consumption and savings in Ireland
   - The Keynesian multiplier

7. **Introduction to the Theory of Fiscal Policy**
   - Fiscal policy
   - Assessing the stance of fiscal policy
   - Problems in implementing stabilization policy
   - Taxation
   - Supply-side of the economy
   - Dynamics of debt stabilization

8. **Fiscal Policy and Economic Planning in Practice: The Irish Record**
   - Economic planning
   - Irish fiscal policy in historical perspective
   - Expansionary Fiscal Contraction?
   - End of history

9. **Money and Banking**
   - What is money?
   - Types of money
   - Functions of money
   - Creation of money
   - The role and functions of a Central Bank
   - Control of money
   - Credit-fuelled property bubble
   - The crash

10. **Money and Interest Rates in a Closed Economy**
    - The demand for money
    - Money market equilibrium
    - Nominal and real interest rates
    - Aggregate demand and interest rates
    - Monetary policy in a closed economy
    - Crowding-out
    - Government monetary financing

11. **The Balance of Payments and the Exchange Rate**
    - Balance of payments
    - Significance of the current account balance
    - The foreign exchange market
    - Exchange rate of the Irish pound
    - Determinants of exchange rates
    - Factors influencing exchange rates in the medium term
    - Exchange rate regimes

12. **Inflation and Interest Rates in Open Economies**
    - Purchasing power parity (PPP)
    - PPP and the real exchange rate
    - Harmonized competitiveness indicators
    - Relative PPP
    - Uncovered interest rate parity theory

13. **The Long-Run Performance of the Irish economy**
    - Growth of population
    - Standard of living
    - Interpreting the record from 1922-'61
    - The 1960s
    - Record since 1971
    - Property and construction bubble
    - Great recession

**Prerequisites:** None

**ECTS Credits:** 6

**EC4108 - CONTEMPORARY ISSUES IN THE GLOBAL ECONOMY**

**Rationale and Purpose of the Module:** Understanding the main issues confronting the international economy is a pre-requisite to finding solutions to global problems. The recent financial and banking crisis and the attendant severe budgetary and fiscal problems facing many countries have led to some significant re-appraisal of what had become mainstream thinking in relation to economic policy and indeed in some circles market capitalism. Increasingly, much debate in the international economy is polarised between two camps: those who see globalisation as the panacea for solving economic and social problems and the anti-globalisation movement that views the process of...
globalisation as the main cause of problems. This module seeks to provide the student with a balanced and objective analysis of the main issues confronting the world economy and through the use of economic theory, empirical evidence and objective analysis seeks to distinguish between fact and fiction.

Syllabus: The module will have as its main objective an exploration of the main issues that confront the world economy. While it would be unreasonable to expect one module to cover all the issues in depth the following will be analysed and discussed:

Topic 1: (i) The identification of the causes of the financial crisis and fiscal crises in the world economy and in Ireland. (ii) The current state of the world economy; an overview of the current and future economic challenges facing the globalised economy. (iii) Review of history of the global economy.


Topic 3: (i) The evolution of international monetary and financial system. The role of the multilateral institutions such as the International Monetary Fund (IMF) and the World Bank. (ii) Changing hegemonic role of the US economy in international political economy and the rise of the BRIC economies. (iii) The European integration; why many EU countries formed a monetary union; macroeconomics in the Eurozone.

Topic 4: The economic performance and problems confronting less developed countries; The development prerequisites, the development history; 1945-1980 and the development policy since 1980; The importance of aid from rich countries.

Topic 5: (i) The policy role, challenges and opportunities of international migration; recent trends and the EU single labour market. (ii) Changing facets of international production; analysis and policy implications of outsourcing; trends in the patterns of offshoring and outsourcing.

Prerequisites: EC4102, EC4101

EC4112 - MACROECONOMICS (FOR NON-BUSINESS)
ECTS Credits: 6

Economics

Rationale and Purpose of the Module: The purpose of this module is to introduce the student to the principles underlying the macroeconomy. This is the study of how aggregate economic variables such as, the real growth rate, inflation and unemployment, behave and how the government and central bank can influence their behaviour. The first part of the course deals with key topics such as the theory of income determination, the consumption function and fiscal policy as well as the foreign exchange market. The latter part examines monetary policy instrument including how interest rates are determined and how monetary policy is conducted by the European Central Bank. The benefits and costs of economic and monetary union are also addressed in this introductory macroeconomics module.

Syllabus: 1. GNP, business cycle, unemployment, inflation. Policy constraints;
3. The Consumption Function and Income Determination including disposable income, consumption and saving; Keynesian multiplier; average and marginal propensity to consume.
4. Fiscal Policy and the Business Cycle Stabilisation policy, fiscal policy in Ireland
5. Money and Banking Definitions; types of money; modern banking systems; money creation, money multiplier; instruments of monetary policy.
7. Interest Rate Determination. Monetary policy; demand for money; money market equilibrium, monetary policy and the Keynesian, Classical debate.
8. The Balance of Payments and Exchange Rate Theory. Foreign exchange market, flexible exchange rates, real exchange rates, trade-weighted exchange rate index, Central Bank intervention, external reserves, fixed exchange rates.
9. Purchasing power parity including absolute and relative PPP.
10. Fixed Exchange Rate Systems including the operation of fixed exchange rate systems; monetary adjustment mechanism; sterilisation; fixed exchange rate systems in the past; benefits and costs.
11. European Monetary Union including economic benefits and costs to Ireland; adjusting to economic shocks
12. The European Central Bank. The design of the ECB; price stability; central bank independence; monetary policy in EMU.

Prerequisites: EC4102

EC4408 - PUBLIC FINANCE
ECTS Credits: 6

Economics

Rationale and Purpose of the Module: This course covers the theory and practice of public finance. It examines the theoretical rationale for government intervention in modern increasingly globalised economies. More specifically it examines the theory and practice of the allocative, stabilisation and re-distributive roles of government. This involves analysis of theory and practice in relation taxation and expenditure decisions.

Syllabus: 1. Pareto Optimality, General Equilibrium, Social Welfare Functions,
3. Cost Benefit Analysis,
4. Taxation: Incidence and Partial Equilibrium, Taxes on Labour, Taxation and the incentive to work.
6. Economics of Regulation.

Prerequisites: EC4101, EC4102, EC4004

EC4418 - MONETARY ECONOMICS AND INTERNATIONAL FINANCE
ECTS Credits: 6

Economics

Rationale and Purpose of the Module: The approach adopted in this module is to explain the main monetary theories and policies in the context of Ireland’s membership of European Monetary Union and the operations and policies of the European Central Bank. Among the issues discussed are: economic adjustment
to asymmetric shocks given the constraints of monetary union; the operations and policies of the European Central Bank; the transmission of monetary policy in the Eurozone; the determination of interest rates; exchange rate, interest rate, and fiscal policies in the Eurozone. In addition, a number of topics in international finance are examined including the various hedging techniques developed to minimize exchange rate and interest rate risk.

**Syllabus:**
1) The Design of the European Central Bank;
2) The ECB’s Monetary Policy;
3) Project: An Introduction to Time Series Analysis;
4) The ECB and Interest Rate Policy;
5) Managing Interest Rate Exposure;
6) 'One Monetary Policy Fits All';
7) Open Economy Monetary Model;
8) Controlling the Money Supply;
9) The ECB and the Stability Pact;
10) ECB and Exchange Rate Policy;
11) Managing Exchange Rate Exposure;
12) Conduct of Monetary Policy by World’s Major Central Banks

**Prerequisites:** EC4102, EC4004

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**EC4711 - EU ECONOMIC ENVIRONMENT**

**ECTS Credits:** 6

**Economics**

**Rationale and Purpose of the Module:** To provide students with an understanding of the economic structures and policies operating at the level of the European Union, together with an analysis of the progress towards integration, its impact on member states and the rest of the world. The module provides a framework understanding of the EU, its institutions, and their competences in key areas of economic activity.

**Syllabus:** The topics covered are set out as follows:
1. EU Competition Policy;
2. The EU Trade or Common Commercial Policy (CCP);
3. Monetary Integration and Economic and Monetary Union (EMU);
4. The Common Agricultural Policy (CAP);
5. The EU and Central and Eastern Europe (Enlargement);
6. The EU and the Less Developed Countries (LDCs).

**Prerequisites:** EC4034, EC4013

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**EC4904 - PRINCIPLES OF ECONOMICS**

**ECTS Credits:** 6

**Economics**

**Rationale and Purpose of the Module:** The purpose of this course is to introduce the student to the principles underlying the macroeconomy. This is the study of how aggregate economic variables (such as the real growth rate, inflation and unemployment) behave and interact and how the policy-maker (Government and Central Bank) can influence their behaviour. Following an introduction to the key macroeconomic variables and globalization, a model of how the macroeconomy operates (the theory of income determination) is developed. This model is then expanded at various stages to include the money market, the foreign exchange market and the supply-side of the economy. The expanded model is used to discuss issues in macroeconomic theory and policy such as the relative importance of fiscal, monetary and exchange rate policies. The course concludes by discussing recent trends and economic issues relating to the Irish economy.

**Syllabus:**
1. Introduction
   - GNP, business cycle, unemployment, inflation, policy constraints.
2. Globalization.
   - Globalization issues and trends.
3. The Theory of Income Determination: Basic Model
   - Economic models, aggregate supply and demand, natural real GNP, natural rate of unemployment, issues in the Keynesian, classical debate.
4. Consumer Theory
   - Consumption function, the multiplier.
5. Money and Banking
   - Money functions, creation and control (open market operations), European Central Bank (ECB), main refinancing interest rate and the EURIBOR, Inter-bank market, ECB’s monetary policy, Taylor rule, interest rates and consumption and investment. Fiscal and monetary policy compared, crowding-out.
6. Fiscal Policy
   - Public finances, problems in implementing a stabilisation policy, Laffer curve. Fiscal policy in Ireland.
7. The Foreign Exchange Market and Exchange Rates

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**EC4908 - ISSUES IN THE GLOBAL ECONOMICS ENVIRONMENT**

**ECTS Credits:** 9

**Economics**

**Rationale and Purpose of the Module:** To help learners understand in more detail the complex real world economy. This module will be divided into two sections: understanding the benefits and limitations of economic analysis as a means of studying business behaviour, and the effects of the real world economy on business decision making.

**Syllabus:**
Section 1: Topic 1; conceptual observations about entrepreneurship from an economic perspective.
Section 2: Topic 1; credit money and banking, structure of the Irish financial system. Topic 8; European central bank. Topic 9; balance of payments and exchange rates. Topic 10; fixed exchange rate systems. Topic 11; inflation and interest rates in open economies, Irish experience in the EMU. Topic 12; model of the open economy, examination of the Irish economy in the long-run.
**ED5502 - DIGITAL SYSTEMS 4**  
ECTS Credits: 6  
Electronic & Computer Engineering

**Rationale and Purpose of the Module:** Introduces the concepts and design issues for interfacing digital hardware to a microprocessor. This involves bus cycle timing, memory and I/O interfaces (serial and parallel) and interrupt architectures.

**Syllabus:** Bus cycle timing: Read and Write cycles. Synchronous and asynchronous bus cycles. The memory interface: Basic Memory device characteristics (ROM, EPROM, EEPROM, FLASH, FRAM, SRAM and DRAM). Static memory timing waveforms, address decoding (full and partial), the memory map. I/O interfacing: Memory mapped and isolated I/O, simple handshaking concepts. Software polling. Serial Communication: Asynchronous and synchronous. RS-232, RS-485 and RS-422. SPI and I2C. USB

**Prerequisites:** ED5501

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**EE4008 - AVIONICS**  
ECTS Credits: 6  
Electronic & Computer Engineering

**Rationale and Purpose of the Module:**  
* To make the students aware of the principles of operation of avionic systems and the application of telecommunications and control techniques to aeronautics.  
* To introduce the students to the principles of radar, radio navigation and telecommunications systems.

**Syllabus:** Principle of operation of avionic systems  
Brief description of instrumentation, sensors, actuators, computer based data acquisition and control systems.  
Introduction to navigational, communications and air traffic control systems.

**Air Data Systems**  
Inputs: pressure, air temperature. Outputs: pressure altitude, air speed, mach number, air density, temp, etc.

**Air data instruments:** altimeter, airspeed indicator, vertical speed indicator, mach metre, etc.

**Compass Systems**  
**Gyrosopic Instruments, mechanical gyros, gimballed gyro, strap down gyro, Laser Gyros, Sagnac effect, Inertial Navigation Systems**  
**Flight control systems**

**Aircraft use of radio:** navigation, radar, voice and data communication  
**Radio wave propagation and radiation:** propagation in the real atmosphere, ground effects: multipath and clutter, ground waves, sky and space waves.

**Modulation:** AM, FM, SSB, etc.

**Radio antennas:** unipole, dipole, loop antenna, capacitive antenna, microwave horn

**Avionics radio systems across different frequency bands**  
**Introduction to Principles and Use of Radar**  
**Primary and secondary radar systems**  
**Antennas:** mechanically steered radar beams, phased arrays.

**Pulse radar, radar transmitters and receivers, radar displays, moving target indicator. Doppler radar, CW and frequency modulated radar.**

**Radar range equation**  
**, input noise, signal-to-noise ratio.**

**Radar cross section of target aircraft**  
**2D and 3D radar systems**  
**Radar resolution, in range, azimuth and elevation.**

**Navigation Theory and Systems**  
**Navigation aids for aircraft**  
**Radio Navigation and Telecommunications Systems**  
**Instrument Landing Systems**  
**Microwave Landing Systems**  
**Loran C, Very High Frequency Omnidirectional Range (VOR), GPS, Automatic Direction Finder (ADF), Non Directional Beacons (NDB).**

**Navigation sub systems surveillance radar for Air Traffic Control.**

**Digital Data Busses used on Aircraft**  
MIL STD 1553, ARINC 429, A629

**Prerequisites:** EE4001, EE4004

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**EE4012 - CIRCUIT ANALYSIS 1**  
ECTS Credits: 6  
Electronic & Computer Engineering

**Rationale and Purpose of the Module:** Academic content is not currently available for this module – updates are in progress

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**EE4013 - COMPUTER NETWORKS**  
ECTS Credits: 6  
Electronic & Computer Engineering

**Rationale and Purpose of the Module:** Academic content is not currently available for this module – updates are in progress

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**EE4022 - SEMICONDUCTOR DEVICE FUNDAMENTALS**  
ECTS Credits: 6  
Electronic & Computer Engineering

**Rationale and Purpose of the Module:** Academic content is not currently available for this module – updates are in progress

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**EE4024 - ELECTRICAL ENERGY (ELECTRICAL MACHINES)**  
ECTS Credits: 6  
Electronic & Computer Engineering

**Rationale and Purpose of the Module:** Review of electromagnetism, Faradays, Amperes and Lezs laws, MMF, flux, flux density, magnetic field intensity and reluctance, self and mutual inductance, magnetic materials, BH curves, core losses. Magnetic circuits, electric circuit analogies, analysis of simple magnetic circuits.

**Transformers:** Construction and principles, ideal transformer, voltage and current transformers, power transformers, single/3 phase, equivalent circuits, open and short circuit tests, application in power systems, per unit system.

**Machines - DC motors and generators:** construction and principles, separately excited, series, shunt and compound machines. Voltage and torque equations. Equivalent circuits, Power flow. Machine characteristics: open circuit/magnetization, speed, torque and dynamic characteristics. Which configuration for which application. DC machines in modern power generation and motion control. AC machines, rotating magnetic fields, alternators, 3 phase generators, salient pole/cylindrical rotor, derivation of equivalent circuit from open circuit and short circuit tests, synchronous reactance, the
Locked-rotor and no-load tests. Induction generator.

determination of torque speed characteristic.

phase, 3 phase. Derivation of equivalent circuit,

Induction machines (motors and generators) single

Steady state stability limit.

Power Angle Curve. Synchronising to an infinite busbar.

phasor diagram (of cylindrical rotor machine) and the

Power Angle Curve. Synchronising to an infinite busbar. 

Steady state stability limit.

Power Angle Curve. Synchronising to an infinite busbar.

Locked-rotor and no-load tests. Induction generator.

Introduction to V/F control. Starting methods and protection.

Electrical machines developments for renewable energy generation.

AC power real and reactive power calculations. Power factor correction, balanced 3 phase systems analysis, star and delta connected loads, advantages of 3 phase systems, the per unit system.

EE4034 - TELECOMMUNICATIONS FUNDAMENTALS
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: The main objective of this course is to provide an opportunity for students to gain a basic understanding of Communication Networks and Protocols

Syllabus: Motivations and objectives of computer networks; overview of layered architecture and the ISO Reference Model; network functions, circuit-switching and packet-switching; physical level protocols; data link protocols including HDLC and multi-access link control. Network control, transport, and session protocols including routing flow control; end-to-end communication and inter-networking. Presentation layer protocols including routing, virtual terminal and file transfer protocols, cryptography, network security. It also introduces some important merging technologies, such as, integrated voice and data networks (VOIP) and the integration of wireless and wired networks. Specific examples and standards will be cited throughout the course.

Prerequisites: EE4313

EE4044 - COMMUNICATIONS AND NETWORKS PROTOCOLS
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: The main objective of this course is to provide an opportunity for students to gain a basic understanding of Communication Networks and Protocols

Syllabus: Review of vector calculus. Electrostatics - Electric field, calculation of the electric field, electric potential, conductors and dielectrics, electrostatic field boundary conditions, capacitance. Poisson's and Laplace's equations. Current density. Resistance calculations. Magneto-statics - Magnetic flux density, vector magnetic potential. Biot-Savart law, magnetic field intensity, magnetic circuits, magnetic materials, inductance. Time-varying fields - Faraday's law, Maxwell's equations, time harmonic electromagnetics, plane electromagnetic waves in lossfree and lossy media, low-loss dielectrics and conductors, power propagation and the Poynting vector, instantaneous and average power densities. Transmission lines - Transverse electromagnetic waves along a parallel-plate transmission line, transmission line equations, wave characteristics along infinite and finite lines, transmission lines as circuit elements, resistive and arbitrary terminations, the Smith chart, impedance matching.

EE4214 - CONTROL 1
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: The module introduces students to some basic control theory, Dynamic System Modelling, open- and closed-loop systems, signal flow graphs, time response of first and second order systems. This module also gives students a basic introduction (from the control perspective to support the control theory and dynamic systems modelling) to some of the basic devices used in control, including actuators, sensors and transducers.


Prerequisites: MA4001, MA4002, MA4003

EE4216 - CONTROL 2
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: This module extends fundamental Control principles with much more emphasis placed on the application of linear analytical techniques to control system design.

Syllabus: LINEAR SYSTEM ANALYSIS: Bode, Nyquist, and root locus, transfer function of plant with delay and non-minimum phase systems. Stability and Performance analysis using Bode, Nyquist, Routh-Hurwitz, and Root Locus methods. Design techniques for system compensation using Bode diagrams, Nichols charts and Root Locus. Lead and lag compensation, the application of these using op-amps as an example, internal compensators. Introduction to Modern Control methods using State Space Techniques.

PROCESS CONTROL: Terminology and practice, application and use of three term control, PID design in the frequency domain, integral wind-up and similar problems, Benchmark methods for tuning PID controllers, (Ziegler-Nichols, Haalman etc.,).

EE4314 - ACTIVE CIRCUIT DESIGN 2
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: This module introduces the basic properties of operational amplifiers feedback, and their use in both linear and non-linear applications as well as the introduction of AC low
frequency design. An introduction to Analogue signal conversion is also given.

**Syllabus:** THE DIFFERENTIAL AMPLIFIER AS A TWO ENDED INPUT AMPLIFIER. Introduce the diff amp as the input element to Op Amps. Define the terms Differential Gain, Common Mode Gain and Common Mode Rejection Ratio

OP-AMP CHARACTERISTICS: Simplified internal view of a typical 3-stage op-amp, current limiting, open-loop transfer curve, offset error. Op-amp configurations; current in, voltage out etc. Finite gain errors. Slew limitations.


OP-AMP NON-LINEAR APPLICATIONS: Comparators, Schmitt trigger, rectifiers, peak detectors etc. Non-linear oscillators (square-triangle), monostable circuits. A.C. COUPLED AMPLIFIERS: Low frequency limitations, break points, Bode plots, design steps.


Prerequisites: EE4313

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**EE4317 - ACTIVE CIRCUITS 4**

**ECTS Credits:** 6

**Electronic & Computer Engineering**

**Rationale and Purpose of the Module:** This module introduces students to integrated circuit design, to the limitations that apply to chip-level components, and to IC design methods.

**Syllabus:** IC technologies and components: Processing methods. Semiconductor Junctions. Passive (R and C) components and their limitations. Integration of BJTs, JFETs and MOSFETs. Device characteristics.

Analogue bipolar design methods: mirrors, high-gain stages, output buffers.

Analogue CMOS design methods: mirrors, high-gain stages, output buffers. Digital logic families, an overview.

Analogue building blocks: overview of op-amps, comparators and PLLs. CMOS and BIMOS technologies. Review of some analogue ICs, bipolar and MOS.

Prerequisites: EE4316

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**EE4328 - POWER ELECTRONICS**

**ECTS Credits:** 6

**Electronic & Computer Engineering**

**Rationale and Purpose of the Module:** This module will give students (electronic, Robotic, Control and Energy students) an understanding of modern power electronics both at the device . products level and at the renewable energy generation and distribution level.

**Syllabus:** Introduction (examples of typical power conversion applications e.g. a complete computer power supply system block diagram/space craft system, importance of efficiency, comparison linear vs switching supplies, overview key components utilised in power conversion) Switch realisation: semiconductor switches: diodes, Power MOSFETs, Thyristors, GTOs, IGBTs, properties, circuit symbols, comparative characteristics and application areas, power losses in switches. The ideal switch, ripple and switching frequency, conduction losses, switching losses. Switch mode power conversion: basic concepts; role of inductors, capacitors and transformers. Analytical treatment of converters in equilibrium (steady-state converter analysis). Modelling and simulation of converter in steady state (Simplis) Overview conversion topologies (non-isolating buck, boost, buck-boost) Three phase full wave uncontrolled rectifier with inductive loads: circuit diagram, waveforms, output voltage, input current, input harmonics. Single phase full wave thyristor controller rectifier: circuit diagram, waveforms and calculations. Inverters main concepts, square wave inverters, Sine PWM inverters: circuit diagram, Circuit waveforms, Amplitude modulation index, Frequency modulation index. Variable Speed Drive: Fixed frequency induction motor torque speed characteristic, V/F operation, torque speed capability with V/F drive, typical V/F drive circuit diagram. Continuous v discontinuous conduction mode. Converter dynamics and control (overview small signals models, example topology, transfer functions). Key skill which can be applied broadly. Energy storage and energy transfer components and magnetics (capacitive, inductive, uncoupled, coupled). Modern rectifiers (topologies, harmonics) High power resonant converters HVAC / HVDC Power systems and conversion basic understanding. Harmonics/Flicker/Reactive Power Control. Modelling of power converters. Low voltage ride-through (wind application)

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**EE4408 - ASICS 2**

**ECTS Credits:** 6

**Electronic & Computer Engineering**

**Rationale and Purpose of the Module:** This module is a 4th year core module for BE in Electronic Engineering (LM070) students. This is a follow-on module from EE4407 (ASICs I) which dealt with digital IC design issues. This follow-on module deals with analogue and mixed-signal IC design with an emphasis on the practice of theory and the use of IC CAD (Integrated Circuit Computer Aided Design) tools (analogue and mixed-signal IC design entry, simulation and layout CAD).

This module deals with the areas of design MOS circuit concepts, operational amplifiers, D/A converters, A/D converters, testability, ESD topics, plus assembly and packaging.

**Syllabus:** Basic electrical properties of MOS and CMOS circuits. Drain-to-source current Ids versus voltage Vds relationships. The threshold voltage Vt. MOS Transistor Circuit Model. MOS transistor trans conductance gm and output conductance gds. Future trends. Sheet resistance Rs and resistor design in CMOS. Area capacitances of layers and capacitor design in CMOS. Choice of Layers.

Operational amplifier (op-amp) architectures, design parameters and transistor sizing. Trade-offs in design. Op-amp DC and AC operation.

The CMOS Inverter. Inverter delays. Driving large
Latch-up in circuits.


Prerequisites: EE4407

EE4524 - DIGITAL SYSTEMS 3
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: The module provides an in-depth treatment of the following topics: Basic Microprocessor; Processor Architecture and programming in machine code; Instruction sets, Addressing modes, Exception handling, I/O programming; Simple handshaking concepts.; Software polling, Interrupts, Basic interrupt processing concepts, Interrupt service routines (ISRs); C programming as a programming language for embedded systems; Practical application of using development using the toolchain; Introduction to techniques used for testing embedded system software. (Digital Systems 1 on the programme is a prerequisite for this module.)

Syllabus: The Basic Microprocessor:

Instruction sets:
Addressing modes: register, immediate, direct, indirect, relative. Program control flow instructions. Stacks, local variables and subroutines. Exception handling.

I/O programming:

C programming as a programming language for embedded systems:
Pointers in C. Macros. Linking and sub-programs. Inline assembly programming in C.

Memory: Addressing concepts. ROM, RAM memory. Volatility. DRAMs, multiplexed addressing Serial data: Asynchronous and synchronous transfers.

EE4816 - SIGNALS AND SYSTEMS 1
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: To introduce a number of mathematical and computer aided tools for analysing signals and systems in the time and frequency domains, such that students will develop a sound knowledge and understanding of linear transform theory for signal processing, and to apply it to correlation and filtering of signals, in analogue and digital domains.


EH4006 - VICTORIAN TEXTS AND CONTEXTS
ECTS Credits: 6

School of Culture and Communication

Rationale and Purpose of the Module: This module aims to introduce students to key elements of nineteenth century literatures in English with a specific focus on Victorian and Edwardian texts and contexts. Students will examine a range of literary texts produced in the period and relate them to the political, social and historical circumstances in which they were written.

Syllabus: Addressing developments in literary practice and form, we will focus initially on the rise of the novel, and will also consider changes in the nature of author and audience during the second half of the nineteenth century. Nineteenth century aesthetic, political and social contexts for the literature will be central to our work and
a range of theoretical approaches will be tested in relation to these categories. As part of this endeavour, students taking the module will be asked to participate in a group-based research project.

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**EH4008 - BRITISH LITERATURE SINCE 1945**  
ECTS Credits: 6

**School of Culture and Communication**

**Rationale and Purpose of the Module:** This module studies British literature from the end of the Second World War to the present day. Students will read a range of literary texts produced in the period and will contextualise them politically, socially and historically. Topics will include the impact of the Second World War and the concomitant erosion of the British Empire; the enduring legacy of modernist literary experimentalism in post-Second World War literature; the rise of various liberation movements, including women's and gay liberation and postcolonial challenges to notions of Britishness; the impact of literary theory and the emergence of postmodernism.

**Syllabus:** This module covers British literature from 1945-present. Writers will include major novelists of the period such as Jean Rhys, Doris Lessing, Margaret Drabble, A. S. Byatt, Salman Rushdie, Jeanette Winterson, Kazuo Ishiguro and Zadie Smith; poets such as Philip Larkin, Dylan Thomas, Derek Walcott, Geoffrey Hill and ted Hughes; and playwrights such as John Osborne, Joe Orton, Harold Pinter, Tom Stoppard, Caryl Churchill and Sarah Kane. To define the themes and interpret this literature, students will become familiar with political, social and historical contexts (the Second World War, various liberation movements, the rise and fall of the welfare state), with significant concepts and philosophies (Thatcherism, postmodernism), and with literary movements (Angry Young Men, Kitchen Sink Realism, New Brutalists).

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**EH4022 - ENGLISH LITERATURE 2: EARLY MODERN POETRY AND PLAYS**  
ECTS Credits: 6

**School of Culture and Communication**

**Rationale and Purpose of the Module:** The purpose of this module is to further develop the introduction of foundational skills to students of English literature, following on from English Literature 1, with a focus on Early Modern poetry and plays in particular.

**Syllabus:** This module introduces students to genre-based studies in poetry and drama, with particular emphasis on significant ideas and key works from the Early Modern period. The period studied sees the introduction both of new philosophies, such as humanism, and new literary forms, such as the sonnet. Therefore, a selection of core drama and poetry texts will be surveyed within their cultural, social, and political contexts in order to develop a secure knowledge base and critical appreciation of Early Modern Literature and the stylistic, historical, and gender dynamics of the period. This account of the poetic and dramatic developments of the period will equip students with the critical skills to identify and critically analyse poetic forms and dramatic conventions.

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**EH4008 - CONTEMPORARY IRISH LITERATURE**  
ECTS Credits: 6

**School of Culture and Communication**

**Rationale and Purpose of the Module:** This module aims to introduce students to a range of Irish narrative texts written in English since 1980 and in doing so: explore the engagement of these texts with contemporary historical, social and political contexts. Consider the contemporary writing of cultural and social identities in, and about, Ireland. Evaluate literary responses to the Northern Troubles and consider the ways in which literary/cultural constructions of Northern Ireland are reproduced at home and abroad. Examine the representation of community and political activism in Irish writing. Address the construction of gender and sexuality in contemporary Irish writing. Explore the writing of the Irish diaspora as well as that of its immigrant communities. Evaluate a range of theoretical approaches which have been, or might be, applied to this literature.

**Syllabus:** This module examines colonial discourse of North and South. It will introduce students to a range of Irish literature, covering the period from the 1930s to the present day. The module will explore the representation of community and political activism in Irish writing, with a focus on significant ideas and key works from the Early Modern period. The period studied will be surveyed within their cultural, social, and political contexts in order to develop a secure knowledge base and critical appreciation of Early Modern Literature and the stylistic, historical, and gender dynamics of the period. This account of the poetic and dramatic developments of the period will equip students with the skills to identify and critically analyse poetic forms and dramatic conventions.

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**EH4026 - COLONIAL/POSTCOLONIAL LITERATURE IN ENGLISH**  
ECTS Credits: 6

**School of Culture and Communication**

**Rationale and Purpose of the Module:** On successful completion of this module, students will be able to apply a critical and cogent awareness of colonial and postcolonial histories of the 19th and 20th centuries. Multiple socio-political and cultural contexts associated with Anglophone world literature. Key literary texts in the field of postcolonial studies from around the world. A sample of key theoretical debates in the field of postcolonial studies at large (connected to additional theoretical fields such as feminism, ecocriticism, postmodernism, and so on). Ways to compare, contrast and combine different theoretical and methodological positions in the field of postcolonial studies.

**Syllabus:** This module will examine colonial discourse of the British Empire, through a series of colonial and postcolonial literary and theoretical readings. More specifically, we will review the fundamental dichotomies of colonial discourse - master/ slave, centre/margins, enlightenment/barbarism, authenticity/ hybridity, secular modernity/ religious conservatism, nation/nativism - and will proceed to read articles and novels from the end of the 19th century, as well as 20th century, from India, Africa and the Caribbean, that both address and attempt to reconfigure the colonial experience from a variety of perspectives.

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**EH4036 - IRISH LITERATURE 1930 - 1990**  
ECTS Credits: 6

**School of Culture and Communication**

**Rationale and Purpose of the Module:** The module revises and updates a module (EH4126 -- Imagined Spaces: Irish Cultural Texts) in ways which better reflect the broad range of faculty interests in twentieth-century Irish literature. It will introduce students to a range of Irish literary work and cultural movements in the period 1930-1990. This was a period in which literary censorship was a controversial topic, and the threat posed by literary radicals to the stability of the new state(s) widely debated. Taking this as a starting point,
the module will encourage students to interrogate the ways in which Irish literary culture challenged state censorship, how it evolved over the century, and what the impact of literary writing has been on dominant social and cultural formations on the island. Attending to innovations in style, structure, and genre in the period, the module will concentrate on formal as well as cultural experimentation.

**Syllabus:** The module will introduce students to a range of twentieth-century Irish literary work, focusing on literary realism, avant garde experimentation, autobiography and memoir, radio writing, and film adaptation, to give just some examples. Topics covered may include urban/rural representations, the "Irish city" (which will include transnational examples), "the Troubles" in Irish culture, changing gender representations, sexualities, language questions, migration, and the representation of minority communities in the culture. While the main focus will be on literary material, the module will also consider the broadcast media and film work of some authors involved, such as Kate O'Brien and Sam Hanna Bell, to give two well-known examples.

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**EH4038 - STUDY OF A MAJOR 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 literature written in English. Students will read an extensive selection of the authors works in order to understand fully his/her individual development and his/her important contributions to literary history. On successful completion of this module, students will have gained:

- An understanding of the author in his/her political, historical, and cultural contexts;
- Familiarity with a range of the authors works and with a range of his/her thematic, stylistic, aesthetic, and formal concerns;
- An understanding of the authors importance in the literary canon;
- An understanding of different theoretical and methodological ways of interpreting the major author.

**Syllabus:** This module will function as a critical survey of the work of a major author. Students will study the authors development from early efforts to mature output and will be able to analyse and discuss the authors overall impact on literary history. Students will be able to position the author historically and politically and will understand the authors role as a contributor to intellectual history. Students will be able to position the author in different theoretical and methodological frameworks and will be able to assess and interpret a wide range of the authors work.

**Example One:**  
**Virginia Woolf**  
This module will trace the development of the modernist novelist Virginia Woolf from early work to mature output. Students will read most of her major fictions as well as a selection of her essays and autobiographical pieces. Students will study Woolf as a theorist and practitioner of modernist narrative form, as a woman writer deeply interested in questions of female creativity and a significant contributor to feminist literary theory, and as a figure increasingly relevant to studies of memory and trauma. Students will also consider Woolf as a cultural icon by considering her work in relation to recent films and novels that deploy her work.

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**EH4125 - FEMINIST LITERARY THEORY**  
**ECTS Credits:** 6

**School of Culture and Communication**

**Rationale and Purpose of the Module:** To introduce students to a range of writing by women and to demonstrate how understandings of literature are marked by gender. To explore critical views of the institution of literature and to produce models of the reading and writing processes from a feminist perspective.

**Syllabus:** This course will combine feminist theory and the analysis of literary texts. We will consider five main areas of feminist theory and criticism: the concept of a 'feminine aesthetic', the contribution of psychoanalytic theory to understandings of gender, identity and writing; the relationship between 'race', ethnicity and gender in literature; questions of 'gender trouble' and sexuality; and postmodern feminist perspectives as they apply to literary texts. Throughout the course, theoretical approaches will be tested in relation to a range of women's writing. Primary texts will be drawn from English language traditions in the first instance, although writings from other language traditions may be included depending on staff expertise.

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**EM4006 - SUBJECT PEDAGOGICS 2 (MATHEMATICS)**  
**ECTS Credits:** 6

**School of Education**

**Rationale and Purpose of the Module:** This is the second subject pedagogics module in mathematics and is devoted to applying the trainee teacher's general pedagogical knowledge and developing mathematics-specific pedagogical knowledge. The module attempts to integrate three strands concurrently: (a) a theoretical mathematics education strand focusing on the mathematics education curriculum; (b) aspects of the psychology of mathematics teaching and learning; (c) practical preparation for school-based practice.

**Syllabus:** LECTURE TOPICS: (2x13 weeks)
- Mathematics and Learning; Learning theories and mathematics; Mathematical thinking; Assessing Mathematics learning; Classroom Practice; International Perspectives; Senior Cycle Maths Curriculum.

**SEMINARS:** (1x5 weeks) Student groups (1 presentation per group)
- Learning theories in mathematics education; Research in mathematics; Teaching proof and proof techniques; Teaching algebra; Teaching geometry; Proving solving and modelling in secondary mathematics teaching; Teaching algebra; Teaching geometry; Proving in mathematics; Teaching proof and proof techniques; Learning theories in mathematics education; Research perspectives in mathematics education; Student choice (to be approved).

**WORKSHOPS/MODEL LESSONS** Student Groups (1 presentation per group)
- Group Brief: Develop and present to peers 30min model lesson for target senior cycle group. Lesson will be discussed and evaluated by panel of peers chaired by lecturer

**Prerequisites:** EM4004
EN4018 - TEACHER AS PROFESSIONAL  
ECTS Credits: 6

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

EN4022 - EDUCATIONAL TECHNOLOGY FOR TEACHING AND LEARNING  
ECTS Credits: 6

School of Education

Rationale and Purpose of the Module: This module introduces students to various forms of educational technology. The module provides participants with both the practical and pedagogical skills to integrate these technologies into their teaching. The module also provides students with relevant policy and professional issues related to ICT use in educational settings. A core focus of the module is to empower students to capitalise on the personal, social and educational benefits of the technologies whilst recognising the critical questions raised by an increasingly technological society.

Syllabus: Reconceptualising teaching and learning in the context of ICT; rationale for the integration of educational technologies in schools; national and international policy trends in educational technology; critical perspectives on educational technology; deconstructing the 'net generation'; critical media literacy; cyber bullying and child welfare issues; information security and legislative requirements; productivity tools for teachers; teacher and student generated content (wikis, podcasting, video content); technologies in the classroom; assistive technologies in education; Communication and collaborative learning technologies (LMS platforms in schools, Social media in education); ICT planning and leadership; use of ICT in supporting independent learning; Evidence-based uses of technologies in the classroom; emerging trends and technologies in education

EN4026 - INCLUSIVE EDUCATION 2: SPECIAL EDUCATIONAL NEEDS  
ECTS Credits: 6

School of Education

Rationale and Purpose of the Module: Successful inclusion of students with special educational needs is underpinned by positive teacher attitudes and a capacity to differentiate appropriately. This module aims to enhance students understanding of inclusion and to develop their capacity to identify and respond to students special educational needs collaboratively and within a whole school framework.

Syllabus: Knowledge of key national and international policy and legislative documents that pertain to special educational needs in Ireland; identification and assessment of need across cognitive, physical and emotional/behavioural domains; effective writing of individual education plans; knowledge and application of evidence based strategies in the area of SEN; understanding and support of SEN within a whole-school framework; collaboration with key stakeholders (e.g. parents/students) and a multi-agency approach to the inclusion of young people with SEN; experience of an alternative educational experience.

EP4003 - ENTREPRENEURSHIP AND INNOVATION  
ECTS Credits: 6

Management and Marketing

Rationale and Purpose of the Module: The aim of the module is to help students to develop an entrepreneurial mindset that includes creativity, innovation and diagnostic abilities. The course focuses on entrepreneurship and innovation for new start-up businesses as well as entrepreneurial behaviour within larger organisations. Key objectives are to introduce students to the theory and practice of entrepreneurial creativity and innovation and to provide an understanding of the nature of entrepreneurship, the characteristics of the entrepreneur, the intrapreneur and the role of the socio-cultural and economic environment in fashioning innovative entrepreneurship. In addition the module examines the process of managing innovation.

Syllabus: This module commences with an introduction to the nature and development of entrepreneurship and emphasises the strong link between entrepreneurship and innovation. This leads to an overview of the schools of thought on entrepreneurship and an understanding of the entrepreneur and the entrepreneurial process. Creativity and innovation are examined with contextual emphasis on innovation in products, services and processes; product strategy, and new product/service development. Corporate entrepreneurship is explored and creative thinking is applied to identify venture opportunities, business planning, networking and technology transfer.

EP4008 - BUSINESS CONSULTING  
ECTS Credits: 6

Management and Marketing

Rationale and Purpose of the Module: Small and medium sized enterprises are constantly evolving and seeking new opportunities to expand and develop their existing businesses which requires external expertise and advice. This advice can range from guidance on new market and product development to overall strategy development, implementation and evaluation; how to develop growth strategies; and to gain objective and expert advice on how they can implement change in their firm successfully. This module will introduce students to the principles and processes of management consultancy and provide them with the opportunity to adopt the role of a professional management consultant, to apply experiential knowledge and concepts learned in the classroom to real-life business situations.

Syllabus: The aim of this module is to provide students with an understanding of the business consulting process and gain knowledge and expertise in how to manage a business consulting project efficiently and effectively. The module will address the following topics: the nature of business consulting; the skills of an effective consultant; developing a research consultancy contract; managing the client-consultant relationship; the stages of consulting process; problem diagnosis and solution development; Project planning; Identifying and evaluating recommendations and their implementation; the ethics of conducting business consulting.

EP4408 - SMALL BUSINESS CONSULTING  
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 both the business planning and consultancy process. Students will act as consultants for existing SMEs. In undertaking the consultancy project, students benefit enormously from this experience as they have the opportunity to apply experiential knowledge and concepts learned in the classroom to real-life business situations.
Syllabus: Knowledge is structured in two main sections, Theory and Application of Consultancy. Initially major consulting concepts and models are imparted, following which students work together in groups engaging in experiential learning acting as consultants for an external SME.

EQ4014 - FOUNDATIONS OF EQUINE PERFORMANCE
ECTS Credits: 6

Biological Sciences

Horse handling and management; methods of control and restraint, protocols for assessing and monitoring horse health, welfare status and fitness for use, use of lunging on hard and soft surfaces and as an evaluation tool for lameness and respiratory assessment. Measuring physiological indicators; respiration, temperature, heart rate, hydration. Assessment and selection for performance; genotypic and phenotypic considerations, environmental and training contributions, cloning the sports horse, sales evaluation. Training; identification of efficient athletic technique, exercises to improve athletic performance, improving accuracy and power in athletic technique in the horse, use of jumping exercises to improve power and agility, establishing independent balance in the horse and rider.

EQ4032 - EQUESTRIAN SKILL ANALYSIS
ECTS Credits: 6

Biological Sciences

Rationale and Purpose of the Module: This module provides important foundation skills for students of equitation in movement and technique analysis, necessary for evaluating equines as athletes. Students are provided with the knowledge and skills to evaluate the physical interactions between the horse and rider.

Syllabus: Common misconceptions in rider skill requirements. Rider movement; the role of nervous, skeletal and muscular systems in proprioception and movement, use of body segments for balance and to influence the horse, core stability, skill related components of fitness, physiology and psychology of motor learning, limiting factors - joint range of movement, mental fitness and physical fitness. Qualitative analysis of rider movement, variations by sports discipline. Analysis of technique, strategies and rules of the 3 main Olympic equestrian disciplines and horse racing. Use of video analysis of, and feedback on rider performance. Analysis of efficient technique and it’s role in influencing the horse and avoiding injury. Simple methods for developing rider and horse skills; use of simple off and on horse techniques on the flat, over ground poles and jumping to promote efficiency, rhythm, balance, coordination and accuracy in rider and horse movement. Developing skills and knowledge on bandaging, bitting, early handling of horses and corrective and surgical shoeing. Factors affecting rider movement; tack and equipment, horse and rider conformation, rider gender, length of stirrup and saddle design.

EQ4038 - TRAINING THE PERFORMANCE HORSE
ECTS Credits: 6

Biological Sciences

Developmental exercises; leg yield, shoulder in, travers, renvers, half pass, sequence bounces, stride adjustment and distance tests, show jumping and dressage exercises for the racehorse, ridehorse willingness in the horse in high level training. Analysis of performance requirements; rules of sports and racing disciplines, test definitions and influence on training and outcome, development, implementation and evaluation of training plans for technique and fitness, long term equine development models, comparison of Irish and international horse development and assessment models. Equipment and technology; use of pressure measurement devices to evaluate saddle fitting, use of 2D motion analysis of technique and movement on the flat and over fences.

EQ4048 - MANAGING THE PERFORMANCE HORSE
ECTS Credits: 6

Biological Sciences

Performance environments; heat and humidity, acclimatisation, replication, aggressive cooling, rehydration and pre-hydration. Ethics; use in competition, safety, rules and regulations, fence and course design. Holistic management; roles and values of the contributing practitioners. Competition planning; periodisation, setting long medium and short term goals, training schedules, licenses and qualifications, entries, travel, quarantine, management at competitions, recovery from competition. Profiling; conformation, back templating, weighing, limb examination, routine health observations, value of veterinary imaging techniques. Procedures; travel documentation, routine health care, vaccinations, licenses, entries, competition analysis and planning.

EQ4068 - ADVANCED EQUINE PHYSIOLOGY
ECTS Credits: 6

Biological Sciences

Rationale and Purpose of the Module: This module is focused on the core principles and recent developments in Exercise and Reproductive Physiology. It aims to provide students with an understanding of both these facets of physiology so as to equip students to work in the equine industry.

Syllabus: Effect of exercise and training on the cardiovascular, respiratory, nervous, and musculoskeletal systems. Sources of energy and the causes of fatigue in horses undertaking different types of work. Modern training methods relating the principles of exercise physiology with current training and management regimes. Laboratory and field methods for monitoring equine fitness based on heart rate, respiratory rate, oxygen consumption and blood lactate production. Examination of fitness training programmes for horses competing in specific disciplines. Interval training, continuous training. Recent developments is assisted reproductive technologies in horses including manipulation of the mares reproductive cycle. Assessment of follicular dynamics using ultrasonography, Multiple ovulation and embryo transfer, Semen collection, processing and freezing, Sperm assessment techniques, Artificial insemination, Cloning.

Prerequisites: EV4013

ER4508 - POLLUTION CONTROL 2 (WASTE MANAGEMENT)
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: To provide an understanding of current waste management options, their benefits and associated problems, and their place in
ER4606 - CLEAN TECHNOLOGY
ECTS Credits: 6

Chemical Sciences

**Rationale and Purpose of the Module:** To provide an introduction to the concept of clean technology. To survey methods of recycling, reducing or removing gaseous or aqueous waste from industrial processes using a clean technology approach.

**Syllabus:** Introduction to clean technology. Examples of Clean Technology in the agricultural industry, agrochemical, fine chemical and pharmaceutical industry. Role of catalysts, reactor configuration and design. Elimination of emissions from material handling and storage, Control of fugitive emissions, Use of biotechnology.

ET4004 - TCP / IP NETWORKING
ECTS Credits: 6

Electronic & Computer Engineering

**Rationale and Purpose of the Module:** The aim of this module is to provide a detailed study of the TCP/IP model and the internet. The module also covers advanced topics in multimedia communications.

**Syllabus:** The internet and TCP/IP model: Evolution of internet; TCP/IP model (layers description and functions, PDU encapsulation, protocol architecture); TCP/IP internetworking principles. Network layer: Internet protocol (IP) mobile IP, addressing (IPv4 vs. IPv6); NAT operation (static vs. dynamic); subnetting and supernetting; address resolution with ARP and RARP; routing protocols (RIP, OSPF, BGP), Quality of Service (DiffServ vs. IntServ); control and assistance mechanisms (ICMP); internet multicasting (MBone operation) and group management (IGMP). Transport layer: Unreliable datagram transport with UDP; real-time transport with RTP and RTCP; reliable connection-oriented transport with TCP and SCTP; wireless TCP. Application layer: Review of client-server model; domain

1 Consolidating the sense of Course identity among European Studies students.
2 Providing an opportunity for students to discuss the application of their theoretical knowledge about the European Union with practitioners, experts and politicians in areas where Ireland’s EU membership has a vital impact.
3 Providing students with space to explore the complexities of EU decision-making in simulation games.
4 For teaching-staff the module provides a space for experimenting with the innovative ways to teach European (Union) Studies.

ES4002 - EUROPEAN STUDIES WORKSHOP
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

**Rationale and Purpose of the Module:** The module takes the form of a workshop with a strong practical focus. It has a four-fold purpose:

1. Guest-speakers: Three speakers will be invited from fields in which Ireland’s membership of the European Union is of central importance. These are also likely to be the areas in which European Studies graduates may find employment. Speakers can be proposed by all disciplines participating in the degree programme. They may include staff of the European Parliament Representation or the European Commission Representation in Dublin, MEPs, senior civil servants interested in EU affairs, politicians active in parliamentary committees with a strong EU focus, civil society organizations such as the European Movement, trade unions, EU translators and interpreters, companies with a strong international orientation or trade links with other EU countries, international legal firms, journalists etc. Each visit will be thoroughly prepared beforehand and the work context of the speaker will be explored. This will allow the students to make more effective use of guest speakers than is normally the case.

2. EU Negotiation Simulation Games: The other half of the module will be dedicated to an EU negotiation simulation exercise which will take account of topical issues. These can take the forms of a European Parliament debate, interactions which occur within and between the European Parliament, the European Commission and the Council of Ministers during the process of drawing up EU legislation, discussions among representations of regional interests and inter-regional cooperation etc. There are a number models and guidelines for such exercises available; some are listed in the resources below. In preparatory sessions students will be enabled to formulate the policy stances of different member states, parties, interest/lobby groups etc. This will require independent research for which students are strongly encouraged to make use of their language skills. Through such simulation exercises, students will gain formal knowledge of the process and techniques of negotiation and decision-making in the EU. In addition, they learn how other factors can affect outcomes, including time pressure, informal discussions that take place on the margins, personalities, negotiating strategies, negotiating languages etc.

The module may incorporate a visit to Brussels.

The relative openness and flexibility of this workshop module also provides the space for interaction with incoming ERASMUS students who may wish to participate as well as for joint projects with our ERASMUS partner institutions involved in teaching European Studies. Exploratory discussions about such collaborations are currently under way.

Students will have to write a report of the simulation exercise as well as a research essay on a topic of their choice.

**Prerequisites:** ES4001

The proposed syllabus remains open and flexible but will contain two distinct elements of six weeks each, though not necessarily in separate blocks:

1. **Guest-speakers:** Three speakers will be invited from fields in which Ireland’s membership of the European Union is of central importance. These are also likely to be the areas in which European Studies graduates may find employment. Speakers can be proposed by all disciplines participating in the degree programme. They may include staff of the European Parliament Representation or the European Commission Representation in Dublin, MEPs, senior civil servants interested in EU affairs, politicians active in parliamentary committees with a strong EU focus, civil society organizations such as the European Movement, trade unions, EU translators and interpreters, companies with a strong international orientation or trade links with other EU countries, international legal firms, journalists etc. Each visit will be thoroughly prepared beforehand and the work context of the speaker will be explored. This will allow the students to make more effective use of guest speakers than is normally the case.

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The relative openness and flexibility of this workshop module also provides the space for interaction with incoming ERASMUS students who may wish to participate as well as for joint projects with our ERASMUS partner institutions involved in teaching European Studies. Exploratory discussions about such collaborations are currently under way.

Students will have to write a report of the simulation exercise as well as a research essay on a topic of their choice.

**Prerequisites:** ES4001
name system (DNS); TCP/IP configuration; static (BOOTP) vs. dynamic (DHCP); terminal networking with Telnet; file transfer with FTP and TFTP; email service (SMTP, POP, IMAP); browsing with HTTP; network management with SNMP.

Multimedia communications; streaming audio, internet radio, VoIP (SIP v H323), video on demand, IPTV.

ET4006 - ELECTRONICS (ED)
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: To provide the students with the knowledge and skills required to specify and manage classroom based projects using analogue and digital electronic devices and equipment available in schools. To develop the knowledge, skills, values and attitudes appropriate to the teaching of technologies.

Syllabus: Transistor switch and operational amplifier circuits (op-amps) with output devices lamp, buzzer, LED, speaker, motor, relay. Operational amplifier circuits (op-amps) assembled as comparator, amplifier, and oscillator. Simple timing circuits. Logic Circuits, basic logic gates AND, OR and NOT NAND, truth tables for each. The main logic families (TTL and CMOS). The use of logic gates with sensors and output devices. Inputs and Outputs, buffers (transistors, amplifiers, paralleled outputs), Schmitt trigger. Binary inputs. Counters, clock circuits, de-bouncers, counters, seven segment displays and display drivers. Circuit Design and Assembly of Pre-designed Circuits. Printed circuit boards (PCBs) Use of prototyping boards for initial assembly and testing of circuits. Strategies for teaching this subject area at second level. Designing, planning and managing appropriate teaching and learning activities for this subject area.

ET4014 - DATA SECURITY
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: To introduce the concept of security services such as authentication, integrity and confidentiality. To introduce the role of digital signatures and their implementation using cryptographic ciphers.

To introduce basic security protocols that provide security services.
Attacks against security services: Replay attack, man in the middle attack.

Syllabus: [Introduction to Security Services:] Security attacks, OSI model, security services: concepts of confidentiality, data origin authentication, entity authentication, data-integrity, access control, availability. [Digital Signatures:] The role of signatures, MACs, Hash functions, digital signatures, public key certificates, X509 certification authorities, e-mail security: PGP. [Security Protocols:] Introduction to key management, peer-to-peer distribution protocols and identification protocols. Secure web (https/ssl), secure shell (ssh) etc. [Identification techniques:] Identification tokens and smart cards. Biometric identification: finger prints, retina scan, face recognition, voice recognition. [Attacks:] Definition of attacker and capabilities of attacker, introduction to attacks on protocols, such as replay attacks, man in the middle attack.

ET4018 - MOBILE AND WIRELESS COMMUNICATIONS
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: The aim of this module is to provide an introduction to mobile communications and mobile networking. At the completion of the module, students should have an understanding of the important issues in providing a mobile communications system including signal transmission, network management and interaction with a fixed network. Students should understand the principles of operation of a current mobile communications system and the potential for future services development.

Syllabus: Digital mobile and personal communications systems: General configuration of cellular systems; comparison a with fixed communications systems; systems overview: Fixed wireless Access, cellular, WLAN, Wireless Personal Area Network (WPAN), satellite. Cellular Concepts: Frequency reuse; channel assignment; capacity; sectoring. Review of wireless transmission; Signals, propagation issues, coding, modulation, multiplexing, spread spectrum. Medium access control: SDMA, TDMA, FDMA, CDMA, WCDMA, effects of Multiple Access Interference and ISI.

Mobile telecommunications systems: GSM, GPRS, EDGE, UMTS, HSDPA, future generation (4G) Key concepts in the dynamic management of resources; call control, switching, wireless access and channel allocation, handoff, roaming, HLR and VLR. Wireless network issues: MAC, QoS, ad-hoc networks, MANET. Example systems: Bluetooth, IEEE 802.11, Ultra-wideband (UWB). Mobile IP, mobile TCP issues. Support for mobility at higher communications layers.

ET4027 - COMPUTER FORENSICS
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: This module aims to give the student a firm understanding of the problems associated with computer forensics in relation to data recovery from digital media, whether the data was accidentally lost or deliberately destroyed. The student will learn to extract information from a computer which might be of relevance at a crime-scene using a variety of forensic techniques, tools and commands.

Syllabus: Computer Forensics: Definition; Evolution of Computer Forensics; Need for Computer Forensics in the digital age. File systems: Disk technologies; Data organisation; File systems on Unix and Windows. Data recovery: Recovering data and analysing data usage patterns: the Audit Trail; Use of caches, spooling, paging files, logs, backup media, computer memory (while still powered). Tools for forensic analysis: Laboratory/project based: file system analysis tools; investigate a case study forensic problem; emphasis on the use of tools.

ET4028 - HOST AND NETWORK SECURITY
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: Gain an in-depth knowledge of host and network security. Assess the security of a network. Recommend and implement measures to prevent security threats.

ET4088 - ENERGY MANAGEMENT AND TECHNOLOGY  
ECTS Credits: 6  
Electronic & Computer Engineering  

Rationale and Purpose of the Module: This module provides the necessary understanding, knowledge and skills for students to undertake a career in Energy Management. This module will be a direct replacement for ET4048 / ET4068 Electronic Systems for the Built Environment 2 on LM080 and LM087  


ET4122 - ANALOGUE ELECTRONICS 2  
ECTS Credits: 6  
Electronic & Computer Engineering  

Rationale and Purpose of the Module: The aim of this module is to continue the introduction and analysis of the principles of operation of electronic devices and circuits using the principles introduced in Analogue Electronics 1. A more in-depth analysis will be undertaken using suitable analysis techniques. The aim of this module is also to introduce a familiarity with the phasor and complex notation approach.  


Prerequisites: ET4141

ET4162 - COMPUTING SYSTEMS ORGANISATION  
ECTS Credits: 6  
Electronic & Computer Engineering  

Rationale and Purpose of the Module: By introducing the concept of connected computing using networking examples, students will appreciate the driving forces affecting computer organisation and architecture. Students will learn about Instruction Set Architecture and its significance in computer design.  

Syllabus: 1. Networking Basics  
   a. Exploring the influence of networking on computer organisation  
   b. Introduction to networking infrastructure  
   c. Networks and the internet  
2. Error correcting codes  
3. Assembly language programming  
4. Computer performance and performance measurement  
5. RISC, CISC and limitations of each  
6. An overview of multicore processing  
7. Memory hierarchy in detail

ET4224 - ROBOTICS 1: SENSORS AND ACTUATORS  
ECTS Credits: 6  
Electronic & Computer Engineering  

Rationale and Purpose of the Module: This module introduces students to fundamental principles of sensors and actuators.  

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

Syllabus: Introduction to Physical Phenomenon:  
* SI Units.  
* Principles of sensor operation (mechanical, thermal, sound, light).  
* Sensors and Transducers:  
* Concept of transducer action as signal conversion with particular emphasis on an electrical signal as the output.
* The ideal transducer.
* Resolution, accuracy, linearity definitions and relevance.
* Review of some physical phenomena that result in electrical parameter variations

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

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

Prerequisites: EE4102, EE4313, EE4101

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**ET4243 - WEB AND DATABASE TECHNOLOGY 2**
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: This module will introduce the students to the concepts of database design, management and applications, such that they will gain a working knowledge of how to design and build a database and database-driven web sites that meet given business requirements, using industry standard database management systems.

**Syllabus:**
* Data models & database architectures
* Database Management System (DBMS): typical functions/services and major components
* The relational database model: introduction & additional concepts
* Database design methodology: conceptual, logical and physical database design phases
* Introduction to Structured Query Language (SQL): Data manipulation and Data definition
* Approaches for integrating databases into the web environment; client-server architectures
* Introduction to Microsoft Web Solution Platform: Active Server Pages (ASP) and ActiveX Data Objects (ADO); Introduction to scripting languages
* Web database programming case study

Prerequisites: ET4132

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**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

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**EV4013 - EQUINE PHYSIOLOGY**
ECTS Credits: 6

Biological Sciences

Rationale and Purpose of the Module: This module builds on the previous modules BY4001, BY4002, BC4902 and EV4012 and forms a core module on the Equine Science Degree programme.

**Syllabus:** Integrating the students prior knowledge, and valuing a quantitative approach, this module leads to an advanced understanding of mammalian body systems, exemplified by equine performance and dysfunction. The systems to be studied include: Blood circulation and the cardiovascular system. Respiration. Water balance and excretion including renal function and urine formation. Gastrointestinal function. The nervous system: central, autonomic. Special senses. Temperature regulation. Skeletal muscle. Endocrinology and metabolism. Reproduction and lactation.

Prerequisites: BY4002, EV4012, BC4902, BY4001

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**EV4014 - EQUINE NUTRITION**
ECTS Credits: 6

Biological Sciences

Rationale and Purpose of the Module: The purpose of this module is to provide students with an understanding of the scientific principles of Equine Nutrition and how these relate to the practical applications of feeding.

**Syllabus:** Classification, digestion, absorption and metabolism of carbohydrates, protein and lipids; Amylose and amylopectin; Utilisation of the products of dietary energy and protein, Glycemic response, insulin production, insulin resistance and hyperinsulinaemia; microbial fermentation, manipulation of fermentation; VFA absorption; VFA efficiency, lactic acid production, Feed digestibility including aspects on apparent and true digestibility; Transit and retention times, Protein degradation and amino acid absorption; NPN and N
utilisation, FFAs; NEFAs; Water; water requirements; Appetite; Feeding standards, Metabolic body size and intake; Feed energy systems, Partition of dietary energy for horses, an evaluation DE and NE systems; energy and protein requirements based on UFC and MADC; heat increment; Efficiency of utilisation of ME; A critical review and evaluation of feeding experiments, and nutrient balance studies; Dietary electrolyte balance; Feeding for performance and metabolism of nutrients during exercise, Applied equine nutrition including aspects on nutrient requirements and utilisation during periods of for growth and production (lactation, gestation). An overview of dietary related problems; Application of current equine nutritional research;

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**EV4015 - EQUINE HEALTH AND DISEASE**  
**ECTS Credits:** 6  
**Biological Sciences**

**Rationale and Purpose of the Module:** To acquaint students with the physical appearance and behaviour of the healthy horse so that signs of ill health and disease are recognised at an early stage, thus enabling them to make informed decisions about the necessity for veterinary intervention. To acquaint students with disease conditions of toxicologic origin and with the causes, management and prevention of infectious diseases.

**Syllabus:** To acquaint students with the physical appearance and behaviour of the healthy horse so that signs of ill health and disease are recognised at an early stage, thus enabling them to make informed decisions about the necessity for veterinary intervention. To acquaint students with disease conditions of toxicologic origin and with the causes, management and prevention of infectious diseases. Topics covered on this course include aspects on disease conditions of toxicologic origin and with the causes, management and prevention of infectious diseases. Topics covered include parasitic, bacterial and viral diseases of the horse. Diseases of metabolic and degenerative origin are also discussed, including degenerative orthopaedic diseases and osteoarthritis. Disease conditions of the airways and their impact on athletic performance of the horse are discussed from the perspectives of contributing environmental factors and prevention.

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**EV4017 - EQUINE PHARMACOLOGY**  
**ECTS Credits:** 6  
**Biological Sciences**

**Rationale and Purpose of the Module:** To acquaint students with the classes of drugs which are of relevance to equine medicine and to provide an insight to the factors that determine species differences in drug response.

**Syllabus:** To acquaint students with the classes of drugs which are of relevance to equine medicine and to provide an insight to the factors that determine species differences in drug response. Classification of drugs and sources of information on drugs. Drug dosage forms and routes of administration. Processes of drug absorption, distribution, metabolism and excretion. Basic principles of pharmacokinetics. Pharmacological effects, mechanism of action and fate of therapeutic agents that affect various systems of the body (equine), with particular emphasis on drugs affecting the muscular-skeletal and respiratory systems; Antimicrobial drugs; Non-steroidal anti-inflammatory drugs; Anthelmintic medication; Applied toxicology; Drug assay methodology; Drug licensing, registration and legislation. Performance enhancing drugs, mechanism of action and current legislation; Doping, current doping problems in the equine industry; international trends; diagnostic assays and their sensitivities.

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**EV4024 - EQUINE REPRODUCTION**  
**ECTS Credits:** 6  
**Biological Sciences**

**Rationale and Purpose of the Module:** The purpose of this module is to provide students with an understanding of the scientific principles of Equine Reproduction and how these relate to the practical applications of equine breeding.

**Syllabus:** The syllabus is comprised of the following: reproductive anatomy of the mare and stallion, reproductive endocrinology of the mare and stallion, oestrous cycle, fertilization, pregnancy, parturition; neonatal physiology; male reproductive physiology and practical aspects of equine breeding management. The management of brood mares and stallions are presented from a physiological and husbandry perspective. The events at parturition are presented and discussed in the context of the management of the neonatal foal and the early return of the mare to reproductive activity.

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**EV4032 - THE HORSE INDUSTRY**  
**ECTS Credits:** 6  
**Biological Sciences**

**Rationale and Purpose of the Module:** This module provides the student with an understanding of the nature and scope of the horse industry, both national and international.

**Syllabus:** Topics covered on this course include aspects related to: The Irish Horse Industry, the UK Horse Industry, The Horse Industry in Europe, US and Australia; comparative analysis of nature, size, economic importance, policies, supports, regulations, organisations, education and training of personnel. Safety, health and welfare within the horse industry; legislation. Horse welfare; issues and legislation. The statutory and regulatory organisations that operate, control and administer the horse industry. Ancillary industries; horse feed industry, transportation, tourism. Racecourse management. Aspects of breeding and training racehorses and sport horses.

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**EV4042 - EQUINE REPRODUCTION**  
**ECTS Credits:** 6  
**Biological Sciences**

**Rationale and Purpose of the Module:** The purpose of this module is to provide students with an understanding of the scientific principles of Equine Reproduction and how these relate to the practical applications of equine breeding.

**Syllabus:** The syllabus is comprised of the following: reproductive anatomy of the mare and stallion, reproductive endocrinology of the mare and stallion, oestrous cycle, fertilization, pregnancy, parturition; neonatal physiology; male reproductive physiology and practical aspects of equine breeding management. The management of brood mares and stallions are presented from a physiological and husbandry perspective. The events at parturition are presented and discussed in the context of the management of the neonatal foal and the early return of the mare to reproductive activity.
EY4014 - SUBJECT PEDAGOGICS 1 (ENGLISH)
ECTS Credits: 6

School of Education

Rationale and Purpose of the Module: 1. Students will be introduced to the principles and practices of teaching English in second level schools.
2. Students will be enabled to understand the concepts and methodologies outlined in the Junior Cycle English Syllabi.

Syllabus: The syllabus will be structured around key concepts in teaching English at Junior Cycle ie, reading, writing, speaking and listening in the three domains of personal literacy, social literacy and cultural literacy.

Prerequisites: EY4014

EY4016 - SUBJECT PEDAGOGICS 2 (ENGLISH)
ECTS Credits: 6

School of Education

Rationale and Purpose of the Module: 1. Students will be introduced to the principles and practices of teaching English in second level schools.
2. Students will be enabled to understand the concepts and methodologies outlined in Senior Cycle English Syllabi.

Syllabus: The syllabus will be structured around the key concepts of teaching English, ie, the development of comprehending and composing in the language categories of information, argument, persuasion, narrative and the aesthetic use of language. It will be premised on the concepts of critical literacy and language awareness.

Prerequisites: EY4016

EY4076 - SUBJECT PEDAGOGICS 2 (ENGINEERING TECHNOLOGY AND GRAPHICS)
ECTS Credits: 6

School of Education

Rationale and Purpose of the Module: Building on the attitudes, skills and knowledge associated with technology education and consolidating the experience from School Placement 1, the focus of this module shifts from that of a teacher-centred planning model to an orientation phased focus of pedagogical development. This module takes a more flexible and inclusive approach to pedagogical design and implementation. The emphasis is to develop both proactive and responsive techniques in an attempt to develop dynamic thinking capacities appropriate to the complex and iterative nature of technology teaching and learning. With particular emphasis on cognitive architecture, primarily memory systems, this module explores the design, intent, and efficacy of learning tasks and activities. Methods for qualifying efficacy are developed through statistical and self/peer audit techniques so as to support reflection and improvement. Special consideration is given to planning for differentiation and alternative educational needs.

Syllabus: Analysis of the leaving certificate Technology, Engineering, and Design and Communication Graphics syllabi, Task Design: learning curves, progressive planning, task design, memory systems, cognitive load theory, mixed ability, planning for differentiation, Personal Development: personal construct of capability, exercising professional judgement, identification of cognitive and meta-cognitive actions, formative and diagnostic assessment, principles of evidence based practice, Strategies: managing permeable and non-permeable task design, divergent outcomes, learner support, quality assurance and improvement Assessment strategies: definition of capability, design of assessment instrument, evaluating competencies.

FI4008 - EMPIRICAL FINANCE
ECTS Credits: 6

Accounting & Finance

Rationale and Purpose of the Module: The course provides students with a thorough grounding in the empirical study of international financial markets to prepare them for potential careers as traders, risk-managers, quantitative analysts, stockbrokers, fund managers, etc in the financial services industry. The learning experience is enhanced through the learning-by-doing experiences of course participants through a mix of computer workshop-oriented tutorials and labs, and interactive web-based simulations.


FI4012 - FOUNDATIONS OF AIRCRAFT LEASING
ECTS Credits: 6

Accounting & Finance

Rationale and Purpose of the Module: Ireland has emerged as a leading centre in the aircraft leasing industry. At present, over half of all operating commercial aircraft are leased and over fifty percent of the world’s leased aircraft are managed from Ireland. This module aims to provide students with a systematic coverage of the important aspects of aircraft leasing and explains why this financing mechanism has become a core competency when acquiring and managing aircraft.

Students will be introduced to the key concepts and processes involved in the efficient management of aircraft leasing. The module present the framework for best practices from an aircraft lessee's perspective while appreciating the fundamental requirements for an aircraft lessor. The module will provide students with the tools to analyse the key constituent paths from selection of the asset, acquisition, securing, managing and finally divesting of the asset.

The major objectives of the module are:
1. Outline the different mechanisms that are available to finance aircraft
2. Provide a thorough examination of the aircraft and engine leasing market
3. Provide a comprehensive analysis of the content of an operating and financial lease and the factors to be considered when negotiating these leases.
4. Explain how aircraft are financially valued and the dynamics of aircraft valuation throughout their economic life.

Syllabus: Development of the aircraft and engine leasing industry; Different ways to finance aircraft; Characteristics of the different types of Aircraft Leases; Selecting and acquiring the asset; An in-depth analysis of an Operating Lease; Analysis of a Financial Lease; Engine Leasing; Financial and technical issues arising in the context of lease negotiations; Legal status of aircraft,
jurisdiction, nationality, registration and securing the asset; Maintenance reserves; Return conditions of aircraft; Formulation and negotiation of lease contracts and letters of intent; Managing the asset; Aircraft Repossession; Divesting the asset from lessor and lessee perspectives; Aircraft valuation - factors affecting aircraft residual value through the economic cycle and residual value forecasting.

FR4142 - FRENCH LANGUAGE AND SOCIETY 2: INTRODUCTION TO FRE
ECTS Credits: 6
School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: (i) To review key aspects of contemporary Francophone societies; (ii) to continue to develop students' receptive and active language skills; (iii) to consolidate students' knowledge of French grammar; (iv) to reinforce students' awareness of issues related to the evolution of the French language and in particular regional varieties and la Francophonie; (v) to promote students reading and analytical skills in the study of French literature.

Syllabus: Students are introduced in lectures to the study of social, historical, linguistic and literary aspects of France and francophone societies. Themes presented this semester are (i) decolonisation and the variety of francophone communities; (ii) the search for identity in modern literature; (iii) la Francophonie and regional varieties of language. Tutorials explore these subjects and students reading and writing skills are improved through regular exercises. Particular attention is paid to oral and aural skills in French which are developed through the discussion of a broad selection of contemporary oral and written texts from diverse media. Students continue to review issues related to French grammar.

Prerequisites: FR4141

FR4146 - FRENCH LANGUAGE AND SOCIETY 4 MODERN CONTEMPORARY
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. 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.

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 analysing the major issues in French politics, economics and society from 1945 to the present. Language tutorials review some of the points raised in the lectures through close reading and discussion of authentic texts related to the lectures. Language tutorials also endeavour to develop written skills in the French language through translation and/ or essay writing. Tutorial are also devoted to the study of a literary text closely related to the subject matter.

Prerequisites: FR4143

FR4242 - FRENCH LANGUAGE, CULTURE AND SOCIETY 2A
ECTS Credits: 6
School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: (i) To provide students with an introduction to major aspects of contemporary Francophone societies and cultures; (ii) to familiarise students to issues related to the evolution of the French language particularly its regional varieties and la Francophonie worldwide; (iii) to promote students reading and analytical skills in the study of French literature; (iv) to give a solid grounding to a number of points of French Grammar. (v) to further develop students practical language skills (oral and written).

Syllabus: Students are introduced in lectures to the study of social, historical, linguistic and literary aspects of France and francophone societies. Themes explored this semester are (i) decolonisation and the variety of francophone communities; (ii) the search for identity in modern literature; (iii) la Francophonie and regional varieties of language. These topics are discussed in depth in the more active setting of weekly tutorials. Oral and aural skills in French are a particular focus, and they are developed through the discussion of a broad selection of oral and written material from diverse media. The study of French grammar in semester 1 is continued.

Prerequisites: FR4241
FR4246 - FRENCH LANGUAGE CULTURE AND SOCIETY 4
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: This module aims:
- To improve oral and written language skills through activities such as textual analysis, translation, essay writing, oral presentations, discussion and debate;
- To provide an in-depth study of aspects of post-war France in political, social and economic contexts;
- To enable students to understand the ideological and cultural background to modern France through a reading of selected eighteenth-century texts;
- To practise translation from and into French of texts relating to post-war France, and to become familiar with the theories relevant to the translation of such texts and the strategies available to the translator when translating them.

Syllabus: Development of active and receptive language skills, both written and oral; key moments in the history of post-war France; revolutionary ideals in eighteenth-century France; introduction to the theory and practice of translation, focusing on the area of post-war France.

Prerequisites: FR4243

FR4248 - FRENCH LANGUAGE CULTURE AND SOCIETY 6
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: The purpose of this module is: (i) to give students an overview of the French media industries and the ability to critically evaluate their functions; (ii) to enable students to improve written and oral language skills; (iii) to provide an understanding of the principles of bilateral interpreting and introductory practice; (iv) to give students practice in translating a variety of texts and to familiarise them with the appropriate translation strategies.

Syllabus: (i) Communication and the media in France - the study of the relationship between the media and the state; analysis of different branches of the media; practice in using the language of the media and in analysing particular media artefacts. (ii) Work on video documents on current issues in francophone countries to improve comprehension and oral skills. (iii) Translation of journalistic texts from French to English in the light of translation theory in order to foster the development of transferable translation strategies. (iv) Principles and practice in bi-lateral interpreting.

Prerequisites: FR4247

FR4622 - LITERATURE AND CULTURE 2: TWENTIETH-CENTURY LITERATURE IN FRANCE
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: To develop students' knowledge of twentieth-century literature from a variety of critical perspectives.

To enable students to apply critical skills to the study of recent literature in French.

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.

FR4626 - FRENCH LITERATURE AND CULTURE 4 19TH CENTURY ART
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: To provide students with the means to recognise and evaluate the links between art and society in 19th century France. This is achieved by:
- giving an overview of the political, economic and cultural development of France from the revolution to circa 1880
- studying selected poems from mid-century onwards
- analysing French painting, particularly the realist/impressionist tradition
- reading and studying a selected realist/naturalist novel

Syllabus: The module is structured around a lecture and tutorials. The lecture will cover aspects of the development of France as well as introducing students to the study and appreciation of painting in the period. The tutorials will concentrate on textual analysis of the poetry and the novels.

FR4628 - FRENCH LITERATURE AND CULTURE 6: MODERNITY AND GENRE; THE NOVEL IN FRENCH
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: This module offers a thorough discussion of the question of literary genre and cultural modernity with particular reference to the novel genre in French over a period of four centuries. In so doing, it builds upon the pre-existing knowledge of students who have been exposed to a number of examples of the genre in preceding modules, while synthesising across the historical scope of their prior exposure to French literary and cultural artefacts. It consolidates the linguistic work done in earlier modules through a challenging exposure to works of a certain difficulty and length, deepening students' practices of both reading and responding to major cultural artefacts in the target (French) language.

Syllabus: The module seeks to foster a sense of the long-term in cultural and literary developments. Hence the inclusion of texts spanning four centuries (17th, 18th, 19th and 20th). Elements of context will be provided, through the inclusion of reference to wider historical development, social and cultural theory, and to the parallel and related development of other literary genres. Secondary reading will be duly circumscribed with emphasis being placed on thorough and close readings of the individual works. This emphasis will be replicated in the forms of assessment adopted. Students will be required to give an analytical presentation in the target language of an agreed extract (close reading and linguistic skills). Assessment will also include an extended synthetic essay in the target language (argumentational and linguistic skills).

FR4922 - FRENCH FOR BUSINESS 2A
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: (i) To consolidate and expand students Business French acquired in Semester one;
(ii) to provide students with an understanding of key aspects of contemporary Francophone societies;
(iii) to further develop practical language skills (receptive and active);
(iv) to develop students appreciation of French literature;
(v) to extend students’ knowledge of French grammar

**Syllabus:** Students are introduced to the detailed study of social, historical, linguistic and literary aspects of France and la Francophonie. Themes presented this semester are
(i) decolonisation and the variety of francophone communities
(ii) the search for identity in modern literature and (iii) la Francophonie and regional varieties of language.

- Oral and aural skills in French are further improved 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: finance, accounts, and investments. Students also study a literary text related to one of the lecture themes. The study of French grammar -in semester 1- is continued.

**Prerequisites:** FR4921

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**FR4924 - FRENCH FOR BUSINESS 4A**  
**ECTS Credits:** 6

**School of Modern Languages and Applied Linguistics**

**Rationale and Purpose of the Module:** To extend within a French business context students’ reading, speaking, writing and listening skills already practised in the previous terms of university study. This is achieved: by revising and increasing students’ knowledge of French vocabulary and grammar by familiarizing them with new aspects of French society and culture by introducing students to Business French relevant to their future professional needs

**Syllabus:** The French for Business 4 module provides students with the space to expand their knowledge and language skills. Using authentic material, students are asked to perform in a simulated business environment a variety of tasks encountered in specific situations -Focus area: Corporate culture (workers and their workplace, internal communication, time management). In addition students make short oral presentations in the target language on selected French social/ cultural issues. Students also study a literary text related to the area of study currently "Les mains sales" by Jean-Paul Sartre.

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**FR4928 - FRENCH FOR BUSINESS 8A**  
**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 relating to contemporary French -society and issues.  
- by working with authentic documents (press articles, one literary text, websites)  
- by providing students with opportunities to practice their oral and written skills  
- by encouraging intercultural understanding via tandem learning with French students

**Syllabus:** The French for Business 8 module provides students with a language rich environment to further their knowledge and increase their confidence. In the lecture, students gain an insight into contemporary French society. The political situation and recent cultural, economic and social developments in France are examined. In the tutorials, students conduct research and complete a task based Internet project on a French city (a city that they know from their Erasmus/Coop placement experience- identifying and analysing a number of political, economic, social, or cultural issues. Finally, students study a literary text related to the module title, currently, ÒJournal du dehorsÓ by Annie Ernaux.

**Prerequisites:** FR4921

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**FT4204 - FOOD CHEMISTRY**  
**ECTS Credits:** 6

**Biological Sciences**

**Rationale and Purpose of the Module:** To introduce students to the utilisation of raw materials by the food industry  
To provide a general course on the chemistry of raw materials and of foods


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**FT4214 - PUBLIC HEALTH NUTRITION**  
**ECTS Credits:** 6

**Biological Sciences**

**Rationale and Purpose of the Module:** This module provides the necessary understanding, knowledge and skills to allow students undertake more advanced learning in nutrition in subsequent semesters. Public Health Nutrition will focus on population-based epidemiological evidence linking diet and disease and explore interactions between nutrition, genetics and lifestyle. Specific topics of issue to public health including obesity, type II diabetes, heart disease, specific micronutrient deficiencies, dental health, osteoporosis, cancer and immunity will be discussed. The role of national and international regulatory agencies (including the World Health Organisation, Food Safety Authority of Ireland, Food Safety Promotion Board, European Food Safety Agency) will be examined in terms of safe guarding population public health. The purpose of this module is to: a). To provide an overview of the role of nutrition as a major factor in the aetiology of chronic disease of relevance to public health b). To examine the role of diet in treatment and prevention of a range of chronic disease c). Explore a number of emerging diet-related public health issues. The most relevant and up-to-date literature will be used and referenced to provide the best evidence base for this module content.

**Syllabus:** Overview of public health nutrition from an epidemiological perspective and strategies to tackle major, population-based public health issues including ecological public health strategies . 2. Examine the role of diet in selected chronic disease of public health concern including obesity, type II diabetes, heart disease, specific nutritional deficiencies, dental health, osteoporosis, cancer and immunity. 3. Discuss the role of media / regulatory bodies / food industry / society / culture on major public health issues. 4. Other factors
FT4428 - ADVANCED FOOD CHEMISTRY
ECTS Credits: 6

Biological Sciences

Rationale and Purpose of the Module: To provide an advanced course in Food Chemistry
To develop a comprehensive understanding of the relationships between food characteristics and their molecular basis.


FT4468 - FOOD BIOTECHNOLOGY
ECTS Credits: 6

Biological Sciences

Rationale and Purpose of the Module: To introduce students to the basic concepts of Food Biotechnology.
To develop an understanding of the enabling technologies used to manipulate micro-organisms, plants and animals for the production of food.
To develop a critical awareness of the impact of Food Biotechnology on the production and processing of food.
To develop a critical awareness of the impact of Food Biotechnology on the ethics, labelling and regulatory issues related to the consumer and the environment

Syllabus: Introduction to Food Biotechnology, Outline of basis of traditional and novel food biotechnology processes; principles of fermentation, separations, recovery systems; Introduction to novel platform technologies; Genomics, Proteomics, Bioinformatics. Biotechnology and the food industry: Enzyme and bacterial mediated bio-transformations; Flavour Ingredients, Brewing, Winemaking, Enzyme technology. Food applications of microbial biotechnology; Lactic acid bacteria and Yeast; metabolic and protein engineering, overexpression of enzymes and metabolic end products; Probiotics and nutrigenetics. Plant Biotechnology; Plant transformations, genetic strategies for improvements of characteristics, pesticide resistance, yield improvement, metabolite production. Animal Biotechnology; Genetic strategies for improvements of animal characteristics, disease resistance, yield and performance improvement, Transgenic animals, Quantitative trait loci (QTL’s) Related issues; Regulations and Legal declarations, Ethics, Consumer concerns, biotechnology and the environment, Future trends

Prerequisites: BC4904, BC4803

FT6002 - NUTRITIONAL EPIDEMIOLOGY AND TRANSLATIONAL RESEARCH METHODS
ECTS Credits: 6

Biological Sciences

Rationale and Purpose of the Module: To provide an understanding of epidemiological study designs and research concepts of direct relevance to the role of food and nutrition in the prevention and causation of disease. Nutritional epidemiology techniques for the assessment of diet and body composition of individuals and populations are covered in depth. The module covers sources of data on mortality and morbidity, measures of disease prevalence, incidence and risk, chance, bias and confounding. Students will use statistical software programme to analyse a population dataset pertaining to nutritional data.

Syllabus: Fundamentals of nutritional epidemiology and overview of study designs; The nutrition research process and ethical considerations; Biostatistics, accuracy and measurement calculations in nutritional epidemiology; Critical appraisal of the literature; Dietary assessment methodologies in nutritional research; Analysing a population nutritional dataset.

This module will run over 10 weeks in Year 1, Semester 2 Spring from week 3 to week 12 - 2hour lecture and 2 hour tutorial/workshop per week to be scheduled.
GA4012 - CELTIC CIVILISATION: CONTINUITY AND CHANGE
ECTS Credits: 6
School of Culture and Communication

Rationale and Purpose of the Module: To offer an introductory module in Celtic Civilisation for the Spring Semester encompassing Celtic Mythology, Religion, Customs and Literature

Syllabus: This module will give an overview of the socio-cultural context of Early Irish literature and culture, as well as Celtic Mythology and Customs, including the following:

- representations of Celtic Deities in the Classical commentaries and in vernacular sources
- Celtic Mythology in early written sources
- an overview of Early Irish festivals and customs and the survival of same in modern Irish folklore
- Celtic Cosmology - including representations of the otherworld(s) in Early Irish literature and in Modern Folklore
- interpretation of historical, literary and folklore sources pertaining to the social, cultural and religious customs and worldview of the Celts

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

GA4116 - IRISH LANGUAGE 2
ECTS Credits: 6
School of Culture and Communication

Rationale and Purpose of the Module: The course aims to build on the language skills acquired in module GA4115. It introduces students to the study of Irish placenames and surnames. 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 learning language skills.
- develop listening and speaking skills in Irish aquired in GA4115.
- equip the student with basic writing skills.

Syllabus: Language element: This is a continuation course. Topics covered include: Matters of work, food and drink, sickness and injury, clothes and shopping, holidays and travel, orders and making arrangements. Gaeltacht regions and certain dialect features will be discussed and some of the many Irish-language materials and resources now 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's Common European Framework of Reference for Languages. Those who complete modules GA4115 and GA4116 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.

Lecture topics to be covered include: Placenames, an understanding of the factors involved in their creation, the people who made them and the purposes they serve, the classification of placenames, ball choir mar logainmneacha, pagan/Christian associations of placenames, toponyms of sea-side and island areas, case-study of the Aran Islands, the most common Irish surnames, the surnames of County Limerick, the influence of invasion on Irish surnames, how surnames evolved / changed, genealogical sources for tracing Irish ancestors, the genealogy market, some prominent Irish families e.g. the O'Malley's, Granuaile

Prerequisites: GA4115

GE4142 - GERMAN LANGUAGE AND SOCIETY 2: INTOD GERMAN STUD II
ECTS Credits: 6
School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: To give an overview over major trends in German culture and society from 1945 to today by means of texts and visual material. To introduce aspects of social and regional variation in the German language. To continue introduction to the analysis of literary texts in German. To conclude the revision of grammatical structures enabling students to use them with a high degree of fluency and correctness.

Syllabus: Lecture: Postwar German-speaking countries: society and institutions; political, economic, cultural and literary trends; contemporary literature and culture in the German-speaking countries of Europe. Tutorials: a) analysis of literary texts to provide further access to the topics discussed in the lecture while at the same time further developing reading techniques, principles of textual analysis and text discussion in oral and written form; b) Contrastive grammar work continued. Language laboratory: exercises in pronunciation, listening analysis and grammar utilizing CALL facilities.

Prerequisites: GE4141

GE4146 - GERMAN LANGUAGE AND SOCIETY 4: GERMANY PAST AND PRESENT
ECTS Credits: 6
School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: To enhance students' knowledge about present day Germany by exploring the historical background of cultural life in Germany today. To further develop writing skills and reading comprehension at advanced level. To further develop students' skills in the analysis of more complex literary texts in German. To consolidate grammatical structures at an appropriate level.
**Syllabus:** Lecture: German revolutions, democracy, fascism; cultural institutions, cultural life; the cultural and literary heritage.

Tutorials: a) reading and discussion texts supporting the lecture; conversation class b) literature class: exploration of the myths and their significance in German literary, cultural and political history and in Germany today; c) advanced grammar work.

**Prerequisites:** GE4143

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**GE4148 - GERMAN LANGUAGE AND SOCIETY 6: ISSUES AND DEBATES**

**ECTS Credits:** 6

**School of Modern Languages and Applied Linguistics**

**Rationale and Purpose of the Module:** This module aims to:
- To give an overview of major trends in German culture and society in the post-war period.
- To consolidate and develop basic communicative skills acquired in GE4211
- To introduce further basic grammatical structures/functions and consolidate those covered in previous module.

**Syllabus:** Lecture: Postwar German-speaking countries: society and institutions; political, economic, cultural and literary trends; contemporary literature and culture in the German-speaking countries of Europe. 

Tutorial work: one hour textwork develops skills relating to textual analysis, grammar in use and writing, literary texts relating to lectures will also be discussed in this class and examined in the oral and written exams; one hour grammar/translation consolidates existing grammatical knowledge and introduces more complex structures through contrastive work using English/German translation exercises; German linguistics relates general linguistic course to the German situation, focusing on past and current developments in the German language.

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**GE4212 - GERMAN FOR BEGINNERS 2 (APPLIED LANGUAGES)**

**ECTS Credits:** 6

**School of Modern Languages and Applied Linguistics**

**Rationale and Purpose of the Module:** This module aims to:
- To give an overview of major trends in German culture and society in the post-war period.
- To consolidate and develop basic communicative skills acquired in GE4211
- To introduce further basic grammatical structures/functions and consolidate those covered in previous module.

**Syllabus:** Lecture: Postwar German-speaking countries: society and institutions; political, economic, cultural and literary trends; contemporary literature and culture in the German-speaking countries of Europe.

Tutorial work: one hour textwork develops skills relating to textual analysis, grammar in use and writing, literary texts relating to lectures will also be discussed in this class and examined in the oral and written exams; one hour grammar/translation consolidates existing grammatical knowledge and introduces more complex structures through contrastive work using English/German translation exercises; German linguistics relates general linguistic course to the German situation, focusing on past and current developments in the German language.

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**GE4246 - GERMAN LANGUAGE CULTURE AND SOCIETY 4**

**ECTS Credits:** 6

**School of Modern Languages and Applied Linguistics**

**Rationale and Purpose of the Module:** To develop students’ understanding of contemporary Germany by analysing central issues/concepts from 18th century to the present day; to consolidate and improve text analysis and oral, reading and writing skills, to revise problem areas in German grammar and introduce selected new or more complex grammatical and syntactic structures. To introduce the systematic study of translation theory and practice, to introduce students to a range of text-types and registers.

**Syllabus:** Lecture: German revolutions, democracy, fascism; cultural institutions, cultural life; the cultural and literary heritage.

Tutorial work: Oral presentation & discussion class: drawing on text and audio-visual materials to develop formal oral skills (note-taking, structuring presentations, summarising and reporting content); Literary text analysis & production; Translation theory and practice: historical and socio-political texts

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GE4248 - GERMAN LANGUAGE CULTURE AND SOCIETY 6  
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: cultural, economic and political issues in unified Germany, Austria and Switzerland; dealing with the past; nationalism and national identity; economic, cultural and social debates (also with regard to the EU); equality, environmentalism, cultural politics, social reforms, migration.

Tutorial work: Oral presentation & discussion class: drawing on text and audio-visual materials to develop formal oral skills (presentations, talks, interviews). Text analysis & production: analysis & writing of project proposals, evaluations, etc. Translation theory and practice: advertising, commercial and literary texts. This hour will be combined with a class providing an introduction to interpreting.

GE4262 - GERMAN LITERATURE AND CULTURE 4  
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: To examine major literary and cultural movements of the 19th century through a study of representative authors and various genres. To give students an understanding of the intellectual, artistic and philosophical milieu in 19th century German culture.

Syllabus: A study of classicism in drama and poetry and its relationship to preceding movements: 'Enlightenment' and 'Sturm und Drang'; poetic realism (1850-1890) in its social context - industrialisation, urbanisation, growth of the middle classes; and impressionism as an expression of the mood of pessimism at the turn of the century and its role in the 'Wilhelminische Zeit prior to World War I.

GE4268 - CURRENT TRENDS IN GERMAN LITERATURE AND CULTURE  
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: To develop an understanding of current trends and developments in literature, cinema and other forms of cultural practice in post-unification Germany, in Switzerland and in Austria by studying individual works in their social and political context.

To engage critically with contemporary literary and cultural production in the German-speaking countries and to analyse a variety of literary texts and films in German.

Syllabus: An examination of most recent developments in literature and cinema in the German-speaking countries. Analysis of literary texts, films and other cultural products (TV, music, visual arts etc) in their social and political context and discuss how they engage with issues that feature strongly in current debate, such as multiculturalism, experiences of migrants, new women's writing, postcolonial aspects, questions of identity and changing memory discourses. Recent debates on colonialism and post-colonialism in a German context; Postmodernism and Pop Literature; Changing Constructions of Identity in Germany, Switzerland and Austria.

GE4922 - GERMAN FOR BUSINESS 2A  
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: To continue the business German foundation provided in Semester 1. To continue to provide an insight into socio-economic and political structures in Germany and to develop students' familiarity with German culture. To equip students with the linguistic skills necessary to deal with business situations. To familiarise students with organisational structures of German firms.

Syllabus: Lecture: Postwar German-speaking countries: society and institutions; political, economic, cultural and literary trends; contemporary literature and culture in the German-speaking countries of Europe.

Tutorials: a) analysis of literary texts to provide further access to the topics discussed in the lecture while at the same time further developing reading techniques, principles of textual analysis and text discussion in oral and written form; b) introduction to firm structures in Germany; induction in telephone techniques and other work-related interactive skills

Language laboratory: exercises in pronunciation, listening comprehension and grammar utilizing CALL facilities

Prerequisites: GE4921

GE4924 - GERMAN FOR BUSINESS 4A  
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: To prepare students for job interviews and applications and to reflect on their professional goals and career aspirations. To enable students to write and communicate successfully in
Syllabus: Lecture: Focus on job application process in German-speaking countries, future career familiarisation with current affairs with the focus on economic and legal topics;
Tutorial: a) production of business and legal correspondence;
b) introduction to translation into English and German; text work in form of summaries and descriptions of graphs etc. c) revision of all grammatical structures, emphasis on passive and indirect speech

Prerequisites: GE4924, GE4143

GE4928 - GERMAN FOR BUSINESS 8A
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: To develop the skill of precise writing in German. To provide an insight into the workings of the European Union (EU) and to examine the role of Ireland and Germany and current challenges and chances. To cover current topics and debates in the German-speaking countries. To prepare students to sit, on an optional basis, international examinations in Business German such as "Prüfung Wirtschaftsdeutsch international".

Syllabus: Lecture: cultural, economic and political issues in unified Germany, Austria and Switzerland; dealing with the past; nationalism and national identity; economic, cultural and social debates (also with regard to the EU); equality, environmentalism, cultural politics, social reforms and migration.
Tutorials: a) discussions of literary texts, newspaper, magazine articles and TV programmes on topical issues connected with the lecture, focusing on the characteristics of different text types and language registers; b) examination of the institutions and policies of the EU with particular reference to Germany's and Ireland's role within the EU; c) revision of business material in general.

Prerequisites: GE4927

HI4066 - ABSOLUTES AND REVOLUTIONARIES: EUROPE IN THE AGE OF ENLIGHTENMENT, 1688-1815
ECTS Credits: 6

History

Rationale and Purpose of the Module: The aim of this survey module is to provide an overview of European History in the eighteenth and early nineteenth centuries. The period will be examined from two angles: (1.) chronologically, so that students will attain a grasp of the progression of events from the death of Louis XIV and the partition of the Spanish Monarchy, through the European revolutions of the late eighteenth century to the rise of the modern nation states in the nineteenth century; and (2.) thematically, where we will be examining different aspects that were characteristic of the period in question, such as the Scientific Revolution and the Enlightenment; liberalism and nationalism; industrialisation and the emerging role of mass movements.

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; 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.

HI4068 - IRELAND AND THE WIDER WORLD, 1919-73
ECTS Credits: 6

History

Rationale and Purpose of the Module: The module will introduce students to the study of international history and Irish diplomatic history. It will examine Ireland's changing place in the world and its involvement in international and European affairs during three key periods 1919 to 1939, 1939 to 1961. 1961 to 1973. It aims to uncover the key assumptions and doctrines underpinning the conduct of Irish foreign policy; to explore the Irish foreign policy formulation process, to examine the key bilateral and multi-lateral external engagements of the Irish state since independence. The module will provide a framework for studying the key concepts, institutions and chronology of the period. Expected to lead the discussion on that issue. a) to introduce students to the key events which shaped Ireland's relations with the wider world in the twentieth century b) to explore the historiography specific to the theme, c) to consider how the newly independent state engaged in diplomatic relations with other states and confirmed its legitimacy, d) to examine the principal features of the Irish diaspora in the US, Australia, New Zealand and South Africa and d) to research and produce a written analysis of selected topics based on accurate use of secondary and primary source material.

Syllabus: Introduction to the key themes in Irish foreign policy in 1919; The origins of Irish foreign policy; the diplomatic service in 1919; Anglo-Irish relations - Anglo-Irish treaty 1921, from empire to commonwealth, dominion status, imperial conferences, Statute of Westminster 1931; External Relations Act 1936, 1937 Constitution; Ireland and the United States - Wilson and peace 1918-1920, relief aid and recognition, immigration legislation; disarmament, normalisation; FDR and Ireland; the Spanish Civil war 1936; Emigration - the diaspora, the missionary movement. World War two - neutrality, the role of foreign diplomats in Ireland, 'benevolent neutrality', the balance sheet in 1945; the Marshall Plan, 1947-58; the Cold War - North Atlantic Treaty Organisation; Ireland and the European Economic Community; multilateral organisations - League of Nations, the United Nations; the developing world - South America, Africa and Asia 1945-74; Overview

HI4082 - EUROPE: SOCIETY AND GOVERNANCE; 1890 - 1990
ECTS Credits: 6

History

Rationale and Purpose of the Module: The aim of this module is to examine significant political, social and cultural aspects of modern life in Europe. This course will, therefore, probe some of the key social and cultural transformations of the twentieth century, and discuss the key political issues and events that have defined that period.
HI4102 - IRELAND: REVOLUTION AND INDEPENDENCE, 1898 - 1968
ECTS Credits: 6

History

Rationale and Purpose of the Module: This course aims to provide a survey of the history of Ireland between the establishment of the penal colony in New South Wales in 1788 and 1918.

Syllabus:
The course comprises lectures dealing with such themes as 'Terra Nulius' and the choice of Botany Bay, the French reconnaissance, hulks and prison ships, convictism, Aborigines, the 'Irish Plots' of 1800 and Castle Hill revolt of 1804, Governors Bligh, Macquarie, Darling and Bourke, the Bigge Report, 'Black War', Anti-Transportation League, Gold, Squatters, the 'Kelly Outbreak', new colonies, Federation, ANZAC and Australia during the First World War.

HI4148 - THE HISTORY OF AUSTRALIA
ECTS Credits: 6

History

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

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

HP4068 - EUROPEAN STUDIES PROJECT 2
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: This is the second of two FYP modules. The purpose of the module is to provide a framework in which the supervisor will offer encouragement and feedback to the student as well as continuous guidance with the writing process.

Syllabus: Completion of the collection of data; Initial drafting of chapters; feedback from supervisor; redrafting and editing; writing of introduction and conclusion; production of bibliography, abstracts, table of contents, appendices and title page according to agreed protocols.

Prerequisites: HP4067

HP4198 - APPLIED LANGUAGES PROJECT 2
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

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

ID4112 - DESIGN MECHANICS
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: This module provides students with the necessary knowledge of mechanical stress and strain theory which when applied allows them to design mechanical components and/or...
The module then studies the implementation of these designs by examining the components required to convert the designs into real world systems.


**IE4248 - PROJECT PLANNING AND CONTROL**
ECTS Credits: 6

**School of Engineering**

**Rationale and Purpose of the Module:** To develop students abilities to plan and manage large engineering projects, and to develop skills required to effectively communicate with other company departments directly involved in such projects, namely: Finance, Manufacturing and Corporate Management.

**Syllabus:** What is a project: the 3 goals of a project. Project selection methods, project appraisal criteria, economic analysis, Project life-cycles

The project managers role and responsibilities, leadership, professional project management, projects within organisations, the project team, motivation, teamwork, communications on projects.

Project planning: Project Charter and scope, work breakdown structures (WBS), linear responsibility chart (LRC), multidisciplinary teams, concurrent engineering, interface management, Design Structure Matrix. Project Budgeting: Cost estimation for projects: Estimating resource, time and cost requirements and constraints; Life-cycle costs, detailed & parametric cost estimating models, Budget determination. Project management software, MS Project applications and examples.

Project Scheduling: PERT and CPM networks, finding the critical path and critical time, milestone management, calculating slack, project uncertainty and risk management, probabilistic activity times, simulation, the Gantt Chart, additional diagramming methods. Project Resources: Expediting a project, crashing a project, resource loading and levelling managing scarce resources on one or several projects, multiple projects, Critical Chain project management. Project Control: Plan-Monitor-Control Cycle, Project reporting, Earned Value, Project control systems, Scope creep and project change control.

Evaluating projects: Evaluation criteria, project auditing, project termination

**IN4004 - INSURANCE LAW AND CLAIMS**
ECTS Credits: 6

**Accounting & Finance**

**Rationale and Purpose of the Module:** 1. To develop in the student an understanding of and insight into the insurance law and claims processes 2. To examine the nature of the interface between insurance organisations and regulators. 3. To introduce students to the practice of insurance claims departments. Stress will be given to the achievement of appreciation of recent developments in the field.

**Syllabus:** Provide the student with an understanding of the claims process and the law of insurance applying to Ireland. Additionally, effective investigation and negotiation techniques are taught to implement the complexities of law to give practical application scenarios. Personality and behaviour are analysed so that a negotiator or investigator can formulate optimum tactics in their vocation.

**Prerequisites:** IN4003

**IN4008 - REINSURANCE / ART**
ECTS Credits: 6

**Accounting & Finance**

**Rationale and Purpose of the Module:** To meet the specialist skills requirements of the re/insurance industry by equipping students with a thorough grounding in reinsurance contracts, innovations in product design and the process and structure of insurance linked securitisation (ILS).

**Syllabus:** The secondary risk transfer device of reinsurance is an essential functional discipline in an insurance organisation. The discipline involves the design and implementation of a reinsurance structure that meets pre-determined criteria of cost economy and effectiveness consistent with solvency assurance. Alternative risk transfer is an evolving set of methodologies that essentially incorporate capital market instruments as an alternative to orthodox corporate
Rationale and Purpose of the Module: To examine the nature of the interface between the Accounting & Finance underwriting.

Prerequisites: IN4003, IN4015

IN4014 - LIFE INSURANCE
ECTS Credits: 6

Accounting & Finance

Rationale and Purpose of the Module: The module provided the student with an understanding of the principles of life insurance and the history and importance of life insurance in both the Irish market and on a global level.

Syllabus: The module includes an analysis of term insurance, whole life insurance and endowment insurance. The health insurance market in Ireland is studied, as is the Irish social insurance system with specific focus on the retirement and pensions market. The module covers the nature and purpose of a variety of life insurance contracts and students gain knowledge of life insurance underwriting. With regard to life insurance underwriting, particular attention is paid to underwriting of a variety of diseases that affect human anatomy, theories of mortality and morbidity risk, formulation of mortality tables, and the calculation of premium for term, whole life, endowment and annuity.

Prerequisites: IN4003

IN4418 - RISK CONTROL AND UNDERWRITING
ECTS Credits: 6

Accounting & Finance

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

Syllabus: Acquire a comprehensive understanding of the underwriting process within the context of risk management. Material damage insurance and risk control Loss of Profits Pecuniary insurance Liability insurances Loss reserve management Principles of insurance pricing

Prerequisites: IN4015

IN4718 - REINSURANCE/ART
ECTS Credits: 6

Accounting & Finance

Rationale and Purpose of the Module: To meet the specialist skills requirements of the re/insurance industry by equipping students with a thorough grounding in reinsurance/alternative risk transfer. Technical analysis of major product types - quota share: surplus; spread loss; loss stabilisation; operational features of managing the reinsurance/alternative risk transfer function - reinsurance accounting; accumulation control. (b) Statistical analysis of pure risk exposures, including computer based simulations of possible loss scenarios; selection of relevant risk transfer measures; underwriting techniques; exercises in reinsurance/alternative risk transfer programming.

IN4738 - INTERNATIONAL INSURANCE
ECTS Credits: 6

Accounting & Finance

Rationale and Purpose of the Module: 1. To develop in the student an understanding of and insight international insurance. 2. To examine the nature of the interface between regulation and insurance. 3. To allow students to comprehend the nature of cross-border business in insurance

Syllabus: The students will gain a general understanding of international insurance and produce an some in depth analysis of specific examples

JA4112 - JAPANESE LANGUAGE, CULTURE AND SOCIETY 2 (ADVANCED)
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

JA4212 - JAPANESE LANGUAGE, CULTURE AND SOCIETY 2
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: To give an overview of Japanese culture and society from 1945 to today by means of texts and visual material. To conclude the revision of grammatical structures and kanji enabling students to use them with a high degree of fluency and correctness.

Syllabus: Lecture: Japanese history, society and institutions; Tutorials: a) analysis of literary and other texts to provide further access to the topics discussed in the lecture while at the same time further developing reading techniques; b) Grammar work continued, listening comprehension. Autonomous Project work utilizing CALL facilities.
JA4246 - JAPANESE LANGUAGE, CULTURE AND SOCIETY 4
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: To enable students to understand more advanced authentic and near authentic, modern Japanese texts and to produce a greater range of spoken and written texts; to foster in students an understanding and appreciation of modern Japanese writing; to consolidate their knowledge of issues in contemporary Japanese society.

Syllabus: Listening practice concentrating on authentic Japanese; speaking exercises using various levels of formal and informal Japanese; using language with the correct nuances of regret etc. Speaking to a group on formal and informal Japanese; using language with the Japanese; speaking exercises using various levels of

Prerequisites: JA4247

JA4912 - JAPANESE FOR BUSINESS 2
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: To consolidate and increase abilities already gained in understanding, speaking, reading and writing, and further students’ understanding of Japanese society, as well as to develop further strategies for autonomous language learning.

Syllabus: Listening exercises dealing with street directions descriptions of places, abilities and family. Speaking practice emphasising talk about ones own and others families in the correct register descriptions of places. Reading descriptions of towns in Ireland and Japan as well as passages about Japanese sport and pastimes. Writing more complicated passages about family and place, pastimes, likes and dislikes. This will involve the introduction and practice of a further 80 kanji, bringing the total learned to 160. Discussion of aspects of Japanese society e.g. the economic system, education, Japanese literature.

Prerequisites: JA4911

JA4248 - JAPANESE LANGUAGE, CULTURE AND SOCIETY 6
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: This module is set at B2+ on the Common European Framework of Reference for Languages (CEFR). To consolidate students’ previous acquisition of Japanese and to bring them to an upper intermediate level of language use in listening comprehension, speaking, reading and writing; to continue the study of Japanese culture and society.

Syllabus: This module is set at B2+ on the Common European Framework of Reference for Languages (CEFR). Listening practice using authentic materials. Further practice in the use of polite language. Vocabulary consolidation; presentations, practice for interviews. Reading practice of authentic news stories, and authentic passages relating to Japanese society and modern literature. Translation of authentic passages, literary or business-related. Writing of summaries, descriptions, letters, and passages expressing opinions. Study of a further 200 kanji, to bring the total up to 750 characters.

Prerequisites: JA4213

JA4914 - JAPANESE FOR BUSINESS 4
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: To enable students to understand more advanced authentic and near authentic, modern Japanese texts and to produce a greater range of spoken and written texts; to foster in students an understanding and appreciation of modern Japanese writing; to consolidate their knowledge of issues in contemporary Japanese business and society.

Syllabus: Listening practice concentrating on authentic Japanese; speaking exercises using various levels of formal and informal Japanese; using language with the correct nuances of regret etc. Speaking to a group on various topics. Reading authentic and near-authentic material on Japanese business life and culture as well as news stories. Writing memos, faxes, e-mails, descriptions and summaries. Use of a further 120 kanji to bring the total up to 500 characters. Translating short passages of various levels from Japanese to English.

Prerequisites: JA4917

JM4004 - MAGAZINE JOURNALISM
ECTS Credits: 6

School of Culture and Communication

Rationale and Purpose of the Module: To give students a thorough understanding of the magazine market, from lifestyle magazines to Business to Business publications, including contract and customer publishing. To enable students to think creatively and develop their ideas to help them understand how magazines work and to create a pitch for a new magazine.

Syllabus: Students will learn how the magazine market works, the differences between the various different
kind of magazine, readership markets and revenue streams. Professionals will speak about their part of the industry to give the students a broad understanding. Students will select a magazine and research it, from circulation to readership, advertising and other revenues. They will obtain interviews to clarify any points, and produce a profile of the magazine, which will form the basis of a presentation to the class. In the second half of the semester, students will work on Project Oscar: in groups of about five, they will generate an idea for a new magazine, research the market, produce reader profiles, produce details of features, design dummy pages and pitch their projected magazine to the class, tutors and a magazine professional. Assessment will be by coursework: production of a portfolio of work completed during the course, and contributions to class discussions.

JM4007 - ADVANCED PRACTICAL JOURNALISM
ECTS Credits: 6

School of Culture and Communication

Rationale and Purpose of the Module: To give students live reporting practice in a variety of areas to prepare them for the professional world. This module aims to bring students to a professional standard in reporting which would enable them to obtain paid work on a local paper or a B2B magazine.

Syllabus: Students will report news events to a deadline from courts, council meetings and other public events and news conferences. They will have practice in reporting from statistics, finding off-diary stories, and generating stories from internet research followed by telephone interviews. They will practise covering breaking stories and constructing news stories from multiple sources (wraps). Students will be helped to create a professional portfolio of their work on the course, on student publications and on their work placements which they can use to obtain paid jobs. Assessment will be by a portfolio of coursework and a timed news writing and editing examination.

JM4013 - RADIO JOURNALISM
ECTS Credits: 6

School of Culture and Communication

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.

JM4014 - FEATURE WRITING
ECTS Credits: 6

School of Culture and Communication

Rationale and Purpose of the Module: Feature Writing aims to develop students’ writing skills in producing features of different types for a variety of publications.

Syllabus: Students will learn how to generate ideas for features, pitch feature ideas at mock feature conferences, research using printed and web sources and face to face and telephone interviews, develop their ideas for specific target publications, and write lively material. They will work on feature structure and writing stand firsts. They will produce publishable features of different kinds, including an interview/profile, colour writing or reportage and an analytical researched feature. They will be encouraged and helped to get work published either in a student or professional publication, or on their own websites. Assessment will be by coursework: production of a portfolio of work completed during the course, and contributions to class discussions.

JM4022 - INTRODUCTION TO SOCIAL MEDIA
ECTS Credits: 6

School of Culture and Communication

Rationale and Purpose of the Module: This module aims to equip students with the web-based research, organisational and value judgement skills necessary to examine and understand critically the power of social media in a globalised world. It aims to enable students to become better critical thinkers and researchers by giving them the skills to understand social media, to question its relevance, its accuracy and its legitimacy; and to construct news in a social media format. It will equip students with communication skills that are appropriate to a first-year level and which will enable them to participate effectively in their university degree.

Syllabus: This module is a foundation for new university students that will introduce them to thinking critically about social media. Taught elements will include concepts drawn from theoretical communications, social and media studies, as well as practical approaches including hierarchical news writing and information construction. The module will examine the changing nature of how news is disseminated through social media and investigate citizen engagement with news. It will give a practical introduction to the use of social media for the purposes of information gathering, as a source for news and as a potential agent of democratisation of media and society. Practical cases will be understood through recent theoretical perspectives on human collaboration and communication. The changing dynamic of news from the traditional (linear) model to the new media (circular) model will be explored. The course has a strong focus on both the use of social media for practical exercises and on evidence-based critical thinking.

JM4024 - SPORTS JOURNALISM
ECTS Credits: 6

School of Culture and Communication

Rationale and Purpose of the Module: This module will provide students with the opportunity to develop their reporting, writing and broadcast skills in sports journalism. It will explore the principles and practice of good sports journalism and develop students analytical skills and critical awareness of the role of sport in newspapers, online, magazines and broadcast organisations.

Syllabus: This module will give students practical experience in producing sports journalism for print and broadcast. Students will develop a rounded understanding of the processes involved in producing journalism content for sport. The significance of sports journalism within the overall newspaper, online and broadcast bulletin will be set in context. Additionally,
students will conduct weekly field reports and work in their own time to attend sports events and write and/or record journalistic output to a professional standard for print, online and broadcast. Students will produce a range of material including reports, interviews and feature articles. Assessment will be through the practical production of sport reports for print, online and broadcast; sports interviewing and feature assignments and reflections on learning.

JM4028 - CURRENT ISSUES IN IRISH MEDIA
ECTS Credits: 6

School of Culture and Communication

Rationale and Purpose of the Module: * To familiarise students with the key contemporary issues in Irish media.
* To give students an overview of the diversity of Irish media contexts.
* To introduce students to a range of media professionals from a range of different contexts and media.
* To enable students to produce an in-depth study of a chosen media context.

Syllabus: * The course is a seminar module. Each week a practising media professional will come to the University to talk to students about their particular working environment and the key issues facing them as media professionals and their particular organisations in contemporary Ireland.
* The range of seminar speakers will be as wide as possible, representing different media, different contexts (local, regional, national, public, private, voluntary) and different linguistic (Irish language and new allochthonous languages) and cultural environments.
* Students will write a brief synopsis of each of the seminars and will also choose to study one of the media contexts presented in the seminar series in depth in an extended essay.

JM4031 - SUB-EDITING AND DESIGN 1
ECTS Credits: 6

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.

JM4034 - JOURNALISM AND WRITING 2: BREAKING NEWS AND FEATURES
ECTS Credits: 6

School of Culture and Communication

Rationale and Purpose of the Module: Journalism and Writing 2 follows on from Introduction to Journalism from semester one. The course aims to delve deeper into journalistic theory while in the laboratory classes the course aims to develop students' writing skills in producing a variety of news articles including breaking news, short features, long form journalism and reviews for a variety of publications - print and online.

Syllabus: In the lectures students will discuss theories of journalism including; journalism and ethics, normative theories of journalism, journalism in the digital age, citizen journalism, mass communication theory and political economy.

In the labs students will extend their knowledge of different journalistic forms, including breaking news, short features, long form journalism, profiles, vox pops, and reviews. Regular news writing workshops will continue, including one on a breaking news exercise and a wrap story exercise. They will be helped to begin writing for student publications, and will be encouraged to write their own blogs. Assessment will be by the production of a portfolio of work completed during the course, and a final timed examination.

JM4038 - RADIO WEEK
ECTS Credits: 6

School of Culture and Communication

Rationale and Purpose of the Module: The module is intended to give practical experience in a live broadcast situation to fourth year journalism students. The experience of working under deadline pressure to produce professional standard output from the University of Limerick in a simulated radio station will be an important training exercise for BA journalism and new media students.

Syllabus: The module will enable the learner to put advanced radio broadcasting skills into practice in a real-world context, by planning and producing programming, in a range of categories, and operating an on-campus radio station for one week. Students will adopt the roles of station editor and manager, head of news, head of sport, presenter, producer, researcher and reporter. The module will enable the learner to fully develop team-working skills in news and other programming roles, and to hone their editorial judgement in high-pressure, on-air situations. Students will be expected to ensure all programming complies with the relevant broadcasting legislation, as well as with the codes and standards set out by the Broadcasting Authority of Ireland (BAI). Learning will be via practice based learning.

JM4058 - BROADCAST WEEK
ECTS Credits: 6

School of Culture and Communication

Rationale and Purpose of the Module: The module is intended to give practical experience in a live broadcast situation to fourth year journalism students. The experience of working under deadline pressure to produce professional standard output from the University of Limerick in simulated radio, TV and online broadcasts will be an important training exercise for BA journalism and new media students.

Syllabus: The module will enable the learner to put advanced radio, television and online broadcasting skills
into practice in a real-world context, by planning and producing programming in a range of categories, and operating an on-campus live web site. Students will adopt the roles of site editor and manager, head of news, head of sport, presenter, producer, researcher and reporter. The module will enable the learner to fully develop team-working skills in news and other programming roles, and to hone their editorial judgement in high-pressure, on-air situations. Students will be expected to ensure all programming complies with the relevant broadcasting legislation, as well as with the codes and standards set out by the Broadcasting Authority of Ireland (BAI). Learning will be via practice based learning.

**LA4002 - JURISPRUDENCE**
ECTS Credits: 6

**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.


**LA4006 - MEDICAL LAW**
ECTS Credits: 6

**Law**

**Rationale and Purpose of the Module:** The aim of this module is to provide students with an understanding of the legal and ethical issues associated with the practice of medicine. The interface between law and medicine has become increasingly controversial in recent years. Aside from traditional concerns such as those relating to medical confidentiality and access to medical records, an increasing awareness of the need to recognise and respect the autonomy of patients has raised new concerns which the legal system must address. This module seeks to introduce students to the challenges posed in the legal regulation of medical practice by introducing them to the law relating to medical confidentiality, access to medical records, consent to treatment and end-of-life decision-making.

**Syllabus:** This module covers: legal and ethical issues surrounding medical confidentiality and access to medical records; human rights and ethical perspectives on autonomy in healthcare decision-making; informed consent to medical treatment; capacity to consent in relation to minors and those with mental incapacity; refusal of treatment and; end-of-life decision-making.

**LA4008 - COMPANY AND PARTNERSHIP LAW**
ECTS Credits: 6

**Law**

**Rationale and Purpose of the Module:** To provide students with an understanding of the legal regulation of the primary forms of business organisation: the corporate entity and the partnership unit.

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

**Syllabus:** Corporate formation: types of companies, formalities, advantages and disadvantages of incorporation, corporate personality, piercing the veil, groups of companies; corporate governance; role of shareholders, directors, employees, directors’ duties, AGM, accounts and audits; minority shareholder protection; protection of parties dealing with corporations: creditors, voluntary and involuntary, charges over companies; ultra vires contracts; capital integrity; minimum requirements, distributions out of profits, repayments of capital; corporate termination: liquidation, receivership, winding up, examinership, amalgamations and reconstructions. Partnerships; joint and several liability; formation of partnerships; dissolution of partnerships; limited partnerships.

**LA4012 - COMPARATIVE LEGAL SYSTEMS**
ECTS Credits: 6

**Law**

**Rationale and Purpose of the Module:** To show the evolution of some of the distinguishing features of the major legal families and to examine some alternatives offered by non-western cultures.

**Syllabus:** The idea of law. Legal concepts. The historical development of common law. Early Irish law. Roman law. Civil law. Some fundamental concepts. German, French, Spanish and Scottish legal systems - introduction. How a Civil lawyer finds the law.

American legal system. Other conceptions of law and the social order.

**LA4032 - CRIMINAL PROCEDURE**
ECTS Credits: 6

**Law**

**Rationale and Purpose of the Module:** This course will consider the procedures to be used in the criminal justice system from the earliest moment of investigation, right through to sentencing. The system as a whole will be evaluated from various value-based positions, encouraging critical reflection among students. Key areas such as policing, trial procedure, and the sentencing process will be considered in depth. The course will involve a mixture of legal detail and sociological theory to give a rounded appreciation of the issues addressed. By the end of the course students should have a strong, and critical, understanding of the how the criminal justice system operates.


**LA4035 - LABOUR LAW**
ECTS Credits: 6

**Law**

**Rationale and Purpose of the Module:** To familiarise the student with the legal regulation of contracts of and for employment, industrial relations and remedies thereto.

**Syllabus:** Nature of Labour law, legal classification of the provision of labour, the role of statute in Labour Law. Protective legislation and conditions of employment, health and safety at work, sex discrimination, equal pay. Termination of employment, redundancy, minimum notice and unfair dismissal. Trade unions, legal regulation thereof, worker participation, EC developments. Courts and tribunals in Labour Law.
LA4036 - INTELLECTUAL PROPERTY LAW
ECTS Credits: 6

Law

Rationale and Purpose of the Module: Intellectual property (IP) is of great importance in modern society and the provision of legal protection to owners of intellectual property is considered by many to be critical to fostering ideas, rewarding innovation and stimulating economic growth. The significance of IP may be identified across a variety of sectors including the engineering, pharmaceutical, medical, entertainment, fashion and computer/software industries. The aim of the module is to give students an understanding of the various sources and forms of intellectual property (IP) rights including patent, trademark, copyright and design protection.

Syllabus: This module will explore the various sources and forms of intellectual property (IP) rights including:
1) patents
2) trademarks
3) copyrights
4) designs

The source of these rights, their limitations, infringement and remedies available for breaches will also be covered.

The course will also examine common law protections available to protect intellectual property including the tort of passing off and breach of confidence.

The focus will be on Irish IP law but will also examine relevant EU directives and global IP treaties.

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.

LA4042 - ADMINISTRATIVE LAW
ECTS Credits: 6

Law

Rationale and Purpose of the Module: To provide students with the mechanisms to test whether any decisions or actions taken by government or governmental agencies are lawful, and examine the redress available for aggrieved citizens.

Syllabus: Historical political and administrative background to administrative law within Ireland; relationship of administrative law with the Constitution of Ireland/ Delegated legislation, decisions, administrative acts, informal rules, circulars. The use of discretion. The principles and procedures of judicial review. Remedies.

LA4044 - LAW OF THE EUROPEAN UNION 2
ECTS Credits: 6

Law

Rationale and Purpose of the Module: This module will review and identify major developments in the substantive law of the European Union, its interpretation and development, with special reference to the foundations and common rules and policies of the Common Market and the realisation of an internal market. The policies dealt with will include i.e. the free movement of goods, persons, services, capital and payments, competition, social policy and animal welfare.

Syllabus: The module covers, in the first instance, background to the single market/common market. The module proceeds to examine in detail the Four Freedoms: free movement of goods, the free movement of persons (including workers, families/dependents, students, retired citizens, the freedom of establishment and the provision of services. Competition Law, including restrictive agreements and abuse of a dominant position will be examined. Social policy, (Equal pay and treatment, same sex couples, transsexuals etc.) will be covered and the module will end with a discussion on the impact of European Law on the animal welfare with specific reference to Treaty developments form the 1960s and the initial connection between animals and agriculture to recognition of the sentience of animals in the Treaty of Amsterdam and Lisbon, recent development including the Cat and Dog Fur Regulation and the Cosmetics Directive.

LA4058 - HUMAN RIGHTS LAW
ECTS Credits: 6

Law

Rationale and Purpose of the Module: The aim of this module is to introduce students to the study of international human rights law.

Syllabus: Upon successful completion of this model students will have a detailed knowledge of the international human rights law framework and will be familiar with the major universal and regional systems of human rights law and the legal value and authority of declarations, decisions, judgments and other output engendered by them. The syllabus will focus extensively on the Council of Europe structures for human rights protection and the United Nations treaty system with emphasis on the impact that the international system has on Irish law. Students will be expected to critically explore the development and expansion of this emerging field of law.

LA4082 - 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.
LA4122 - CONTRACT LAW 2
ECTS Credits: 6

Law

Rationale and Purpose of the Module: To examine the grounds upon which contracts may be discharged or avoided and the remedies available to ensure performance of contractual obligations.


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LA4142 - CONSTITUTIONAL LAW - FUNDAMENTAL RIGHTS (ONLINE)
ECTS Credits: 6

Law

Rationale and Purpose of the Module: The objective of this module is to impart knowledge of the fundamental rights provisions of the Irish Constitution, the tools that the courts use to interpret them and the remedies that can be granted to enforce them, and to assess the need for reform of those provisions.

Syllabus: The aim of this course is to examine the fundamental rights provisions of the Irish Constitution. Topics to be covered include: Articles 40-45 of the Irish Constitution; constitutional interpretation; personal and unenumerated rights; the right to life of the unborn; family rights and the rights of children; educational rights; religious freedom; property rights; socio-economic rights; remedies for breaches of constitutional rights.

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LA4222 - CRIMINAL LAW 2
ECTS Credits: 6

Law

Rationale and Purpose of the Module: By building on Criminal Law 1, to examine the principal criminal offences and elements of criminal procedure.


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LA4320 - LAW OF TORTS 2
ECTS Credits: 6

Law

Rationale and Purpose of the Module: To examine the tortious concepts of trespass, nuisance, defamation and economic torts. To evaluate remedies in the area of Tort Law and the assessment of damages.


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LA4392 - LAW OF TORTS 2
ECTS Credits: 6

Law

Rationale and Purpose of the Module: To examine the tortious concepts of trespass, nuisance, defamation and economic torts. To evaluate remedies in the area of Tort Law and the assessment of damages.


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LA4440 - CONSTITUTIONAL LAW 2
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: The aim of this course is to examine the fundamental rights provisions of the Irish Constitution, considering always the obligations of the state under international law. Topics to be covered include fundamental rights theories, unenumerated rights and enumerated rights and directive principles of social policy under the Irish Constitution.

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LA4540 - COMPANY LAW 2
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 module covers the administration of companies insofar as topics covered include; the duties of the Company Secretary and the Annual return obligations of companies. The module also covers issues of dividends and the company law limitations on profit distributions. In addition, the module covers the various methods of enforcement of company law. The
consequences of a company’s secured borrowings are also considered in terms of the secured party enforcing security by appointment of a receiver. The statutory scheme and facility of examinership for a company in financial difficulty is reviewed and the duties of court appointed examiners analysed. Finally, the module covers the various methods of winding up of companies and the roles of different types of liquidators. The duties of liquidators are examined and the connections between those duties and the schemes and bodies of company law enforcement are reviewed.

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**LA4620 - LAND LAW 2**  
**ECTS Credits:** 6  
**Law**  
**Rationale and Purpose of the Module:** To familiarise the student with a detailed knowledge of the regulatory aspects of the use of real property, including landlord and tenant law and the law of succession.  
**Syllabus:** The laws relating to succession, statutory control of the right to devolve property upon death, wills and intestacies. Landlord and Tenant Law, nature and creation of the relationship, determination of the relationship, statutory control of tenancies, public welfare codes. Lesser interests in real property including licences and covenants. The distinction between leases and licences. Mortgages.

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**LA4692 - LAND LAW 2**  
**ECTS Credits:** 6  
**Law**  
**Rationale and Purpose of the Module:** To familiarise the student with a detailed knowledge of the regulatory aspects of the use of real property, including landlord and tenant law and the law of succession.  
**Syllabus:** The laws relating to succession, statutory control of the right to devolve property upon death, wills and intestacies. Landlord and Tenant Law, nature and creation of the relationship, determination of the relationship, statutory control of tenancies, public welfare codes. Lesser interests in real property including licences and covenants. The distinction between leases and licences. Mortgages.

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**LA4828 - EQUITY AND TRUSTS 2**  
**ECTS Credits:** 6  
**Law**  
**Rationale and Purpose of the Module:** To inculcate in the student an understanding of the modern law of trusts, their creation and regulation.  
**Syllabus:** The trust, classification of trusts, express, implied, resulting, constructive and charitable trusts. The requirements of a trust, the constitution of trusts. General principles relating to trustees, their obligations and duties, powers of trustees, variations in a trust, fiduciary responsibilities of trustees. Breach of trust and remedies thereof.

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**LA4922 - 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.

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**LA4992 - CONSTITUTIONAL LAW 2**  
**ECTS Credits:** 6  
**Law**  
**ACADEMIC CONTENT IS NOT CURRENTLY AVAILABLE FOR THIS MODULE – UPDATES ARE IN PROGRESS**

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**LA6022 - COUNTER TERRORISM LAW AND INTERNATIONAL BUSINESS**  
**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 responses to terrorism as it impacts upon the legal environment in which international business takes place.  
**Syllabus:** This course will introduce students to the legal constraints on the operation of international business prior to the events of 9/11. Elements of UK counter-terrorism laws with respect to Northern Ireland, the use of customs and excise agencies and covert surveillance of business entities will be examined, including the wider European context of human rights issues. The course will then look at the impact of 9/11, the London and Madrid bombings and the response of both the EU and the US in creating a legislative arsenal designed to disrupt and destroy a common terrorist threat.

The course will focus on three of the most important areas governed by this new legal environment.

First, the increased monitoring of financial transactions both domestic and international. It will examine the role and legal responsibility of various financial institutions in monitoring and reporting suspicious activities surrounding the movement of money and financial assets. It will look at the legal controls on the right to move money across borders and the powers of confiscation based on suspicion versus proof. It will look at various laws that seek to prevent money laundering through international business transactions. It will cover the serious consequences, including both financial and custodial sanctions for breaches of these responsibilities.

Second, the course will deal with the rapidly expanding surveillance of communications traffic and the collection and interrogation of information held by private individuals and corporations. It will contrast the competing legal obligations of privacy and security. It will examine differing approaches from both EU and US authorities as to the nature and scope of privacy rights and the obligations of private enterprise service providers such as mobile phone operators to retain and supply records belonging to third parties.

Third it will examine the regulation of bribery and corruption in international business transactions, the theoretical issues involved as to whether those bribery and corruption is best dealt with on the supply side and the cultural differences as to the definition of bribery and corruption. It will explore the increasing link between bribery and corruption and international terrorism. It will introduce the role of sanctions in such actions and the effectiveness of implementing them.

Finally the course will examine the role of EU and US enforcement agencies in the implementation of
counter-terror law in a commercial context, the consequences for business people and the implications for private enterprise.

LI4001 - PEER TUTORING FOR LANGUAGES
ECTS Credits: 3
School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: This module aims to provide students who are native speakers of a language other than English which is taught in the School of Languages, Literature, Culture and Communication (hereafter referred to as LOTE students) with the appropriate training, guidance and support to effectively facilitate optional peer-led discussion groups or one-to-one sessions. It will particularly focus on the relationship between language and society.

This module mainstreams a project which has been very successfully running with AHSS Faculty Development Teaching Fund since September 2012. In AY 2012-13, 19 LOTE students were trained as peer tutors and 133 hours of additional language practice were provided. Substantially more hours are being provided in AY 2013-14 (32 peer tutors have enrolled in the Autumn Semester).

Practising the language is paramount in achieving fluency and accuracy, and yet language studies programmes within Higher Education are understandably limited in the amount of focused language practice they can offer. This 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.

LI4212 - LINGUISTICS 2
ECTS Credits: 6
School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: This course is designed to serve as an introduction to basic concepts and theories in sociolinguistics. The various subfields and branches of sociolinguistics will be introduced and discussed in class lectures.

The more specific objectives of this course are:
- Recognize the fundamental relationship between language and society
- Use the basic terminology and concepts of sociolinguistic subfields
- To acquaint you with the basic concepts necessary to pursue sociolinguistic studies further, if you wish to.

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. Sociolinguistics: In this first part, students will be introduced to basic concepts in sociolinguistics, including: accent, dialect, speech community.
2. Multilingualism: In this second part, students will learn about key features of multilingual societies.
3. Language and Media: In the third section, students will focus on the relationship between language and how it is used in the media.
4. Language and Gender: The final section of the module will focus on the relationship between language and gender.

Prerequisites: LI4211

MA4002 - ENGINEERING MATHEMATICS 2
ECTS Credits: 6
Mathematics & Statistics

Rationale and Purpose of the Module: To develop the student's understanding of and problem solving skills in the areas of Integral Calculus and Differential Equations. To give the student an understanding of the Matrix Algebra and its application to solving systems of linear equations. To give the student an understanding of the Matrix Algebra and its application to solving systems of linear equations. To introduce the student to Multivariate Calculus.

Syllabus: [The Indefinite Integral]: Integration techniques including integration of standard functions, substitution, by parts and using partial fractions.
[The Definite Integral]: Riemann sums, and the Fundamental theorem of calculus.
Application of integration to finding [areas, lengths, surface areas, volumes and moments of inertia].
[Numerical Integration]: Trapezoidal rule, Simpson's rule, other Newton-Cotes formulae and Gaussian quadrature.
[Functions of several variables and partial differentiation.] Fitting a line or curve to a set of data points.

Prerequisites: MA4001

MA4004 - ENGINEERING MATHEMATICS 4
ECTS Credits: 6
Mathematics & Statistics

Rationale and Purpose of the Module: To provide students with an understanding of the fundamentals of probability and its relation to statistics. To introduce statistical inference through the concepts of estimation and hypothesis testing. To apply these concepts to problems from both daily life and engineering/science.

Syllabus: The concept of variation - discrete and continuous variables.
Graphical representation of data - frequency tables,
histograms, bar charts, piecharts, boxplots.
Descriptive statistics - measures of location and dispersion.
Basic concepts of probability - Frequency interpretation and axioms of probability. Probability of an event. Laws of addition and multiplication. Compound events.
Discrete and continuous random variables - expectation, variance, moments.
Continuous probability distributions - Exponential, Normal, Uniform distributions.
The central limit theorem.
Statistical inference - interval estimation and hypothesis testing, type I and type II errors, one and two-tailed tests.
Linear regression - testing for an association between two continuous variables.

MA4006 - ENGINEERING MATHEMATICS 5  
ECTS Credits: 6  
Mathematics & Statistics
Rationale and Purpose of the Module: To introduce the student to elementary Vector Calculus. To give the student a broad understanding of analytical and numerical techniques for solving Partial Differential Equations.
Syllabus: Vector Calculus: Scalar and vector fields, contour maps, directional derivative and gradient vector of a scalar field, divergence and curl of a vector field (line, surface and volume integrals), Integral Theorems (Gauss’, Green’s and Stokes’).
Prerequisites: MA4003

MA4114 - APPLIED BUSINESS STATISTICS  
ECTS Credits: 6  
Mathematics & Statistics
Rationale and Purpose of the Module: This module contains the second half of MA4102 and the first half of MA4104.
This course is designed to give students the statistical background required to apply statistical techniques to data both of general interest and of interest specific to business activity.
This involves
1) presenting data using descriptive measures and graphical means,
2) presenting hypotheses that can be tested statistically, together with an appropriate interpretation of the test results
3) providing an introduction to correlation, linear regression and time series analysis
Syllabus: 1. Sampling methods and descriptive statistics - collection and tabulation of data. Summary measures and graphical presentation of data.
2. Basic concepts of probability - probabilities of the union and intersection of events, conditional probability and contingency tables.
3. Normal probability distribution and applications to control charts.
5. Hypothesis testing - one and two sample hypothesis tests and non-parametric tests for skewed quantitative data.
6. Chi-squared test for independence.
7. The Pearson and Spearman correlation coefficients and simple linear regression.
8. Introduction to Time Series Analysis - trends and seasonal variation, use of moving averages.

MA4128 - ADVANCED DATA MODELLING  
ECTS Credits: 6  
Mathematics & Statistics
Rationale and Purpose of the Module: To ground the students in Applied Multivariate Analysis. The module serves business and mathematics students. It introduces the mathematical statistical ideas behind Principal Component Analysis, Factor Analysis, Cluster Analysis, Discrimination Function and the Multiple Linear Logistic function. The students learn how to implement these techniques in Minitab to become competent in the analysis of a wide variety of multivariate data structures.
Syllabus: Principal Component Analysis, Cluster Analysis, Discrimination Function and the Multiple Linear Logistic function and Factor Analysis are introduced in this order. From the outset the Minitab (Statistical Package) is introduced. Different types of multivariate data structures are introduced. The analyses appropriate to each type of data structure are deduced from general principles and their implementation in Minitab described. Many different data structures are considered. Emphasis is placed on the integration of the different methods of analysis available in order to achieve an effective interpretation and simple summary of the multivariate data. Report writing, communicating the interpretation to non-technical business managers, is taught.
Prerequisites: EC4307, MA4125

MA4302 - APPLIED STATISTICS FOR ACCOUNTING  
ECTS Credits: 6  
Mathematics & Statistics
Rationale and Purpose of the Module: This course is designed to give students the statistical background required to apply statistical techniques to data both of general interest and of interest specific to business activity.
This involves
1) presenting data using descriptive measures and graphical means,
2) presenting hypotheses that can be tested statistically, together with an appropriate interpretation of the test results and
3) analysing time series data and prediction. In order to deal with large data sets, the lectures are accompanied by computer laboratories using a statistical computer package (SPSS).
Syllabus: 1. Sampling methods and descriptive statistics - collection and tabulation of data. Descriptive measures and graphical presentation of data.
2. Basic concepts of probability - probabilities of the union and intersection of events, conditional probability, contingency tables.
3. Discrete probability distributions - the binomial distribution. Expected values.
4. Continuous probability distributions - the normal and Pareto distributions, relevance to natural and economic phenomena.
5. Applications of the central limit theorem - interval estimation.
6. Hypothesis testing - one and two sample tests for population proportions and means. Tests of association.
7. The Pearson and Spearman correlation coefficient and simple linear regression.
8. Time Series Analysis. Trends and Seasonal Variation.
9. Use of a statistical package (SPSS) for data input and transformation, as well as carrying out the statistical methods described above.

MA4402 - COMPUTER MATHS 2
ECTS Credits: 6

Mathematics & Statistics

Rationale and Purpose of the Module: To develop some of the fundamental concepts and basic tools of calculus. Rationale and Purpose of the Module: To develop the basic scientific mathematical skills. To introduce applications of calculus in science and technology.

Syllabus: [Integration and applications: ] indefinite integral as antiderivative; integration by substitution; definite integral as area; Fundamental Theorem of Calculus; integration by parts; calculation of areas; applications in science. Introductory treatment of Simpson’s Rule.

MA4402 - COMPUTER MATHS 2
ECTS Credits: 6

Mathematics & Statistics

Rationale and Purpose of the Module: To develop some of the fundamental concepts and basic tools of calculus. Rationale and Purpose of the Module: To develop the basic scientific mathematical skills. To introduce applications of calculus in science and technology.

Syllabus: [Integration and applications: ] indefinite integral as antiderivative; integration by substitution; definite integral as area; Fundamental Theorem of Calculus; integration by parts; calculation of areas; applications in science. Introductory treatment of Simpson’s Rule.

MA4602 - SCIENCE MATHEMATICS 2
ECTS Credits: 6

Mathematics & Statistics

Rationale and Purpose of the Module: To develop some of the fundamental concepts and basic tools of calculus. Rationale and Purpose of the Module: To develop the basic scientific mathematical skills. To introduce applications of calculus in science and technology.

Syllabus: [Integration and applications: ] indefinite integral as antiderivative; integration by substitution; definite integral as area; Fundamental Theorem of Calculus; integration by parts; calculation of areas; applications in science. Introductory treatment of Simpson’s Rule.

MA4604 - SCIENCE MATHEMATICS 4
ECTS Credits: 6

Mathematics & Statistics

Rationale and Purpose of the Module: To develop some of the fundamental concepts and basic tools of calculus. Rationale and Purpose of the Module: To develop the basic scientific mathematical skills. To introduce applications of calculus in science and technology.

Syllabus: [Integration and applications: ] indefinite integral as antiderivative; integration by substitution; definite integral as area; Fundamental Theorem of Calculus; integration by parts; calculation of areas; applications in science. Introductory treatment of Simpson’s Rule.

MA4702 - TECHNOLOGICAL MATHEMATICS 2
ECTS Credits: 6

Mathematics & Statistics

Rationale and Purpose of the Module: To develop some of the fundamental concepts and basic tools of calculus. Rationale and Purpose of the Module: To develop the basic scientific mathematical skills. To introduce applications of calculus in science and technology.

Syllabus: [Integration and applications: ] indefinite integral as antiderivative; integration by substitution; definite integral as area; Fundamental Theorem of Calculus; integration by parts; calculation of areas; applications in science. Introductory treatment of Simpson’s Rule.

MA4704 - TECHNOLOGICAL MATHEMATICS 4
ECTS Credits: 6

Mathematics & Statistics

Rationale and Purpose of the Module: To develop some of the fundamental concepts and basic tools of calculus. Rationale and Purpose of the Module: To develop the basic scientific mathematical skills. To introduce applications of calculus in science and technology.

Syllabus: [Integration and applications: ] indefinite integral as antiderivative; integration by substitution; definite integral as area; Fundamental Theorem of Calculus; integration by parts; calculation of areas; applications in science. Introductory treatment of Simpson’s Rule.
MA4704 - TECHNOLOGICAL MATHEMATICS 4  
ECTS Credits: 6

Mathematics & Statistics

Rationale and Purpose of the Module: To introduce students to the fundamental ideas of uncertainty through probability. To lay a good foundation for the stream of statistically oriented modules in the fourth year. To introduce students to the most widely used statistical distributions and applications thereof. To introduce statistical inference through the concepts of estimation and hypothesis testing.

Syllabus:  
- Introduction to the fundamentals of probability. Experiments, sample spaces, events, Laws of probability - addition and multiplication, conditional probability. [Bayes theorem], prior and posterior distributions.  
- Introduction to random variables, probability density functions. [Special distributions]  
- Binomial, Poisson, geometric, uniform, exponential, 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.  
- Non-parametric tests - sign test, rank tests.  
- Correlation and Regression - method of least squares.

Prerequisites: MA4702, MA4701

MA4708 - QUALITY CONTROL  
ECTS Credits: 6

Mathematics & Statistics

Rationale and Purpose of the Module: To develop skills in the use of the appropriate statistical techniques in quality control

Syllabus:  
- History and development of techniques statistical process control charts: capability: Cpk, R&R studies control charts (Shewhart), variable and attribute, control & out of control, specifications, short and long run applications, proportion defective, ARL, PPM cusum, multivari acceptance sampling: AQL, CQL, risks, construction of sampling plans, various international standards

Prerequisites: MA4707

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 test. Mann-Whitney and Kruskaal-Wallis tests. Spearman's test for linear correlation. The course will be underpinned by extensive use of Case studies

Prerequisites: MA4701, MA4002

MB4008 - GROUPS AND ALGEBRAIC STRUCTURES  
ECTS Credits: 6

School of Education

Rationale and Purpose of the Module: To develop a broad understanding of algebraic structures especially group structure. To study realizations of group structure in geometry. To study selected applications in Science and Engineering.

Syllabus:  
- Sets and operations: review of sets, operations; Groupoids and semi-groups: equality, commutativity, associativity, inverses, order; Groups: axioms, properties, sub-groups, cyclic groups, p-groups, permutation groups; Lagrange's theorem: applications to number theory, kernel, isomorphisms, normal subgroups, quotient groups; Sylow's theorems; Group of isometries; group of transformations, enlargements; Group of similarities; Rings: definition; integral domain, fields.

Prerequisites: MA4001, MA4002

MB4018 - DIFFERENTIAL EQUATIONS  
ECTS Credits: 6

Mathematics & Statistics

Rationale and Purpose of the Module: To develop and understanding of the theory of differential equations. To study standard solution techniques. To apply differential equations to real situations.

Syllabus:  
- Basic concepts: order, degree, solution, boundary and initial conditions, graphs of solutions; Mathematical modelling: examples from mechanics and population growth; Classical mechanics: velocity, acceleration, motion of a rigid body; Newton's Laws, simple harmonic motion, elastic strings and springs; Projectile motion and orbital motion; First order ODEs: variable separable, homogeneous, linear and exact with applications; Second order differential equations: linear with constant coefficients, trial method and D-operator method with applications; Numerical solution of first order differential equations: Euler to Runge-Kutta.

Prerequisites: MA4702
**MD4038 - CONTEXTUALISING AND VOCATIONAL STUDIES**  
**ECTS Credits:** 6

**Irish World Academy of Music and Dance**

**Rationale and Purpose of the Module:** To introduce the professional disciplines of music psychology and therapy to the students and to develop a vocational project relevant to the potential future professional experience of the student, involving one or a combination of educational, community music / dance, technology, business orientations.

**Syllabus:** In the first part of the module an overview of the principles and research base relating to the psychology and sociology of music and dance will be presented through lectures and seminars; in particular, human responses to music and/or dance in affective, physiological, emotional and psychological domains. Current research relating to dance participation and performance, music listening, music preference, music for relaxation, music and dance in public spaces, responses to participation and observation of dance and ambient music, will be presented and critiqued.

In the second part of the module students will engage in a self-directed project relating to the application of vocational aspects of performance that have been addressed through the course (education, community music / dance, technology, business)

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**MD4044 - TRAVELLER MUSIC STUDIES**  
**ECTS Credits:** 6

**Irish World Academy of Music and Dance**

**Rationale and Purpose of the Module:** This module will examine the music traditions of nomadic communities immediate to the Irish experience (ie. Irish, Scottish travellers and Romany Gypsies) but in a wider European context. Students will engage these music cultures in a wide cultural and physical context and develop an understanding of the contribution of these music cultures to those of the ‘so-called’ settled community. The inclusion of this module will contribute to the maintenance of this aspect of the curricular activities of the Irish World Academy of Performing Arts.

**Syllabus:** Students will study the music traditions of Irish, Scottish travellers and Romany Gypsies. For these communities issues such as Ethnicity, origin, language and Nomadism will be addressed especially as they are manifest through the musical traditions of these communities. The module will also address the historical treatment of these traditions by collectors and musicologists. Case studies will be presented to contextualise these issues addressing the role of the Irish travelling community in the piping, song and fiddle traditions of this island, the song tradition of the Scottish traveller community and its appearance in Ireland and the fusion of Gypsy music with other music cultures across Europe.

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**MD4046 - IMPROVISATION AND COMPOSITION (VOICE / MUSIC / DANCE)**  
**ECTS Credits:** 6

**Irish World Academy of Music and Dance**

**Rationale and Purpose of the Module:** This module will introduce students to creative processes, using improvisational and compositional exercises. Students will investigate the use of movement, instrumental and vocal concepts as motives for creative practice.

**Syllabus:** Students taking this module will engage in a number of different improvisatory and compositional practices from western and world music and dance traditions as well as their own genres. They will understand these practices in context but also engage them in the context of their own performance practices. Students will develop performances that will be produced from an engagement and development of these practices in a meaningful and creative manner. Students will be provided with written feedback according to BA Irish Music and Dance policy.

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**MD4066 - ETHNOMUSICOCOLOGY AND ETHNOCHOREOLOGY WORLD MUSIC AND DANCE SURVEY / DIGITAL MEDIA TECHNOLOGY**  
**ECTS Credits:** 6

**Irish World Academy of Music and Dance**

MD4066 is divided into two sections. The World Music and Dance Survey, and a Digital Media Technology (each worth 50% of the module). The whole module is worth 6 ECTS credits.

**Rationale and Purpose of the Module:**

To introduce students to aspects of sounds and movement from around the world. Asking questions of what is ‘World Music and Dance’ in the 21st century digital age. Digital audio and visual technologies associated with music and dance performance, with a focus on professional audio and video recording and editing software.

**Syllabus:** One half of this module will examine a selection of music and dance expressions from diverse places round the globe. The other half of the module examines the creative and analytical possibilities of digital technologies associated with music and dance performance, with a focus on audio/video editing techniques.

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**MD4068 - SOMATICS AND RITUAL PERFORMANCE**  
**ECTS Credits:** 6

**Irish World Academy of Music and Dance**

**Rationale and Purpose of the Module:** This module will provide each student with the opportunity to continue to develop skills to research and develop an informed and intelligent approach to own specific technical needs so they can develop healthy and sustainable practices in preparation for performance; it will also provide the opportunity to develop skills and confidence to create innovative new models for ritualising performance; students will specialise in creating a project within a specific context and begin to focus on their preferred options for professional practice.

**Syllabus:** This module will provide each student with the opportunity to continue the study and practice of Authentic Movement, Feldenkrais and Alexander techniques to develop skills to research and develop an informed and intelligent approach to own specific technical needs and also so they can develop healthy and sustainable practices in preparation for professional practice; students will continue to develop their final year project within a specific context and continue to focus on their preferred options for professional practice.

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**MD4076 - SOMATICS AND PERFORMANCE PRACTICE**  
**ECTS Credits:** 6

**Irish World Academy of Music and Dance**

**Rationale and Purpose of the Module:** This module is one of five modules (three new, one existing and one elective from existing modules) put in place to provide the option of a UL based semester six for this programme. Currently there is a compulsory exchange semester that is no longer viable. This module will
provide each student with the opportunity to continue to develop skills to research and develop an informed and intelligent approach to own specific technical needs so they can develop healthy and sustainable practices in preparation for performance; it will also provide the opportunity to develop skills and confidence to create innovative new models for performance; students will specialise in creating a project within a specific context and begin to focus on their preferred options for professional practice. This is particularly focused on the development of final performance programmes.

**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 practices such as Pilates, Yoga, Feldenkrais, Alexander technique Body-Mind Centering and 'Tai Chi. Students will be required to use these methodologies to develop and extend their performance practice.

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**MD4087 - ADVANCED ENSEMBLE**  
*ECTS Credits: 6*

**Irish World Academy of Music and Dance**

**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.

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**MD4094 - MUSIC, LANGUAGE, SIGN AND TEXT**  
*ECTS Credits: 6*

**Irish World Academy of Music and Dance**

**Rationale and Purpose of the Module:** To develop the students critical understanding of the relationship of language, signs and symbols to music. This will allow students to engage their academic studies in the field of performing arts in a more critical and informed manner.

**Syllabus:** In this module students will be introduced to the broad twentieth-century traditions of structuralism, post-structuralism, post-modernism and cognitive linguistics. They will examine the application of theoretical structures from these traditions, in particular those promoted by Saussure, Barthes, Foucailler, Bakhtin, Kristeva, Lakoff, Turner and Foucault, in the contexts of understanding roles of meaning and the interaction of sign, text and language in musical and musicological contexts. Students will be encouraged to examine these theoretical constructs in the constructs of their own performance practices. Students will be provided with written feedback according to BA Irish Music and Dance policy.

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**MD4098 - COMPOSITION AND ARRANGEMENT IN IRISH TRADITIONAL MUSIC 2**  
*ECTS Credits: 6*

**Irish World Academy of Music and Dance**

**Rationale and Purpose of the Module:** To develop the students’ skills and knowledge of composition and arrangement in popular and classical music idioms and apply them in the context of traditional music fusions with these forms.

**Syllabus:** Students will examine some of the dominant forms of ensemble making in western music today. These will specifically be examined in the context of western art music (in particular string writing) and the contemporary use of studio techniques in popular music culture. Students will develop these skills in lectures, composition and studio laboratories, Assessment will be through continuous assessment on the submission of scores and recordings. Students will be provided with written feedback according to BA Irish Music and Dance policy.

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**MD4102 - PERFORMANCE 2A**  
*ECTS Credits: 6*

**Irish World Academy of Music and Dance**

**Rationale and Purpose of the Module:** Further development of the student’s primary performance interest, whether instrumental, vocal or dance. Students will be encouraged to engage in a dynamic self-critical process conducive to development and related to the principle of ‘reflective practice’. Also the development of musicianship and body-awareness skills.

**Syllabus:** This module is a development of the semester one Performance 1A module and as such divided into two parts. The first is the development of the students’ performance practice and will occur in the stylistic context most common to the performance practice of the student. The second part of this module will be related to performance skills pertinent to the specific music, song or dance practices of the student. This module will run in different streams for musicians, vocalists, Irish traditional musicians, contemporary dancers, and Irish traditional dancers. Musicians will have one-on-one instrumental classes, and classes to develop music theory and/or keyboard skills. Contemporary Dancers will have classes in contemporary and Ballet technique. Vocalists will have one-on-one vocal technique and repertoire classes, sight singing, keyboard and/or music theory classes and a weekly performance workshop. Traditional Irish dancers will have a weekly creative practice class, technique class, percussive dance technique class and a repertoire class. Students of this module also engage somatic classes in Feldenkrais, Pilates and Yoga as well as physical fitness classes.
MD4108 - CHOREOGRAPHIC SKILLS 1  
ECTS Credits: 6  
Ireland World Academy of Music and Dance  

Rationale and Purpose of the Module: This is an elective module intended for undergraduate students with dance as a first area who wish to further develop and deepen their choreography and notation skills.

Syllabus: This module has two elements creating and documenting solo and/or duet dance works. Students in this module will concentrate on further developing their choreographic abilities drawing on choreographic tools and techniques from a multitude of dance genres and contexts. The students will create and perform new solo and/or duet works. They will also be taught a variety of skills to assist with the development of strategies to record and document their creative processes. A number of notation systems including Labanotation, Newcastle notation, a variety of journal reflections as well as video and audio recordings will all inform the choreographic practice.

MD4111 - Irish World Academy Practicum C2  
ECTS Credits: 6  
Ireland World Academy of Music and Dance  

Rationale and Purpose of the Module: This module will continue to focus on students developing their artistic practice in a collaborative context while gaining embodied experience of other arts practices outside of their own genre and disciplinary specialities. The rationale for including a defined space for the engagement with performance practices unfamiliar to the student is to show the student different creativities structured by unfamiliar aesthetics, cultural context and modes of embodiment. Students will have the option to build on cross-genre skills acquired in Practicum C1 in certain contexts. The title of the module reflects the Irish World Academy tradition of presenting modules with an emphasis on cross-arts’ exploration of creative practice as a core dimension of every Academy undergraduate’s educational experience. Each student will choose a performance course, from a genre or approach outside of their disciplinary and genre focused stream, selecting from a pool of courses covering instrumental /dance tuition, music/dance ensemble, dance/music ensemble, dance/music composition and other available performing arts practices. Students will have the option to build on cross-genre skills acquired in Practicum C1 in certain contexts. This module will run in different streams for musicians, vocalists, Irish traditional musicians, contemporary dancers, and Irish traditional dancers.

Musicians will have one-on-one instrumental classes, and classes to develop music theory and/or keyboard skills. Contemporary Dancers will have classes in contemporary and Ballet technique.

Vocalists will have one-on-one vocal technique and repertoire classes, sight singing, keyboard and/or music theory classes and a weekly performance workshop.

Traditional Irish dancers will have a weekly creative practice class, technique class, percussive dance technique class and a repertoire class. Students of this module also engage somatic classes in Feldenkrais, Pilates and Yoga as well as physical fitness classes. This module will run in different streams for musicians, vocalists, Irish traditional musicians, contemporary dancers, and Irish traditional dancers. Much of the focus of this module is on collaborative, creative ensemble making and students have the opportunity to engage this across the many genres represented at the Irish World Academy of Music and Dance.

Musicians will have the opportunity to engage a number of ensembles across genres such as traditional music, classical music, gamelan and other world music practices.

Contemporary Dancers will have classes in choreography and improvisation. Students of this module also engage somatic classes in Feldenkrais, Pilates and Yoga.

Vocalists will have the opportunity to engage a number of vocal ensembles as well as musical theatre.

Traditional Irish dancers will have classes in their own genre and numerous other genres as well as contemporary direction.

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MD4114 - CRITICAL ENCOUNTERS WITH GLOBAL POP  
ECTS Credits: 6  
Ireland World Academy of Music and Dance  

Rationale and Purpose of the Module: This module is a further engagement with the study of popular music, emphasising its internationality as a domain for the circulation of many varied genres with origins around the world. “Irish trad,” as it is commonly called, is a significant idiom within this field and here is placed in its international context as but one example of local-global-local, sometimes called glocal (or occasionally Lobal), interaction. Global Pop is a field of musical production with which our students are likely to interact as musicians and dancers; this module prepares them to act as critical thinkers about its practices and their engagement with these.

Syllabus: The module content focuses on understanding the volatile dynamics of this field of cultural production through the study of particular examples. Some of the most important, and well documented, in this regard have been musics from Black America, South America, the Caribbean, North Africa, Sub-Saharan Africa, South America, Southeast Asia, Native North America, and the Northern Circumpolar regions. Particular issues and concepts key for an understanding of this phenomenon will be addressed in the context of these examples. Using an arts practice research perspective students will be asked to reflect on their own experience, most often in Irish music, in this domain.

MD4122 - AERIAL DANCE CREATIVE LAB  
ECTS Credits: 6  
Ireland World Academy of Music and Dance  

Rationale and Purpose of the Module: The aim of this module is to introduce students to this core aspect of aerial dance. This module forms part of a suite of aerial modules designed to create an aerial dance strand within the MA Festive Arts programme. This responds to the demand for third level training in the field, combined with the management and research elements of the MA Festive Arts programme. Creative Lab is an integral part of aerial dance as it uses the performance skills and tools developed to create an aerial solo or group piece. This module focuses on creativity within choreography, and on building and working towards aerial acts, including individual, duo and trio performance pieces.
MD4132 - HIP-HOP DANCE ELECTIVE 2
ECTS Credits: 6

Irish World Academy of Music and Dance

Syllabus: Creative Lab is an integral part of aerial dance as it uses the performance skills and tools developed to create an aerial solo or group piece. This module focuses on creativity within choreography, and on building and working towards aerial acts, including individual, duo and trio performance pieces. Students learn sequences and then improvise with it, using other choreographic skills for working on material. Students will also learn how to move with the trapeze or cocoons spinning, circling, swinging and changing heights. This module develops ease in moving in and out of the floor and in an out of the aerial apparatus as it spins and swings. It also develops each student’s creative ethos and thinking by working through different exercises originating in theatre, dance and clowning to overcome blocks and fears in performance.

MD4142 - IRISH DANCE PERFORMANCE SKILLS 2
ECTS Credits: 6

Irish World Academy of Music and Dance

Rationale and Purpose of the Module: With the move to a general engineering common entry, this module will use the principles of Conceive, Design, Implement and Operate (CDIO) to help develop key engineering fundamentals. The module will, through lecture, lab and group activity, provide the student with a basic knowledge and experience of the methods employed in the processing and fabrication of common engineering materials. The module will develop the students’ communication, visualisation and collaborative capabilities. The module will emphasise the importance of safety in the engineering environment.

MD4134 - EXPERIENTIAL ANATOMY AND MOVEMENT ANALYSIS
ECTS Credits: 6

Irish World Academy of Music and Dance

Rationale and Purpose of the Module: The Experiential Anatomy and Movement Analysis module introduces the principles of anatomy and movement analysis to dance students. The module aims to develop an awareness of the relationships between body awareness, dance training, fitness, health and injury prevention.

School of Engineering

ME4008 - ORTHOPAEDIC BIOMECHANICS AND MECHANOBIOLOGY
ECTS Credits: 6

Rationale and Purpose of the Module: This module will introduce an understanding of the fundamental principles of anatomy and introduce students to the principles of movement analysis to develop an understanding of the functions and structure of the human body.

ME4042 - INTRODUCTION TO DESIGN FOR MANUFACTURE
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: To provide students with the opportunity to become competent in hip hop dance so that they can develop the skills and confidence to work towards the creation of Hip-Hop compositions in a range of performance contexts, which will broaden their career options in Dance.

Syllabus: Over this elective, students will learn, in studio, the roots of Hip-Hop and its evolution from the streets of New York city in the 1970s. Emphasis will be placed on learning about roots of Hip-Hop through class participation and learning the choreography of these dances and origins. By utilizing contemporary choreographic techniques, dancers will create new works for performance. This elective will lead on from Hip-Hop dance elective 1 and will require a greater complexity of choreography and of choreographic tasks.

ME4052 - CELL AND TISSUE BEHAVIOUR FOR ENGINEERS
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: With the move to a general engineering common entry, this module will use the principles of Conceive, Design, Implement and Operate (CDIO) to help develop key engineering fundamentals. The module will, through lecture, lab and group activity, provide the student with a basic knowledge and experience of the methods employed in the processing and fabrication of common engineering materials. The module will develop the students’ communication, visualisation and collaborative capabilities. The module will emphasise the importance of safety in the engineering environment.

Rationale and Purpose of the Module: The purpose of the module is to give a basic appreciation of the physics of living cells and tissues. This is done through integration of physical chemistry, electrostatics and mechanics of biological systems.

Syllabus: Presentation of physical chemistry, mechanics and electrostatics in the context of a unifying framework of thermodynamics. The students will learn to be acquainted with concepts such as chemical potential, electrochemical potential, diffuse double layers, electroneutrality, Brownian motion. Integrate these concepts with the knowledge that they acquired in earlier modules on thermodynamics, strength of materials, continuum mechanics, chemistry and biology. Application of the multiphysics of interfaces to mechanotransduction, tissue repair, cellular function, microfluidic devices, and electrostatics in the context of a unifying framework.

Gaining proficiency in laboratory skills of multiphysics of tissues and cells.

Prerequisites: ME4523

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ME4104 - AIRCRAFT SYSTEMS ENGINEERING
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: The primary purpose of this module is to introduce students to the design principles and operation of the systems incorporated in modern aircraft. Aeronautical engineers are engaged in design, operation and maintenance of aircraft systems through the whole lifecycle of aircraft. The role of the different systems in safety and operational characteristics and performance of aircraft is covered in this module. Moreover, the regulatory requirements and constraints in system design/re-design/modification and certification are covered, providing an integrated and holistic understanding of the technical and non-technical considerations involved.


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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.

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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 problems 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.

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ME4116 - AIRCRAFT VIBRATIONS
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: To provide an appreciation of the critical design issues associated with vibrations in structures and devices, with an emphasis on applications in aircraft. To enable students to analyse vibrational problems with standard mathematical tools for linear systems, and design simple vibration absorption and isolation systems.

Syllabus: Oscillatory motion; free vibration of single degree of freedom systems; harmonically excited vibration; transient vibration; vibrations under general forcing conditions; systems with two or more degrees of freedom; modal analysis; introduction to aeroelasticity.

Prerequisites: ME4111, ME4112

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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

ME4134 - AIRCRAFT DESIGN
ECTS Credits: 3

School of Engineering
Rationale and Purpose of the Module: To introduce the student to the important considerations involved in the design of an aircraft, with particular emphasis on the aerodynamic load calculation and airframe structural design. Of critical importance will be the design philosophies associated with safe structures.

Syllabus: Review of low speed aerofoil and finite wing aerodynamics, aerofoil stall characteristics, approximate methods for obtaining wing lift distributions, wing stall characteristics. Calculation of wing shear force, bending moment and torsional load distributions.

Structural design and analysis philosophies, material design allowable, reserve factors, construction principles, fail-safe, safe-life philosophies. Design of structural components for ultimate failure and fatigue life estimation, including cumulative fatigue. Fasteners and structural joints.

ME4226 - MECHANICS OF SOLIDS 2
ECTS Credits: 6

Rationale and Purpose of the Module: To understand and analyse and measure the state of strain at a point in a 2D strain field. To analyse stresses and deformation in circular plates under symmetrical loading. To be able to determine yielding under multiaxial loading. To be able to predict the maximum deflection of a beam subjected to simple and complex loading in a plane. To predict the buckling load and maximum stress in a strut. To understand the factors influencing fatigue life and be able to predict the life of simple engineering components. To understand the basics of LEFM. To analyse the stresses in beams of unsymmetrical section.

School of Engineering
ME4308 - BIOMATERIALS 2
ECTS Credits: 6

Rationale and Purpose of the Module: To provide the theoretical knowledge required to analyse and design aircraft control systems.

Prerequisites: ME4213

School of Engineering
ME4412 - FLUID MECHANICS 1
ECTS Credits: 6

Rationale and Purpose of the Module: To introduce the nature of fluids, the dynamic behavior of fluids and application of the principles of continuity, energy and momentum to viscous fluid flow.

School of Engineering
ME4112 - AIRCRAFT CONTROL SYSTEMS
ECTS Credits: 6

Rationale and Purpose of the Module: To gain appreciation for hard tissue replacement materials in current use; To enable students to understand material selection and design criteria for hard tissue replacement applications; Gain understanding of regulatory environment.


School of Engineering
ME4306 - BIOCOMPATIBILITY
ECTS Credits: 6

Rationale and Purpose of the Module: To gain appreciation for hard tissue replacement materials in current use; To enable students to understand material selection and design criteria for hard tissue replacement applications; Gain understanding of regulatory environment.

ME4414 - FLUIDS MECHANICS 2
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: To apply the principles of Continuity, Energy and Momentum covered in Fluid Mechanics 1 to dimensional analysis and similarity, viscous flow, inviscid flow, circular motion, hydraulic machines and compressible flow.

Syllabus: Dimensional analysis and dynamic similarity with applications; inviscid flow theory and applications; vortex motion; analysis and performance evaluation of turbines, fans and pumps; selection of hydraulic machines from specific property requirements; Navier-Stokes equations with applications, lubrication theory; compressible flow. Channel flow.

Prerequisites: ME4412

ME4516 - THERMODYNAMICS 2
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: To provide the principle of Continuity, Energy and Momentum covered in Fluid Mechanics 1 to dimensional analysis and similarity, viscous flow, inviscid flow, circular motion, hydraulic machines and compressible flow.

Syllabus: Fourier’s Law of Heat Conduction
The Convection Equation
Thermal Resistance’s and their Application
Two-dimensional Heat Conduction: An Analytical Example
Numerical Methods in Heat Conduction
Time Varying Heat Transfer: The Lumped Heat Capacity Method
Forced Convection: Standard Heat Transfer Correlation’s and their Application
Free Convection: Standard Heat Transfer Correlation’s and their Applications
Thermal Radiation: An Introduction
Heat Exchange Design Equations: The Log Mean Temperature Difference

Prerequisites: ME4412

ME4526 - INTRODUCTION TO HEAT TRANSFER
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: To provide a basis to students in the concepts and solution methods of conduction, convection and radiative heat transfer, and the measurement techniques utilised in heat transfer

Syllabus:

ME4718 - FLUID PROCESS CONTROL
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: To provide the student with a very good knowledge of advanced process control with emphasis on fluid & thermal processes.

Syllabus: Advanced Control Strategies
Control of Multi-Input-Multi-Output (MIMO) Processes
Development of Discrete-time Models
Dynamic Response of Discrete-Time Systems
Analysis of Sampled-Data Systems
Design of Digital Controllers

ME4726 - FLIGHT MECHANICS
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: To introduce the student to aircraft performance and the static and dynamic stability and control of aircraft.

Syllabus: International Standard Atmosphere, Aircraft speed and height conventions
Aircraft engine thrust and drag characteristics, parabolic drag polar
Aircraft performance in steady, climbing and turning flight
Range and endurance equations (including Breguet equations) for piston and turbine powered aircraft
Prediction of takeoff and landing distances
Longitudinal static stability, stick-fixed and stick-free stability margins.
Manoeuvre point and manoeuvre margin.
Introduction to dynamic stability, stability modes

Prerequisites: ME4424, ME4412

ME4736 - PHYSIOLOGICAL FLUID MECHANICS 1
ECTS Credits: 6

School of Engineering
Rationale and Purpose of the Module: To introduce the students to the field of physiological fluid mechanics, develop their knowledge of physiological fluid flows including airflow, blood flow and urology, study these flows in straight, rigid and compliant tubes and examine transport phenomena in biological systems, viscous flow, inviscid flow.

Syllabus: Viscous and inviscid flow theory and applications. The role of transport phenomena in biological systems and the definition of these processes, including momentum, convection, diffusion and binding interactions. Introduction to the primary physiological convective transport systems: cardiovascular system, respiratory system, urological and lymph systems. Properties of physiological fluids and constitutive relations; Newtons law of viscosity, non-Newtonian rheology and time dependant viscoelastic behaviour. The derivation of the conservation relations for fluid transport, dimensional analysis and scaling. Introduction to Mass Transfer, Ficks law of diffusion. Transport of Gases between blood and tissues: oxygen-haemoglobin equilibria and the dynamics of oxygenation of blood in lung capillaries. 

Prerequisites: ME4412

ME4746 - PHYSIOLOGICAL FLUID MECHANICS 2
ECTS Credits: 6

School of Engineering
Rationale and Purpose of the Module: To advance the knowledge of students physiological fluid mechanics, specifically introducing concepts and applications in mass transport and heat transport.


Prerequisites: ME4412

ME6032 - ADVANCED AIRCRAFT STRUCTURES
ECTS Credits: 6

School of Engineering
Stress analysis of aircraft components: Tapered wing spars and box beams; beams having variable stringer areas; cut-outs in fuselages; fuselage frames and wing ribs, principles of stiffener/web construction. Fatigue of aircraft structures: Safe life and fail-safe structures; designing against fatigue; fatigue strength of components; prediction of aircraft fatigue life; crack propagation. Aeroelasticity: Load distribution and divergence, control effectiveness and reversal, introduction to flutter. Structural and loading discontinuities: shear stress distribution in beams; shear lag. Structural Stability: Unstable behaviour; beam columns; slender column buckling; column imperfections and load misalignment; inelastic buckling; Approximate methods; thin plate buckling; crippling stresses. Crashworthiness: Bird strike on aircraft, hard debris/hail impact, certification. Composite Structures: Boiled composite joints; stresses in open hole and filled hole coupons, single/double lap joints, multi-bolt joints, load distribution, bearing/bypass stresses, joint failure; bonded joints; thin walled composite beams. Damage Evaluation Techniques; A-, B- and C-scan, X-ray, microscopy.

ME6052 - FRACTURE MECHANICS
ECTS Credits: 6

School of Engineering

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.
ME6072 - ENGINEERING MECHANICS OF PLASTICS AND COMPOSITES  
ECTS Credits: 6

School of Engineering


ME6092 - RENEWABLE ENERGY TECHNOLOGIES  
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: To provide students with knowledge of renewable energy technologies.

Syllabus: From the following Renewable Energy topics, 3 areas will be addressed in detail each year:
- Wind Turbines, Solar, Hydro, Wave, Tidal, Geothermal, Biomass, Fuel Cell
- Hydro Power: Introduction; Principles; Assessing the resources for small installations; An Impulse Turbine; Reaction Turbine; Hydroelectric systems; Social and environmental aspects
- Biomass: Processes for the use of biomass: Drying, Gasification, Fluidized Beds; Feedstock/Fuel: Particle characterisation, Flow through packed beds, Carmen-Koseny equation, Ergun equation, Geldart classification, Grace-Reh diagram; Fluidization: flow through fluidized beds, minimum fluidizing velocity, regimes of fluidization; Elutriation of fine particles and pneumatic transport.


Wave Power: Introduction, principle of wave motion, wave energy, power and resources, wave patterns, wave conversion devices, social and environmental aspect. Tidal Power: Introduction, the cause of tides, enhancement of tides, tidal current/stream power, tidal range power, world range power sites, social and environmental aspect of tidal power, Geothermal: Physics of geothermal resources; Steam power plants, Ground source heat pumps, Hot dry rock technology; Environmental Implications & Economic potential; Geothermal Energy in Ireland: ground temperatures, soil types.


Electricity Generation: Photovoltaic: Semiconductors and Doping, Monocrystalline silicon cells, Polycrystalline silicon, electrical characteristics of PV, remote power, grid connected PV systems, cost of PV, environmental impact & safety


ME6122 - MICROFLUIDICS  
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: To provide students with an understanding of the main theoretical concepts, measurement and manufacturing methodologies for microfluidic devices.

Syllabus: Relevance of microfluidics in Lab-on-a-Chip, BioMEMs and Process Intensification

Scale effects on mass, momentum and thermal transport

Poiseuille flow in rectangular channels, developing microflows, prediction using hydraulic resistance, slip effects in gaseous flows (1st and Deissler 2nd Order), Tangential Accommodation Coefficients

Measurement Techniques (Pressure, Flow, Velocity, Mass Transport, Temperature)

Introduction to Microfabrication Techniques for microfluidic devices (DRIE, Stereolithography, Embossing etc.)
Syllabus: The key elements lie under the following headings:
- Making economic decisions
- Engineering costs and cost estimates
- Interest and equivalence and interest formulas
- Present worth analysis, annual cash flow analysis
- Rate of return analysis, incremental analysis
- Other methods: payback period, sensitivity and breakeven analysis
- Uncertainty
- Depreciation and taxes
- Replacement analyses
- Discount rates: inflation and escalation, selecting the MARR
- Investment analysis in the public sector
- Further topics: rationing capital amongst competing projects; accounting models and engineering economy

Syllabus: - Software lifecycles: review of the waterfall model, prototyping, spiral, and object-oriented (OO) development models.
- Focus on understanding the Unified Enterprise.
- Characteristics of good software design - modules, cohesion, coupling or dependency, encapsulation, abstraction, etc.
- Requirements investigation.
- Requirements classification: functional and non-functional requirements.
- Entity Relationship Modelling, Requirements Engineering: use case diagrams and use case descriptions.
- Relational Database Design and Development.
- Other methodologies: DSDM, Agile approaches, Extreme Programming.

Integration with, and data capture from, metrology equipment and bar-code readers. Interfacing with, and control of, stepping motors and programmable logic controllers. Use of application program libraries and integration with other software applications. File format conversion between computer aided design, manufacturing systems and other Manufacturing applications, e.g. Shop floor data acquisition systems.

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MF4736 - ENGINEERING ECONOMY
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: This module locates engineering design in the context of a broad-ranging cost-benefit analysis, through the development of alternative solutions and their evaluation in terms of onward impacts, in a quantitative multi-annual economic reference framework. As such, it recognises the key importance of a common yardstick for costs and benefits involving capital sums such as spent on facilities, and periodic cash flows such as those resulting from improved methods or reduced because of poor quality.

It recognises the reality of taxes and of uncertainty in outcomes.

Engineering Economy is a core subject in the US ABET scheme for accreditation of professional engineering courses leading to the designation Professional Engineer.

Syllabus: Problem definition and clarification - design briefs; New Product Development (NPD) Concurrent Engineering NPD vs Traditional NPD; The deliverables of processes of design; design processes and the role of parametric CAD; Modelling strategies from cognition to prototype; Creative Design Methods; Product Concepts Surface modelling and solid modelling techniques; design intent: planning parts for design flexibility; relations and equations; parametric dimensions; design and modelling for manufacture and assembly; assembly modelling; drawings; drawing documentation; BOMs; creating design tables using Excel for multiple part and assembly configurations; Library features: SolidWorks Toolbox of fasteners and components; importing and exporting files; CAD standards for data exchange; STL files and the FDM rapid prototyping system; linking with SolidCAM. FEA analysis and design validation; rendering and presentation techniques; product animation.

Prerequisites: MF4722

MG4037 - STRATEGIC MANAGEMENT
ECTS Credits: 6
Management and Marketing

Rationale and Purpose of the Module: To provide students with a significant understanding of the role and importance of strategic management in contemporary organisations.

To enable students to integrate functional specialisms into an appreciation and application of strategy processes in both the private and public sector.

Syllabus: Multi-perspective nature of strategy, strategic dimensions, strategy processes, theories of business level competitive advantage - market positioning, resource-based and the dynamic capabilities approach. Strategic options and decision making, implementation issues: resource allocation, stakeholder management, strategic control, and change management. Strategic cultures and paradigms, the role of the strategist. Corporate-level strategy, multi-business structures and coherence, Organisational and Environmental Turbulence, Scenario Planning and future thinking.

MG4058 - MANAGEMENT CONSULTING
ECTS Credits: 6
Management and Marketing

Rationale and Purpose of the Module: Contemporary management practice is a novel and action orientated
Management and Marketing

Rationale and Purpose of the Module: To provide a strategic perspective on the role of knowledge, information and technology in organisations. Develop the role played by technology in market and organisational transformation. Develop planning processes for the strategic use of the information resource. Provide students with an appreciation of the need to manage knowledge as an organizational resource and the infrastructural requirements to facilitate this.

Syllabus: The role of technology, information and knowledge in a strategic context; technological change and the transformation of organisations and markets in the networked economy; techniques and frameworks for strategic planning of the information resource; the nature of knowledge as an organizational capability; models and conceptual frameworks for knowledge management; knowledge management systems; knowledge codification; the transfer of knowledge at an individual, group, organizational and inter-organizational level; cross cultural knowledge management; changing use of systems due to knowledge intensity; communities of knowing; implications for knowledge systems in support of non-traditional/emerging organizational structures. The above concepts will be reinforced and developed through the use of various software packages including web, intranet and knowledge portal software systems.

Prerequisites: MI4407

MK4002 - MARKETING
ECTS Credits: 6

Management and Marketing

Rationale and Purpose of the Module: This module is designed to introduce students to the philosophy and historical underpinnings of marketing. As such, it will help students to position marketing both as an organisational discipline and as a societal force. The module will trace the development of marketing as a business philosophy and will assess the role of marketing within the international business organisation. Students will also explore what it means for organisations to be market-led. Finally, the module will delineate the rights and responsibilities of marketers and customers, and identify the role and impact of marketing in society.

Syllabus: The syllabus provides coverage of the nature of marketing and, in particular, offers an historical backdrop to the development of the discipline. Next, students are introduced to the cornerstones of the discipline in the guise of the marketing concept and the marketing mix. Issues relating to marketing as an organisational culture are considered with specific reference to marketing orientation and the barriers to developing such an orientation. The process of marketing in different contexts (service, industrial, international etc.) is discussed and differences highlighted. The consumer is introduced as the core target of marketing activity and relevant issues such as consumer sovereignty; consumer rights and the consumer movement are debated. On a macro level, issues relating to social responsibility and ethics are delineated. Finally, the module addresses the thorny issue of how marketing adds value and what its contribution might be.

MK4004 - CONSUMPTION AND CONSUMER CULTURE
ECTS Credits: 6

Management and Marketing

Rationale and Purpose of the Module: This course aims to provide coverage of the nature of consumer culture.

* To reflect the general shift within consumer culture in the basic emphasis of economic systems from exchange or production to consumption.
* To define the domain of consumer behaviour, including some areas of interest to consumer behaviour researchers, policymakers, and marketers.
* To provide coverage of the circle of consumption and how consumption relates to other technological and economic processes.
* To explore contemporary theories of consumption.
* To encourage students to critically reflect upon their own consumption.

Syllabus: The Circle of Consumption; Motivational Dynamics; Culture; Cultural Values; Myths & Symbols; Cultural Rituals; Types of Meanings; Meaning Transfer; Strategic Analysis of Consumers; Self Concept; Subcultures of Consumption; Lifestyles; Embodiment & Consumption; Classic Theories of Motivation; Consumer Motives in Cultural Perspective; Involvement; Consumer Experience; Consumer Learning; Purchasing; Gift Exchange; Organisational Consumption; Family & Household Consumption; The Social Context of Personal Consumption; Tools of Influence; Reference Groups; Innovation; Adoption and Diffusion; Resistance; Compulsive Consumption; The Disposition Process;
Profile of Disposition Behaviours; Factors Affecting Disposal Choices.

Prerequisites: MK4002

MK4006 - MARKETING MANAGEMENT (NON BUSINESS)
ECTS Credits: 6

Management and Marketing

Rationale and Purpose of the Module: This module will provide non business students with an understanding of the key knowledge and skills involved in marketing management. The module will examine the strategic importance of marketing and explore the key challenges and contemporary issues surrounding the management of marketing.

The key objectives are:
1. To explore the role of marketing management in the contemporary environment and investigate how marketers can manage environmental changes
2. To evaluate marketing’s contribution in the creation of sustainable competitive advantage for different business contexts
3. To investigate the importance of marketing within the firm and the challenges surrounding the management of the marketing function
4. To provide students with an understanding of the role of marketing planning and implementation.

Syllabus: Building upon the foundations of marketing, this module takes a strategic approach to the theory and practice of marketing. The module introduces the concept of the marketing vision and explores the process of strategic analysis based on an assessment of key external and internal forces affecting the firm. An exploration of marketing strategy and the sources of competitive advantage follow with key competitive positioning strategies presented. The module focuses on understanding the management of the marketing function, the development of the marketing mix and the practice of marketing in terms of maximising value to customers and other stakeholders. Core areas to marketing management such as customer behaviour, brand management, services management and relationship marketing are examined. Key models and theories related to marketing planning and implementation are explored.

Prerequisites: MK4603

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

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.

Prerequisites: MK4002

MK4038 - MARKETING RELATIONSHIPS AND NETWORKS
ECTS Credits: 6

Management and Marketing

Rationale and Purpose of the Module: 1. To introduce relational approaches to marketing.
2. To understand the nature and importance of interaction in service, intra-organisational and mass marketing contexts.
3. To understand the process of relationships development and to appreciate relationships success variables and how they might be fostered.
4. To consider approaches to relationship management including CRM.
5. To understand competitive and collaborative networks and the strategic implications for individual organisations.
6. To appreciate the implications of marketing when viewed as relationships and networks.


Prerequisites: MK4002
**MS4014 - INTRODUCTION TO NUMERICAL ANALYSIS**
ECTS Credits: 6

**Mathematics & Statistics**

**Rationale and Purpose of the Module:** This module provides an introduction to the basic concepts of numerical analysis.

**Syllabus:**
- Propagation of floating point error;
- Zeroes of nonlinear functions: Bisection method, Newton’s method, Secant method, fixed point method; convergence criteria, rate of convergence, effect of multiplicity of zero; introduction to the use of Newton’s method for systems of nonlinear equations.
- Systems of linear equations: Gauss elimination, LU and Cholesky factorisation, ill-conditioning, condition number; iterative methods: Jacobi, Gauss-Seidel, SOR, convergence criterion.
- Interpolation and Quadrature: Lagrange interpolation, error formula;
- Newton-Cotes and Romberg quadrature.

**Prerequisites:** MS4022, MS4403

**MS4018 - DYNAMICAL SYSTEMS**
ECTS Credits: 6

**Mathematics & Statistics**

**Rationale and Purpose of the Module:** To demonstrate to the student how dynamical techniques can be applied to the analysis of nonlinear and chaotic models, data and systems.

**Syllabus:**
- One dimensional flows: flows on the line, fixed points and stability; bifurcations, flows on the circle.
- Chaos: Lorenz equations; strange attractors; control of chaos.
- One dimensional maps: fixed points, periodic points and stability; bifurcations, the logistic map — numericals and analysis, period-doubling and intermittency; Lyapunov exponents, renormalisation and Feigenbaum numbers.
- Introduction to time series applications.
- Fractals: dimensions; strange attractors revisited.

**Prerequisites:** MS4022, MS4403

**MS4022 - CALCULUS 2**
ECTS Credits: 6

**Mathematics & Statistics**

**Rationale and Purpose of the Module:** This module introduces the student to sequences and series, integral calculus, ordinary differential equations and functions of several variables. It develops problem solving skills in these topics.

**Syllabus:**
- Sequences and series: Limit of a sequence, convergence of a sequence; series, convergence, tests for convergence, absolute and conditional convergence. Power series.
- MacLaurin and Taylor series: Order notation, big-O, little-O notation, asymptotic equivalence, Taylor’s Theorem and remainders, applications.
- Indefinite Integral: Integration of standard functions, techniques including integration by parts, substitution and partial fractions.
- Definite Integral: The limit of a Riemann sum, fundamental theorem of calculus, Area between two curves, Volumes of revolution, Improper integrals.
- Introduction to ordinary differential equations: Definition of an ODE, linearity, first order variables separable, solution technique by integration.
- Introduction to functions of two real variables: Continuity, partial derivatives and their geometrical interpretation, Leibniz’s rule, conditions (without proof) for maximum, minimum, saddle-point.

**Prerequisites:** MS4021

**MS4028 - STOCHASTIC DIFFERENTIAL EQUATIONS FOR FINANCE**
ECTS Credits: 6

**Mathematics & Statistics**

**Rationale and Purpose of the Module:** Methods of stochastic dynamics applied to finance, and with reference to problems involving stochastic differential equations from physics and engineering.

**Syllabus:**

**Prerequisites:** MS4213, MS4217

**MS4034 - APPLIED DATA ANALYSIS**
**Rationale and Purpose of the Module:**

**Mathematics & Statistics**

To answer a question, statistical methods are introduced, posed by the original researchers who collected the data. The module serves to integrate the practice and theory of statistics.

The instructor and students are expected to analyse the data provided with each lab in order to answer a scientific question posed by the original researchers who collected the data.

To answer a question, statistical methods are introduced, and the mathematical statistics underlying these methods are developed.

**Syllabus:**

- Descriptive statistics; quantile plots, normal approximation.
- Simple random sampling; confidence intervals.
- Stratified sampling; parametric bootstrap allocation.
- Estimation and testing; goodness-of-fit tests, information, asymptotic variance.
- Contingency tables; experimental design. Poisson counts and rates; Mantel-Haenszel test.
- Regression; prediction, replicate measurements, transformations, inverse regression, weighted regression.
- Multiple linear regression; model checking, projections.
- Analysis of variance; unbalanced designs, indicator variables, factorial designs.

**Prerequisites:** MS4131

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**MS4122 - FURTHER LINEAR ALGEBRA**

**ECTS Credits:** 6

**Mathematics & Statistics**

**Rationale and Purpose of the Module:** Course re-structuring in response to Project Maths.

The aim of this module is to build the student’s understanding of Linear Algebra to a more advanced level. The module includes a formal treatment of Vector Spaces and Inner Product Spaces followed by a careful treatment of the properties of vectors and matrices on $\mathbb{R}^n$ and $\mathbb{C}^n$.

**Syllabus:**

- Axiomatic treatment of Vector Spaces and Inner Product Spaces.
  - Linear Independence, spanning sets.
  - Bases & Dimension.
  - Inner products/norms.
  - Angles/orthogonality in Inner Product Spaces.
  - Orthonormal bases/Gram Schmidt Orthogonalisation.
  - Linear transformations/changes of basis.
- Properties of matrices.
  - Rank, row space, column space, null space.
  - Vector norms on $\mathbb{R}^n$ and $\mathbb{C}^n$.
  - Existence and uniqueness of matrix inverse/relation to matrix rank.
  - Fredholm Alternative.
  - Unitary and Hermitian properties of matrices.
  - Eigenvalue & Eigenvector Topics.
  - Eigenvalue decomposition for Hermitian matrices.
  - Algebraic & Geometric Multiplicity.
  - Defective Eigenvalues and Matrices.
  - Similarity Transformations.
  - Diagonalisation/Unitary Diagonalisation.
  - Induced matrix norms.
- Applications of the above topics.

**Prerequisites:** MS4131

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**MS4222 - INTRODUCTION TO PROBABILITY AND STATISTICS**

**ECTS Credits:** 6

**Mathematics & Statistics**

**Rationale and Purpose of the Module:** This module replaces existing module MS4212 Introduction to Data Analysis.

The focus of the previous module MS4212 was the analysis of data without a formal background in probability. The philosophy underpinning this approach was to introduce students to real data, which was entirely absent from Leaving Certificate mathematics in the 1990s, and begin to lay the foundations for the elements of data modelling necessary for the years three and four modules in the statistics options. Probability and Statistics account for 20% of the new Project Maths syllabus. Students now entering first year have had prior exposure to elementary data handling skills and experience applying the some basic ideas of probability. Consequently, it is not obvious that it is still necessary or desirable to adopt a teaching approach that separates the subject areas statistics and probability. As things stand, probability is totally absent from MS4212.

One consequence of this omission is that statistical tools are introduced without proper formal theoretical justification based on probability models. Likewise, students are not as well prepared as they could be for the (rather packed) follow-on module MS4213. The intention in the revised (and renamed) first year introductory module is to include some probability in the syllabus. The strategy is to give students time to explore some of the many classical/famous problems that often arise in introductory
The Normal Curve: the normal curve as an idealised law of total expectation (discrete form). Value, variance; Poisson approximation to the binomial; (Bernoulli, binomial, Poisson, geometric); expected Discrete Random Variables: probability mass functions hypothesis testing and confidence intervals. Control; precision of an estimate; the foundations of the mean through applications in statistical quality probability plot; illustrating the sampling distribution of histogram; areas under the normal curve; normal total probability; Bayes' rule. Probability; independent events; probability trees; law of total expectation (discrete form). The Normal Curve: the normal curve as an idealised histogram; areas under the normal curve; normal probability plot; illustrating the sampling distribution of the mean through applications in statistical quality control; precision of an estimate; the foundations of hypothesis testing and confidence intervals.

Gathering Data: sample surveys; designed experiments and observational studies; randomized control trials. Exploratory Data Analysis: frequencies; histogram; empirical density curve; percentiles; measures of centre; measures of spread; outliers; boxplots; scatterplots; correlation; contingency tables, Simpson's Paradox.

Regression Models: least squares line; transforming to linearity; out-of-sample prediction.

MS4303 - OPERATIONS RESEARCH 1
ECTS Credits: 6

Mathematics & Statistics

Rationale and Purpose of the Module: The module will introduce OR and various standard techniques for decision-making. Linear programming will be covered in some depth. The student will be able to apply these techniques to realistic problems.

Syllabus: Model building and the methods of operational research.

Linear programming - graphical interpretation, simplex method and sensitivity analysis, duality and the dual simplex method,

Applications of linear programming - Transportation and assignment algorithms, zero-sum games.

Critical path analysis - minimum completion time, resource constraints and resource levelling, probabilistic task durations.

Decision analysis - decision trees, expected value, utility, Bayesian approach.

Prerequisites: MS4213

MS4327 - OPTIMISATION
ECTS Credits: 6
Mathematics & Statistics

Rationale and Purpose of the Module: To give students a broad understanding of the theoretical and numerical aspects of non-linear optimisation


Constrained Optimisation. Penalty and Barrier Function Methods, Computational limitations of penalty function methods - ill-conditioning. Exact Penalty Function Methods.

The module will include at least one computer-based project requiring students to select and implement a suitable algorithm for the solution of a non-trivial optimisation problem using either Fortran or Matlab.

Prerequisites: MS4403

MS4408 - MATHEMATICAL MODELLING
ECTS Credits: 6
Mathematics & Statistics

Rationale and Purpose of the Module: To learn the techniques of advanced mathematical modelling or real phenomena with examples from the physical, biological, chemical and financial sciences.

Syllabus: Review of modelling skills, applications from: classical models (e.g. heat transfer), continuum models, financial models, statistical models, mathematical biology, advanced models.

Prerequisites: MS4404, MS4407, MS4403
**MS4414 - THEORETICAL MECHANICS**  
ECTS Credits: 6

**Mathematics & Statistics**

**Rationale and Purpose of the Module:** To introduce students to the fundamental concepts of theoretical mechanics.

To prepare students by developing the basic mathematical skills in theoretical mechanics.

To emphasise applications of vector calculus and ODEs.

**Syllabus:** Kinematics: reference frames, motion in one dimension, motion with constant acceleration, kinematics in three dimensions, uniform circular motion, centripetal acceleration

Dynamics: mass, force, Newton’s laws of motion, friction, Newton’s Law of Gravity, planetary motion

Conservation laws: momentum, angular momentum, energy (kinetic energy, potential energy as gradient of force)

Oscillatory motion: free and forced pendulum, resonance, parametric resonance

Introduction to the Hamiltonian and Lagrangian mechanics

Prerequisites: MS4403, MS4613

**Rationale and Purpose of the Module:** To introduce students to the fundamental concepts of theoretical mechanics.

To prepare students by developing the basic mathematical skills in theoretical mechanics.

To emphasise applications of vector calculus and ODEs.

**Syllabus:** Kinematics: reference frames, motion in one dimension, motion with constant acceleration, kinematics in three dimensions, uniform circular motion, centripetal acceleration

Dynamics: mass, force, Newton’s laws of motion, friction, Newton’s Law of Gravity, planetary motion

Conservation laws: momentum, angular momentum, energy (kinetic energy, potential energy as gradient of force)

Oscillatory motion: free and forced pendulum, resonance, parametric resonance

Introduction to the Hamiltonian and Lagrangian mechanics

Prerequisites: MS4403, MS4613

**MT4006 - TISSUE ENGINEERING**  
ECTS Credits: 6

**School of Engineering**

**Rationale and Purpose of the Module:** The rationale of this module is to augment the Biomedical Engineering undergraduate module portfolio with a module in Tissue Engineering and Regenerative Medicine.

The purpose of the module is to cover the physical principles and engineering science associated with Tissue Engineering, encompassing biomaterial selection, tissue scaffold design, bio printing, and cell-matrix interactions.

**Syllabus:** Fundamental Principles of Tissue Engineering and regenerative medicine; Biomaterials in tissue Engineering: hydrogels; growth factors; synthetic scaffolds; Stem Cells for Tissue Engineering; Tissue Scaffold design; Scaffolding Bioprinting; Electrospinning; freeze-drying; Cell Culture for Tissue Engineering; Cell Proliferation and Migration; Scaffolds for Tissue Based Repair; Bioprinting; Bioreactor Systems and Design; Diffusion & Nutrient Transport Limitations in Tissue Engineered Constructs; Skin Tissue Regeneration; Cartilage Tissue Engineering & Regeneration; Bone Tissue Engineering; Cardiovascular Tissue Engineering; Corneal Tissue Engineering and Replacement; Cell encapsulation; Immunomodulation and protection example Diabetes; Peripheral Nerve Repair; Cell Separation Technology; Gene Therapy; Regenerative Surgery in Orthopaedics & Sports Medicine; Ethical Issues and Considerations for Tissue Engineering

**MU4002 - CRITICAL ENCOUNTERS WITH POPULAR MUSIC AND DANCE**  
ECTS Credits: 6

**Irish World Academy of Music and Dance**

**Rationale and Purpose of the Module:** This module is an introduction to the growing field of popular music and dance studies and will give the student an overview of some of the important features of these contemporary practices as well as current areas and modes of research in this context. The investigations presented in these modules will be particularly informed by the international disciplines of Arts practice research. Students here will also be introduced to responsible and accountable academic and research practices

**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 contexts. Here students will seek to develop a vocabulary to think, talk, and write about the world of popular music/song/dance in order that we might better understand the purpose, meaning, and values associated with its forms. By examining case studies and key writings about popular music, song, and dance, students are introduced to the theoretical models developed within the field to account for the development of popular music and dance (and the very concept of 'popular' itself), the role of commodification in popular arts and how that shapes its aesthetics, and the meaning of popular forms in identity politics and in our everyday lives. Students will be develop writing and presentation skills associated with such academic engagement and be introduced to concepts of research as a creative, scholarly practice.

MU4012 - CRITICAL ENCOUNTERS WITH WESTERN ART MUSIC AND DANCE
ECTS Credits: 6

Irish World Academy of Music and Dance

Rationale and Purpose of the Module: This module is an introduction to the field of classical music dance studies, with a particular focus on contemporary practices. Students will be exposed to a selection of classical music and dance practices in an academic and performative context, providing them with an insight into some of the diversity of music and dance practices within these traditions. The investigations presented in this module will be particularly informed by the international disciplines of Arts practice research. Students here will also be introduced to responsible and accountable academic and research practices.

Syllabus: This module will act as an introduction to the historical development of Western Art Music from its roots in medieval church and secular music to its contemporary forms. Its historical relationship to traditional music in Europe and beyond will be discussed. Dance traditions will also be explored, referencing classical, neo-classical, contemporary and post-modern dance artists and practices. The course will include aspects of the history of dance performance in other locations and environments, for example site specific works, choreography for camera and the influence of new technologies on the development of choreography and performance. Students will be develop writing and presentation skills associated with such academic engagement and be introduced to concepts of research as a creative, scholarly practice.

MU4018 - SECOND INSTRUMENT STUDIES TWO
ECTS Credits: 6

Irish World Academy of Music and Dance

Rationale and Purpose of the Module: This module allows students on the BA Performing Arts to further develop performance skills in a second instrument. Students will have the opportunity to critically engage embodied expressions of performance practice on an instrument and or practice other than that in their core Practicum A module. Students will engage these studies in an environment informed by recent principles in arts practice research. This module will give students invaluable new perspectives on their creative and artistic potential. This is an elective module to be offered throughout the BA in Performing Arts programme and is subject to the Irish World Academy being able to source appropriate expertise and resources.

Syllabus: Students in this module will continue to develop a second instrumental performance area in small group and one-on-one contexts. Students will develop and document an appropriate practice regime as well as use reflective tools such as auto-ethnographic journals.

MU4022 - INTRODUCTION TO SONGWRITING 2
ECTS Credits: 6

Irish World Academy of Music and Dance

Rationale and Purpose of the Module: Students will build on skills and experiences, composing within a group as well as developing their individual practice as songwriters.

Syllabus: Through weekly workshops, students will experiment with different methods of developing original songs, considering simple elements of melody, lyrics and structure of song. Through weekly lectures and engagement with post-graduate students of MA Songwriting, students will be exposed to a range of different songwriters of varying genres and styles. They will be encouraged to locate their own creative practice within the wider experience of songwriting, engaging in reflective practice through group discussion, and individual journaling and self-evaluation. Moving on from Introduction to Songwriting 1, students will now be expected to produce individual as well as group compositions for performance.

MU4043 - VOCAL PEDAGOGY
ECTS Credits: 6

Irish World Academy of Music and Dance

Rationale and Purpose of the Module: This module is an introduction to the expanding, interdisciplinary field of vocal pedagogy and will provide the student with an overview of arts based and scientific approaches to vocal pedagogy. The student will critically engage with key pedagogical texts and discuss current research in the field.

Syllabus: This module will offer an introduction to contemporary, arts based and scientific perspectives on vocal pedagogy, surveying key Western pedagogical approaches and presenting recent research in the field. The module content will provide the student with an opportunity to critically engage with the interdisciplinary perspectives that enrich discourse in this area on an ongoing basis, offering an informed foundation in care of the professional voice.

MU4136 - IRISH TRADITIONAL MUSIC 2
ECTS Credits: 6

Irish World Academy of Music and Dance

Rationale and Purpose of the Module: To introduce the students to the history and structures (musical and in a wider cultural sense) of traditional Irish music and dance.

Syllabus: Issues addressed in this module will be instrumental and dance style, Irish language song tradition, nineteenth-century collections, contemporary issues, sean-nós and set dancing.
NM4086 - RESEARCH AND EVIDENCE IN HEALTHCARE
ECTS Credits: 6

Nursing & Midwifery

Rationale and Purpose of the Module: This module will develop students understanding of research and evidence informing healthcare practice.

Syllabus: Research skills development; cognitive and practical. Research terminology; processes and approaches; research methodology and methods. Systematic searching, hierarchy of evidence. Data extraction techniques; reviewing evidence; ethical principles and research integrity. Working with evidence and evidence based practice and translating evidence and research into practice.

NM4092 - INTRODUCTION TO HEALTH AND HEALTH PROMOTION
ECTS Credits: 6

Nursing & Midwifery

Rationale and Purpose of the Module: To introduce the concepts of health, health education and health promotion to nursing and midwifery students and provide the necessary foundations to develop competence in the promotion of health.

Syllabus: Concepts of health and wellbeing, illness, disease and disability. Determinants of and influences upon health. Health inequalities, protection and welfare of vulnerable groups. Measuring health and identifying health care needs. Health strategies and policies. Empowerment, advocacy, partnership working, health literacy, ethical issues. Health education, health promotion, public health, screening and preventative medicine. Health promotion models and approaches. Health needs of diverse groups and different cultures. The role of the nurse/midwife in promoting health and supporting healthier life choices across the health spectrum. Settings approach to health promotion e.g. communities, work place, schools, hospitals.

NM4122 - NURSING THE PERSON WITH COMORBID PHYSICAL AND MENTAL HEALTH DISORDERS
ECTS Credits: 6

Nursing & Midwifery

Rationale and Purpose of the Module: The purpose of this module is to develop mental health nursing students’ appreciation of the importance of a holistic approach to service user care and to develop their knowledge and understanding of physical illnesses common in mental health care.


Clinical Skills:
- Blood glucose monitoring
- Oxygen therapy, nebulizers, peak flow, inhalers, oxygen saturation
- Assessment and maintenance of skin integrity
- Neurological observations, CNS examination
- Catheter care
- Stoma Care

NM4152 - BIOLOGICAL SCIENCES APPLIED TO NURSING & MIDWIFERY 2
ECTS Credits: 6

Nursing & Midwifery

Rationale and Purpose of the Module: The aim of this module is to provide students with a foundation for understanding human systems and provide an introduction into pathology as applied to nursing and midwifery practice.

Syllabus: The structure, function and biochemistry of the endocrine system and the special senses. Structure and function of the central nervous system, pain pathways and the biochemical and signalling process regulating action potentials and nerve impulses: The peripheral nervous system. The autonomic nervous system. Introduction to pathology: Inflammation, granulomas, repair/regeneration of tissues, tumours, degenerative changes in cells/tissues, carcinogenesis, classification of tumours, tumour biology. Introduction to X-rays, radioactivity and diagnostic radiology.

NM4171 - PRACTICE PLACEMENT 1
ECTS Credits: 6

Nursing & Midwifery

Rationale and Purpose of the Module: This is the first of eight practice placement modules. This module is offered at learning level 1, towards development of competence recognising that the student is a novice to the world of nursing (NMBI 2016). The student will be expected to participate in care provision, requiring continuous prompting and direction in the provision of person centred nursing.

Syllabus: Six weeks of practice placement experience within the chosen discipline of Nursing (Mental Health, General and Intellectual Disability) will be provided. Students begin their journey supported through reflective practice.

NM4181 - PERSON CENTRED MEDICAL NURSING
ECTS Credits: 6

Nursing & Midwifery

Rationale and Purpose of the Module: This module builds on the philosophies and fundamentals of person centred nursing and introduces students to the principles of acute medical nursing.

Syllabus: Person centred medical nursing; assessment and monitoring techniques, planning interventions and interrelationships between activities of living utilising exemplars from conditions including assessment of breathlessness, asthma, pneumonia, hypertension, myocardial infarction, acute pain, altered consciousness. The impact of illness on the individual’s physical,
Rationale and Purpose of the Module: Nursing & Midwifery

NM4182 - PRACTICE PLACEMENT MIDWIFERY 1
ECTS Credits: 6

Nursing & Midwifery

Rationale and Purpose of the Module: This module is the first of eight modules exploring midwifery practice. The module will provide students with an orientation to the profession of midwifery and introduce the student to the skills necessary for providing holistic woman centred care for women and their families.

Syllabus: This module provides six weeks of practice placement experience within a midwifery setting. The student is a novice to the world of midwifery and will gain exposure to all aspects of practice under direct supervision of the midwife. Theory included in the programme to date will be applied within this setting while gaining experience of core midwifery skills. Students begin their journey supported through reflective practice.

NM4192 - MIDWIFERY CARE IN CHILDBIRTH
ECTS Credits: 6

Nursing & Midwifery

Rationale and Purpose of the Module: The aim of this module is to explore the provision of midwifery care within the parameters of normal childbirth.

Syllabus: Normal labour and birth and the role and responsibilities of the midwife in providing woman-centred care and promoting normal birth. Anatomy and physiology and how they inform care provision in the first, second, third stage of labour and in the early puerperium. Onset, process and progress of labour. Monitoring maternal and foetal wellbeing in labour supporting women and their partners in the birth of their babies. The physiology of pain; working with pain in labour. Immediate care of the new-born including skin to skin contact. Documentation specific to birth.

Clinical skills
Airway management
Nursing assessments and monitoring techniques
Oxygen therapy
Suctioning techniques
Devices: nebulisers and inhalers
Active and assisted limb exercises
Introduction to neurological assessment

NM4252 - INTRODUCTION TO SUPPORT STRATEGIES ACROSS THE LIFESPAN
ECTS Credits: 6

Nursing & Midwifery

Rationale and Purpose of the Module: The module explores the role of the nurse in supporting the person, transitioning through the lifespan. Person centred care provision utilising the nursing process as applicable across the lifespan. In meeting the needs of individuals in a safe, legal, and ethical manner using the nursing process. Students will be introduced to policies, practices and procedures that directly influence the lives of people with intellectual disabilities.

Syllabus: Definition and characteristics of a lifespan approach, theories of lifespan development e.g.; Bronfenbrenner's. Person centered and health focused approaches to care. Nursing models and theories. Application of the nursing process towards understanding the needs/outcomes of individual/families person centred plans, health action plans, communication passports etc. Nursing care skills - assessment, observation, decision making, risk management and interventions in supporting individuals. International, national and local strategies to support the rights of people with ID. Development of age appropriate interpersonal, cross cultural and communication techniques and skills essential for communicating with persons with an intellectual disability, families, and colleagues. Person centred nursing skills. Care planning underpinned by principles of person centred care.

NS4074 - SEXUAL AND REPRODUCTIVE HEALTH IN MIDWIFERY
ECTS Credits: 6

Nursing & Midwifery

Rationale and Purpose of the Module: This module will enable the student to promote gynaecological and reproductive health and well-being and provide care for women with related gynaecological and reproductive problems.

Syllabus: Gynaecological health and wellbeing and care for women with related problems, to include endometriosis, poly cystic ovarian syndrome, cervical cancer screening, breast awareness, gynaecological cancers. Topics addressed will include fertility/, infertility and its impact on women's well-being, pre-conception care, sexuality and childbearing, sexual and reproductive health needs of diverse groups eg teenagers, travellers, Cultural issues which impact impacting on sexuality, fertility and childbearing e.g. female genital mutilation. Health promotion strategies appropriate within maternal health, use of complementary therapies in childbirth, reproduction and childbearing. The role of the midwife in family planning and contraception,. Impact of substance abuse on childbearing, sexually transmitted infections, consequences of childbearing including morbidity and mortality, pregnancy and . Perinatal mental health, domestic violence/abuse. Applied pharmacology.

NS4084 - CARE OF THE AT RISK AND ILL NEONATE
ECTS Credits: 6

Nursing & Midwifery

Rationale and Purpose of the Module: This module will enhance the students role and responsibilities in relation to the care of the at risk and ill neonate.

Syllabus: Systematic care for the at risk and ill neonate e.g. management of cardiovascular and respiratory
disorders, neonatal jaundice, metabolic transient disorders, endocrine disorders and congenital anomalies, infections in the neonate, trauma in the neonate; complications arising with low birth weight, preterm and post term infant; breastfeeding management under difficult circumstances, midwives role within the multidisciplinary team; neonatal resuscitation and rapid midwifery intervention; perinatal and infant morbidity and mortality; adoption and fostering; child protection issues; support in the context of bereavement and loss

**CLINICAL SKILLS:**

Introduction to the Neonatal Resuscitation Programme Assessment and management of the at risk and ill neonate
Nutritional support for the at risk and ill neonate (feeding practices oral, nasogastric)
Care of baby in an incubator and under phototherapy
Administration of medication to the neonate

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**NS4204 - RESEARCH FOR NURSES AND MIDWIVES**

**ECTS Credits:** 3

**Nursing & Midwifery**

**Rationale and Purpose of the Module:** The module aims to develop knowledge, attitudes and skills to critically review research literature, and understand the contribution of research to nursing and midwifery practice is promoted

**Syllabus:** Ways of knowing in Nursing, Midwifery and health care practice. Accessing sources of knowledge: searching, reading, critiquing literature. Philosophical and theoretical underpinning of research: philosophy and research paradigms. Ethical issue. the research process: developing a research concept, statement, design. Introduction to methodologies: qualitative, quantitative, action research. Data collection and analysis, writing up research

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**NS4214 - ENDOCRINE AND REPRODUCTIVE NURSING**

**ECTS Credits:** 6

**Nursing & Midwifery**

**Rationale and Purpose of the Module:** This module will address the nursing care and management of individuals’ endocrine and reproductive disorders and the provision of appropriate nursing care for individuals with such condition(s) in the acute and community setting

**Syllabus:** Integrate professional values and nursing roles through nursing assessment and management of endocrine disorders: e.g. diabetes, thyrotoxicosis and hypothyroidia. Nursing assessment and management of reproductive disorders: e.g. benign/malignant breast disorders, dysfunctional uterine bleeding, cervical carcinoma; menopause, sexual health problems: e.g. infertility, endometriosis, and sexually transmitted infections within primary, secondary and tertiary healthcare settings. Nurse’s role and responsibilities in the investigative and diagnostic procedures within the healthcare team. Applied pharmacology. Clinical Skills

Clinical Skills
Insulin administration, techniques
Women’s health - breast awareness, cervical screening, Men’s health - testicular examination

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**NS4224 - NEUROLOGICAL, SENSORY AND MUSCULA-SKELETAL NURSING**

**ECTS Credits:** 6

**Nursing & Midwifery**

**Rationale and Purpose of the Module:** The purpose of this module is to facilitate students’ understanding of neurological, sensory and musculo-skeletal disorders and to provide appropriate nursing care to an individual with such condition(s) across all healthcare settings.

**Syllabus:** Neurological disorders: e.g. head injuries, increased intracranial pressure, cerebral vascular accident, epilepsy, meningitis, multiple sclerosis, Alzheimer’s and Parkinson’s disease; nursing care and management. Nursing care and management of individuals with auditory and visual disorders: e.g. Osteoporosis, fractures, amputation, spinal injuries; arthritis, nursing care and management. Nurses role and responsibilities in investigative and diagnostic procedures. Applied pharmacology.

Fracture management and care e.g. cast care, traction, external skeletal fixation, limb elevation
Positioning and mobilising after orthopaedic surgery
Eye care
Ear care
Stroke positioning
Glasgow coma scale and other neurological assessments
Assisting patients with mobility

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**NS4224 - NURSING THE INDIVIDUAL WITH MULTIPLE NEEDS**

**ECTS Credits:** 6

**Nursing & Midwifery**

**Rationale and Purpose of the Module:** The aim of this module is to introduce the student to the care and management of persons with an intellectual disability with associated physical and sensory impairment.

**Syllabus:** The nursing care and management of acute and chronic physical illness. Senses and their functions and sensory impairment: care and management. Physical disability, nursing care and management. Preparation and care of persons with an intellectual disability undergoing investigative and diagnostic procedures. Functions and promotion of sleep. Applied pharmacology

Clinical Skills Syllabus:
Breast awareness
Testicular examination
Cervical screening
Monitoring of blood glucose and administration of insulin
Wound management and associated dressing techniques

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**NS4424 - NURSING THE OLDER PERSON WITH INTELLECTUAL DISABIL**

**ECTS Credits:** 6

**Nursing & Midwifery**

**Rationale and Purpose of the Module:** To module aims to develop students’ knowledge regarding the ageing process and the specific needs of older persons with an intellectual disability.

**Syllabus:** Ageism, concepts and theories of ageing, physiological social and psychological changes associated with generic ageing and the older person with an intellectual disability. Nursing care and management of support for the older person with an intellectual disability. Person centred planning and the concept of
choice and quality of life in older adulthood. Nursing process applied to the older person with an intellectual disability associated with age related illness. Living arrangements and service provision for the older person with an intellectual disability. The following concepts related to the older person with an intellectual disability; retirement, recreational and leisure pursuits, spiritual care, pastoral care and palliative care. Applied pharmacology.

Clinical Skills Syllabus:
Central Nervous System (CNS) examination
Facilitative communication skills: reality orientation, reminiscence and art therapy
Assisting an older person with mobility and engagement in activities of living
Environmental comfort and last offices

NS4434 - PSYCHOTIC AND PERSONALITY DISORDERS AND MENTAL HLTH
ECTS Credits: 6

Nursing & Midwifery

Rationale and Purpose of the Module: The purpose of this module is to develop the students' knowledge and understanding of the role of the nurse in the care and management of an individual experiencing personality or psychotic disorders

Syllabus: Disorders of thought and perception; e.g. schizophrenia, presentation, aetiology, types, classifications, epidemiology, and socio-cultural aspects.
Personality disorders; theories, classifications, characteristics. Nursing assessment and management of persons with a schizophrenia and personality disorder. The role of the nurse in providing effective therapeutic interventions which facilitate recovery and well-being in persons with schizophrenia or personality disorders and their families/carers. Related pharmacology.
Contemporary research findings and relevant health policy.

Clinical Skills Syllabus:
Engagement and facilitation when communicating with persons with psychotic and personality disorders.
Observation, recording and eliciting information in the assessment of persons with psychotic disorders.
Introduction to cognitive behaviour therapy for schizophrenia and dialectic behaviour therapy for persons with personality disorders.

NS6038 - PROMOTING QUALITY AND SAFETY IN HEALTHCARE
ECTS Credits: 12

Nursing & Midwifery

Rationale and Purpose of the Module: Nurses are increasingly being recognised as key stakeholders within health service organisations. At specialist and advanced practice levels, nurses are expected to contribute to safe effective healthcare provision and promote quality care. This module explores the concept of quality and safety in healthcare in promoting quality patient outcomes.

Syllabus: Principles of promoting quality, safety and clinical governance in shaping global healthcare practice; safety culture; quality systems and regulations; patient focus within healthcare; sources and levels of evidence underpinning practice; current national and international projects in evidence based practice; critical thinking; factors influencing clinical decision-making; hierarchies of evidence; strategies to promote quality and safety in promoting quality patient outcomes.

NS6040 - INTERCULTURAL CARE
ECTS Credits: 9

Nursing & Midwifery

Rationale and Purpose of the Module: The purpose of this module is to examine the knowledge, skills and attitudes required by health care professionals to care for individuals from diverse cultural, ethnic and linguistic backgrounds.

Syllabus: Globalisation and the changing demographic profile within healthcare; opportunities and challenges of living and working in culturally diverse societies globally, concepts of culture, race and ethnicity; theories and Models promoting transcultural health and cultural competence; cultural identity and self-awareness, ethnocentrism and stereotyping, National and international legislation and influences related to immigration, human rights, discrimination and healthcare/service provision, policy developments that promote cultural sensitivity at an individual, organisational and society level, cultural generic and cultural specific knowledge, intercultural communication, challenging racism, discrimination and inequalities.

NS6042 - THERAPEUTIC ENGAGEMENT
ECTS Credits: 9

Nursing & Midwifery

Rationale and Purpose of the Module: This module will develop knowledge/skills to facilitate practitioners to use therapeutic engagement at specialist/ advanced levels in nursing/midwifery practice. Therapeutic engagement is an essential means through which healing and personal growth and development are achieved within nursing and midwifery and healthcare practice. Participants completing this module will improve the efficacy of their current practice through increased knowledge of CBT and its use in addressing maladaptive cognition and behaviour.

Syllabus: Theoretical foundations of therapeutic engagement and counselling. Person centred/humanistic; cognitive and behavioural; and psychodynamic approaches to the therapeutic process and counselling Therapist qualities and needs. Therapeutic use of self. Levels of Therapeutic Engagement. The Elements of Therapeutic Dialogue. Introduction to cognitive behavioural therapy and techniques used to facilitate adaptive coping responses; Cognitive behavioural assessment, functional analysis, use of outcome measures, developing a collaborative case formulation. Brief Interventions.

NS6122 - PERINATAL BEREAVEMENT AND LOSS
ECTS Credits: 9

Nursing & Midwifery

Rationale and Purpose of the Module: The aim of this module is to facilitate midwives and other health care professionals to work more effectively with bereaved parents and their families experiencing perinatal loss. The quality of perinatal bereavement care delivered during the parents grieving journey can have long-lasting consequences. It may have a significant impact in shaping their healing process and may directly influence how they cope following their baby’s death. The module is designed to facilitate all health care professionals to work more effectively with bereaved parents and their families (National Standards for Bereavement Care.
NS6302 - INFECTION PREVENTION AND CONTROL IN HEALTHCARE
ECTS Credits: 9

Nursing & Midwifery

Rationale and Purpose of the Module: Infection prevention and control is a critical concern for patients, clients, health care employees, health care administrators and government agencies. This module explores infection control measures necessary to prevent and manage the spread of illnesses and identify appropriate infection control measures. The clinical and financial consequences of healthcare associated infections are increasingly recognised. The Health Service Executive (HSE) is committed to a National Infection Control Action Plan which includes a 20% reduction in health care associated infections, a 30% reduction in MRSA infections and a 20% reduction in antibiotic consumption. In order to deliver on the vision of improved infection prevention and control outcomes the focus is on the development of a culture of quality of care, process and outcome measurement, education and high quality research. All healthcare employees are required to have an in-depth knowledge of the infection prevention and control processes involved in caring for patients. There is evidence that there is a significant shift in health care workers compliance with infection prevention and control practices and guidelines, following educational programmes. An education module for healthcare professionals on infection prevention and control will contribute to the achievement of identified targets in the reduction of healthcare associated infections and excellence in patient care in Primary, Acute, Community and Continuing Care settings.

Syllabus: Microbiology: Chain of infection, infection control standards and guidelines, modes and mechanisms of transmission of pathogenic organisms in the health care setting. Communicable diseases and multi resistant organisms. Antibiotic use and resistance. Strategies for prevention and control of infection. Invasive medical devices and care bundles. Creation and maintenance of a safe environment for patient care in all health care settings through application of infection control principles and practices for cleaning, disinfection and sterilisation. Audit, surveillance and research. Includes sourcing up to date information, surveillance of health care associated infection and how surveillance is used to improve patient care.

PA4018 - THE PUBLIC POLICY PROCESS
ECTS Credits: 6

Politics and Public Admin

Rationale and Purpose of the Module: Aims: This course aims to provide students with an overview of the theory and practice of policy analysis. The process of public policy making in the modern democratic state will be explored with particular reference to the socio-political environment of policy making and organisationally based decision processes within public administration.

Objectives:
- To build an understanding of what policy is, nature of policy problems and the role of problem definition in structuring policy
- To focus on theories of the public policy process and explore the variety and complexity of decision making processes
- To identify a classification of approaches to the analysis of public policy
- To investigate and understand how information about public policies is made available and is accountability for outcomes clear
- To evaluate the policy process in government and public bureaucracies through the analysis of case study material
- To promote career development skills

Syllabus: What is public policy?; stages approach to the policy process; power approaches - elitism, pluralism, corporatism; agenda setting; models of decision making; Simon, Lindblom, Allison, Etzioni, Dror; institutional approaches; rational choice theory; policy networks; policy transfer; policy implementation; evaluation, accountability; Europeanisation

Prerequisites: PA4021

PA4022 - INTRODUCTION TO PUBLIC ADMINISTRATION II
ECTS Credits: 6

Politics and Public Admin

Rationale and Purpose of the Module: Awareness of different systems is essential for explanation, theory and practice in Public Administration. This module explores how new national and international realities shape administrative practices and systems and draws on examples from throughout the world. It examines public service systems in different contexts, the roles and functions they fulfill and the administrative traditions that shaped them. It explores how common administrative problems are dealt with and the processes used to deal with contemporary challenges. It also identifies trends in public sector reform and the role of international institutions, such as the OECD, in promoting public sector modernization.

This module will be offered on the new BA Arts programme.

Pre-requisite module for this modules is Module ID 1548 Introduction to Public Administration I.

Syllabus: Major functions of the modern democratic state Postmodern public management; Organizing the civil and public service - different approaches, different roles; Structures, processes and institutions in different contexts; Coordination of public policy and administration - towards joined-up government; Links between administrative and political systems; Decentralization, devolution and the hollowing out of the State; Reform trends; The influence of supranational organisations; Contemporary Issues in public administration e.g., the challenges and potential of technology for public service systems; accountability; gender; ethics
**PD4004 - DESIGN VISUALISATION**

**ECTS Credits:** 6

**School of Design**

**Rationale and Purpose of the Module:**
The aim of this module is to build upon the learning outcomes from ID4811/2 in first year where students learn to represent their design ideas graphically through the traditional media of pens, pencils markers etc. This module will develop skills of product representation using design CAD software (Adobe Creative Suite). The students will be able to:

- Understand the needs and practices of presentation in design
- Project the meanings behind the concepts through visual methods
- Graphically represent concepts using the Adobe Illustrator as a drafting tool
- Undertake visualisations of products that are photo-realistic representations in 2D using Adobe Photoshop graphic software tool
- Undertake Product/systems presentations using Adobe InDesign graphic design tool
- Photography and digital editing
- Contextualisation of products (graphically place in-situ).

**Syllabus:**
- **Interpretation of 3D forms and detail design in 2D rendering.**
- Develop a visualisation skill-set in computer-based visualisation.
- CAD used as a tool in the processes of design visualisation (product renderings) and representation to convey product form, finish, texture and meaning.
- Contextualisation of products in environments of use.
- Communication of design concepts.
- CAD used as a design tool in graphic design and presentation.
- Project-based-learning in Design visualisation underpins the Studio learning method.

**Prerequisites:** ID4811, ID4812

**PD4124 - CONTEMPORARY DESIGN CULTURE**

**ECTS Credits:** 6

**School of Design**

**Rationale and Purpose of the Module:**
- To effectively experiment, analyse, innovate and plan a design project from inception to completion.
- Understand and develop design ideation.
- Implement a variety of design tools and methodologies.
- Engage in multidisciplinary teams.
- Collaborate with industry partners.
- Improve teamwork skills.
- Improve primary design research skills.
- Collate, analyse and synthesise research findings for design ideation.
- In-depth user testing and analysis.
- Improve concept development skills through exploration of idea generation techniques.
- Develop an ability to effectively progress concepts through iteration.
- Critique and evaluate concepts.
- Develop an appreciation for design detailing.
- Develop knowledge of design manufacturing processes and materials.
- Advance design communication skills.
- Utilise leading edge technologies in communication of designs.
- Develop an ability to reflect on personal design work.
- Application of this theory to their own work through project based studio classes.

**Syllabus:**
The following is an outline of topics covered in project based studio classes:
- Evaluation and filtering methods for concept selection.
- Idea generation techniques.
- Implementation of entire design process from research to design detailing.
- Design ideation.
- Engagement with industry partners through sponsored design projects.
- Visual communication tools.
- Advanced design skills development.
- Usability principles - testing and analysis.
- Graphical user interface interaction.
- Product design focused manufacturing techniques and communication. Forecasting & Trends. Field trips.

**PD4104 - DESIGN STUDIO 4**

**ECTS Credits:** 6

**School of Design**

**Rationale and Purpose of the Module:**
- To introduce the fundamental skills and cognitive processes of product design and to lay the foundations for subsequent Design Studio modules. These will be taught under the following headings: design skills, design methods, and design history.

**Syllabus:**
- Design skills include; an introduction to design skills, an introduction to sketching and rendering skills, principles of orthogonal technical drawing and perspective line-work, 3D spatial awareness, an introduction to low fidelity prototyping model making skills, communication (verbal and visual), fundamentals of presentation techniques and graphic layout.

Design methods include; an introduction to design processes, design brief analysis, creative thinking techniques, ideation methods, basic user research, concept development, design representation (2D & 3D), understanding and construction product form.

Design history includes; an overview of industrial design in the context of social and economic conditions (from ancient civilisations to the contemporary practice). Discussion and debate on contemporary and historical design trends.

**Prerequisites:** PA4001
School of Engineering
ACADEMIC CONTENT IS NOT CURRENTLY AVAILABLE FOR THIS MODULE – UPDATES ARE IN PROGRESS

PH4012 - PHYSICS FOR ENGINEERS 2
ECTS Credits: 6

Physics

Rationale and Purpose of the Module: Continuation of an introductory course in physics (PH4011) for engineering students.


Prerequisites: PH4011

PH4018 - MEDICAL INSTRUMENTATION
ECTS Credits: 6

Physics

Rationale and Purpose of the Module: * To introduce the special considerations for electric/electronic instruments attached to patients for the purposes of diagnosis or therapy. * To introduce the medical device directive and the regulatory environment. * To give the student a working knowledge of the operation of some medical equipment * To introduce the student to the scientific basis of the well-known radiological equipment commonly in use in our hospitals and medical research institutes.

* To provide a working knowledge of the operation of this equipment.


PH4022 - Physics for Environmental and Biosciences
ECTS Credits: 6

Physics

Rationale and Purpose of the Module: To provide an understanding of the basic principles of mechanics, heat, fluids, waves, optics, sound, the atom and nucleus, and how these are relevant to our daily life.


PH4032 - PHYSICS FOR GENERAL SCIENCE 2
ECTS Credits: 6

Physics

Rationale and Purpose of the Module: To introduce the student to general wave motion, optics and acoustics. To introduce the student to the mechanical and thermal properties of matter.


PH4038 - ENERGY STORAGE
ECTS Credits: 6

Physics
Fundamentals of advanced energy conversion and storage.


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**PH4042 - THERMAL PHYSICS**

**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 thermal physics. The objectives are to first present a general thermodynamics framework, then to introduce statistical concepts followed by analysis of specific physical models.

**Syllabus:** Temperature: thermal equilibrium; the zeroth law; equations of state; temperature scales. [First law of thermodynamics]: internal energy; heat and heat capacity; reversible processes and work; free expansion and Joules law. [Second law of thermodynamics]: Carnot cycles, efficiency; thermodynamic temperature scale. [Entropy]: Clausius inequality and entropy; principle of increasing entropy; central equation of thermodynamics; entropy of an ideal gas. [Thermodynamic potentials and Maxwell relations]: internal energy U; enthalpy H; Helmholtz free energy F; Gibbs free energy G; energy equations; availability A and useful work; mechanical, magnetic, and electrochemical systems. [Change of phase]: chemical potential; Clausius-Clapeyron equation; nucleation; Gibbs phase rule. [Microstates and macrostates]: statistical weight of a macrostate; Boltzmann definition of entropy; entropy and disorder. [Equilibrium of an isolated system]: magnetic dipole lattice; Schottky defects. [Equilibrium of a system in a heat bath]: the partition function and the Boltzmann distribution; equivalence of thermodynamic and statistical quantities; the classical gas; heat capacities of solids; perfect quantum gas; Planck’s law; thermodynamics of black body radiation. [Equilibrium of a system with variable particle number]: Gibbs distribution; Fermi-Dirac and Bose-Einstein distributions; Bose-Einstein condensation; Fermi energy; density of states; electrons in metals.

**Prerequisites:** PH4131

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**PH4058 - TRANSPORT**

**ECTS Credits: 6**

**Physics**

The history of transportation, transportation modes, the need for transport in Ireland. Strategies to avoid transport (broadband, video conferencing). The use of Ireland’s large wind power capacity to innovate and develop new type of electric based vehicles (hybrid, hydrogen, Ultra Battery, Super Capacitor...). Storage technology for vehicles (NiMH, Li-ion, Sodium-Sulfur...), application of second generation biofuel to long haul flights and aviation in general, possible development of Ocean Thermal Energy Conversion to power ferries and ships, sustainable transportation networks, system optimisation versus user optimisation, the classic urban transportation problem, congestion, infrastructure demand, modelling and use of data to predict transportation problems, engine technology (diesel, common rail, petrol, electric, hybrid...), green house effect, carbon emission, trend of buying oversized vehical, American versus European trend.

**Prerequisites:** PH4131

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**PH4062 - NANOTECHNOLOGY 2**

**ECTS Credits: 6**

**Physics**

Rationale and Purpose of the Module: The purpose of this module is to enhance the students’ understanding of key concepts of mechanics, optical and electronic transport properties of nanostructured materials and to develop an understanding of the importance of mechanical and electro-optical properties in applications of nanostructured materials.


**Prerequisites:** PH4081

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**PH4072 - ELECTROMAGNETISM**

**ECTS Credits: 6**

**Physics**

Rationale and Purpose of the Module: The purpose of this module is to enhance students understanding of key concepts associated with electromagnetism. The objectives are to first present a general vector analysis, then to introduce electric and magnetic field concepts...
followed by analysis of specific physical problems using vector calculus. Secondly, the students will be introduced to the fundamental properties of electric and magnetic materials. The final objective is to introduce the students to the unified theory of electromagnetic waves and its application in matters and simple physical systems.

**Syllabus:** Vector methods: div, grad, curl; line, surface and volume integrals; Electric field E: electric charge, Coulomb's law, electric field E, Gauss law, divergence of electric field, the Dirac delta function; Magnetic field: magnetic field B, Biot-Savart law, Ampere's law, Lorentz force; Electromagnetic induction: emf, Faraday's law, generators and motors; Maxwell's equations in vacuum: integral and differential form, monopoles; Energy and potential: energy density in E and B fields, scalar potential V and vector potential A; Dipoles and multipoles: electric dipole p, magnetic dipole m, electric multipoles; Conductors: conductivity, Ohm's law, Hall effect; Dielectrics: polarisation P, displacement D, permittivity, electric susceptibility, dielectric constant; Magnetic materials: diamagnets, paramagnets, ferromagnets; magnetic intensity H, magnetisation M, magnetic susceptibility, inductance, transformers; Maxwell's equations in matter: Maxwell's equations in terms of H and D; Boundary value problems: Poisson's equation, Laplace's equation, uniqueness theorem, images; Circuits: transients, reactance, power, and impedance.

**Prerequisites:** PH4131

**PH4102 - WAVES/LIGHT/MODERN PHYSICS**

**ECTS Credits:** 6

**Physics**

**Rationale and Purpose of the Module:** To introduce the student to general wave motion, optics and acoustics and to provide the student with a general introduction to special relativity and to atomic and nuclear physics.

**Syllabus:** Oscillations and simple harmonic motion: transverse and longitudinal waves, superposition, speed, reflection, harmonic waves. Sound: sound waves, sound intensity, Doppler effect. Light: EM Spectrum, Sources of light, Geometrical optics; reflection, refraction, dispersion, achromatic optics; Physical optics; interference, diffraction, diffraction gratings, polarisation; Optical systems; the microscope, the telescope, the eye. Special Relativity: Einstein's Postulates, time dilation, length contraction, the Lorentz Transformation, relativistic momentum and energy conservation. Atom: Classical models, Planck's quantum hypothesis, the Bohr atom, The photoelectric effect; quantized energy; the de Broglie wavelength. The nucleus: nucleons; isotopes; nuclear structure; binding energy. Radiation: X rays, alpha, beta and gamma radiation, the law of radioactive decay. Fission and fusion; nuclear reactors. Detection, dosage.

**Prerequisites:** PH4131

**PH4132 - MODERN PHYSICS**

**ECTS Credits:** 6

**Physics**

**Rationale and Purpose of the Module:** This module will develop the student's understanding of fundamental
concepts and ideas in modern physics, specifically the use and application of the Schroedinger equation, and the principles of special relativity.

**Syllabus:** Wave mechanics: De Broglie's hypothesis, wave functions and probability amplitudes, the Heisenberg Uncertainty principle. The Schroedinger wave equation: simple solutions in one dimension, transmission, reflection and penetration at a barrier, tunnelling, potential wells, the harmonic oscillator. The Schroedinger equation in three dimensions: the hydrogen atom, quantisation of angular momentum, spatial quantisation, the Zeeman effect. Spin: the fourth quantum number, the Pauli exclusion principle. Special Relativity: Relativistic dynamics, relativistic mass and momentum, total energy, mass/energy equivalence. Spacetime: spacetime diagrams, introduction to four-vectors. Application of relativistic dynamics to particle beam devices and collision experiments.

Nuclear Physics: Nucleons and nuclear models, nuclear spin, nuclear reactions and cross-sections. Introduction to elementary particles and the Standard Model.

**Prerequisites:** PH4102

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**PH4142 - INTRODUCTION TO PHYSICS**

**ECTS Credits:** 6

**Physics**

**Rationale and Purpose of the Module:** Physics is a fundamental discipline for all Science & Engineering students. Studying physics helps teach students how to think rationally and logically, how to interpret the physical world around them, and how to quantitatively assess and predict what happens in the world using the tools of mathematics to do so.

The specific purpose of Introduction to Physics is to introduce students to the basic principles of measurement, mechanics, heat, fluids, waves and optics. The aim is to teach students how to understand the relationship of these principles to the real world and through rational thought use this understanding to interpret, solve physical problems and question the meaning of their solutions.


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**PH4608 - SOLID STATE PHYSICS 2**

**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, magnetism, superconductivity and low dimensional systems.

**Syllabus:** Magnetism: paramagnetism, diamagnetism, exchange interaction and ferromagnetism, Weiss model of ferromagnetism, Neel model of antiferromagnetism, domains and Bloch walls, giant magnetoresistance. Insulators: dielectrics and susceptibility, pyroelectrics, ferroelectrics and piezoelectrics. Quantum transport: ballistic transport, tunnelling and Coulomb blockade. Low dimensional systems: two dimensional electron/phonon gas, density of states, quantum Hall effect. Superconductivity: Type-1 and Type-2 superconductors, magnetic properties, thermodynamics of superconducting transition, London equations, energy gap and Cooper pairs, tunnel junctions and Josephson effect.

**Prerequisites:** PH4607

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**PH5095 - NANOSCIENCE AND TECHNOLOGY 2**

**ECTS Credits:** 6

**Physics**

**Rationale and Purpose of the Module:** The purpose of this module is to enhance the students' understanding of key concepts of mechanics, optical and electronic transport properties of nanostructured materials and to develop an understanding of the importance of mechanical and electro-optical properties in applications of nanostructured materials.

**Syllabus:** Nanotribology and Materials Characterization Studies Using Scanning Probe Microscopy: Description of AFM/FFM, Friction and Adhesion, Scratching, Indentation and wear, Phase, electrostatic and related scanning fabrication as the technology moves towards 30 nm features and below.

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**PH6031 - PHYSICS OF MEDICAL INSTRUMENTATION**

**ECTS Credits: 6**

**Physics**

**Rationale and Purpose of the Module:** * To introduce the special considerations for electric/electronic instruments attached to patients for the purposes of diagnosis or therapy. * To introduce the medical device directive and the regulatory environment. * To give the student a working knowledge of the operation of some medical equipment * To introduce the student to the scientific basis of the well-known radiological equipment commonly in use in our hospitals and medical research institutes. * To provide a working knowledge of the operation of this equipment.

**Syllabus:** Introduction to regulatory bodies in the EU and US: CE, FDA etc.; 21 CFR, 510k, Medical Device Directive, Investigational Device Exemptions; Electrical isolation standards, implementation options; Laser Safety - EN 60825. Measurements in biological systems: obtaining a reference, ratiometric analysis, clinical requirements. Physiological monitoring; Invasive/non-invasive, Probes - Electrical, fibre optic, non-contact. Vital signs monitoring: ECG- Electro cardio gram, electrical function of the heart; EEG- Electro encephalo gram, electrical function of the brain; EMG- Electro myelo gram, electrical function of the muscle; Pulse Oximetry, optical measurement of arterial blood oxygen saturation; MAP- mean arterial pressure. Introduction to radiation transport in tissue: absorption/scattering theory (Mie, Rayleigh Gans), bulk scattering and bulk absorption, anisotropy, typical values for radiation transport properties, Monte Carlo modelling.X-RAY/CT: X-RAY generation and propagation, Introduction to tomography, Computed Tomography - Slicing the living human body. Ultrasound: Doppler effect, high frequency ultrasound, limitations. MRI/MRS: Magnetic Resonance basics, the hydrogen nucleus, proton spin and quantum mechanics; 3D map of hydrogen atoms and hence content of the sample volume, Properties and amount of water in tissue, distinction between contrast and content imaging.

**PI4024 - PHILOSOPHY AND ETHICS IN HEALTH STUDIES**

**ECTS Credits: 3**

**Nursing & Midwifery**

**Rationale and Purpose of the Module:** The module does to introduce students to standard philosophical and ethical approaches that guide nursing and midwifery practice.

**Syllabus:** Contemporary philosophical theories enlightening underpinning nursing and midwifery practice with particular reference to developments in such schools as existentialism; phenomenology; philosophy of therapy; understanding the body, the person (holism vs. dualism), relationships and desire; critical thinking and ethical decision-making. Theoretical approaches to ethics: deontological, utilitarian, and rights-based views. The role of oaths, declarations and codes in medical ethics,. Key principles: patient of Nursing and Midwifery ethics including, autonomy, advocacy, beneficence and primum non nocere, truth-telling, confidentiality and justice; traditional distinctions!for example, between acts and omissions and ordinary and extraordinary means; the double-effect criterion; selected issues etc. Ethical conflicts in specific case studies, and the process of ethical decision making involved in their resolution. Issues relating to life and death arising from nursing and midwifery practice for example, i.e. the definition and medical management of death;, abortion;, assisted human reproduction, challenging care:, physical and intellectual disabilities, those in need of intensive care; the elderly. health, the goal of therapy older person. Main traditional ethical theories (utilitarianism, deontology, virtue ethics) and contemporary advancements upon them (principlism, narrative ethics, ethic of care, feminist ethics) and their relevance for practical decision making in nursing and midwifery practice

**PM4008 - EMPLOYMENT RELATIONS PRACTICE**

**ECTS Credits: 6**

**Personnel & Employment Relations**

**Rationale and Purpose of the Module:** Explore the key operational practices in the conduct of employee relations. Examine the issue of conflict in the context of the employment relationship. Expose students to theory and practice of negotiation and conflict handling. Appreciate the role of negotiation in the conflict resolution process. Allow for a knowledge of the key 3rd party institutions in the context of workplace conflict resolution.

**Syllabus:** Understanding of sources of conflict in the workplace and possibilities for resolution; managing collective and individual issues; applying the regulatory framework to conflict issues; the nature of negotiation; integrative and distributive bargaining; strategy and tactics of distributive bargaining; negotiation planning and strategy; negotiation breakdown; communication and persuasion processes in negotiation; power in negotiation; third party intervention; analysing a moot labour court hearing; negotiation exercise and case study.

**PM4014 - HUMAN RESOURCE DEVELOPMENT**

**ECTS Credits: 6**

**Personnel & Employment Relations**

**Rationale and Purpose of the Module:** This module is designed to provide students with a conceptual appreciation and practical understanding of Human Resource Development in organisations. There is a focus on integrating HRD activities with the range of HR policies and systems enacted by organisations and on perceiving HRD as a strategic organisational activity.
PM4045 - APPLIED ORGANISATIONAL BEHAVIOUR
ECTS Credits: 6

Personnel & Employment Relations

Rationale and Purpose of the Module: The purpose of this module is to enhance students understanding of key concepts and issues associated with behaviour in organisations. The specific objectives are to focus on the role of individual behaviour, specifically on personality, perception and motivation, and to increase students understanding of group dynamics in the international workplace, paying particular attention to the dynamics of communication, groups, conflict, and leadership. Participants will become acquainted with theories, concepts and methods through both didactic and experiential learning techniques.

Syllabus: The syllabus allows for the treatment of a small number of critical dimensions of organisational behaviour. Building on material covered in an earlier organisational behaviour module, the module explores a number of processes and issues associated with individual and group behaviour in organisations. It explores the following areas: the development of the individual: personality and individual difference, perception, attitudes, the psychological contract and individual motivation. Group development: structures and roles, the dynamics of groups and teams, communication processes particularly in an intercultural context. organisational leadership and organisational citizenship behaviour are also examined.

PM4064 - EMPLOYMENT RELATIONS
ECTS Credits: 6

Personnel & Employment Relations

Rationale and Purpose of the Module: To outline the role of the State, Trade Unions and Employers in industrial relations. To enable students to understand the various theoretical perspectives on employee relations and develop the ability to think critically about the subject. This module will demonstrate to students that conceptual analysis has practical outcomes and consequences. It will also show the historical and economic context in which these perspectives arise and how they are made operational. Students will be able to evaluate the practical consequences of such approaches and the demands they may place on management.

PM4022 - PRINCIPLES OF ORGANISATIONAL BEHAVIOUR
ECTS Credits: 6

Personnel & Employment Relations

Rationale and Purpose of the Module: This module is designed to give students an understanding of key concepts in Organisational Behaviour. It seeks to describe the complex work organisation from a behavioural perspective and it evaluates the methodologies available for analysing organisational behaviour. In an attempt to provide some answers to the why of human behaviour in the workplace, selected individual, group and organisational processes are introduced and explored

Syllabus: Organisational Behaviour in perspective: Introduction to the field and paradigms of study; Defining the concept; disciplinarily and interdisciplinary nature of the field; dominant methodologies for understanding the social world. Personality: Defining personality; sources of personality difference; the nature/nurture debate. Perception and Cognition: The nature of perception; perception and perceptual influences; the process of perception. Motivation; theories of motivation; Learning & the Individual: Defining learning and theories of learning. Stress & Psychological Wellbeing: stress at work; stress and performances; psychological well-being and self-esteem. Groups & Team Roles: What is a group in psychological terms; function of groups; Hawthorne studies; the group formation process. Power, Politics and ethics: Interrelated concepts; sources of power; the use of power; political tactics and their use and legitimacy in organisational life. Leadership: theories of leadership; Organisational culture; diagnosing organisational culture; Schein's typology; formation and maintenance

PM4098 - CONTEMPORARY HUMAN RESOURCE MANAGEMENT: CONTEXT AND STRATEGY
ECTS Credits: 6

Personnel & Employment Relations

Rationale and Purpose of the Module: This module seeks to develop analytical and conceptual capabilities in the domain of human resource management (HRM). The purpose of the module is to integrate knowledge and competence from previous modules (both within and beyond HR, e.g. strategic management, financial planning, etc.) and from work experience and to integrate them in a way that enhances students' capacity to analyse key HR issues in a wider national and international context. Students are required to critically evaluate key contemporary issues in HRM literature and to examine recent research on trends and developments in HRM/employment relations within both an Irish and international context. The module is strongly focused on strategic aspects of HRM, its application in practice and critical evaluation thereof, using an evidence-based perspective.

Syllabus: Introduction & course overview; Introduction to key concepts of HRM The changing context of work and HRM; Contemporary influences on HRM; Strategy and strategic HRM; Models of strategic HRM; HRM and industry dynamics; Changing labour markets; International HRM; Annual Lovett lecture; diversity; strategic HR planning; rewards; performance management; talent management; guest lectures addressing recent research findings and evidence-based HRM.
PM4108 - THE PSYCHOLOGY OF CAREER SUCCESS
ECTS Credits: 6

Personnel & Employment Relations

Rationale and Purpose of the Module: The purpose of this module is to introduce students to a range of theoretical concepts within the field of career theory. It is also intended to give students an understanding of the tension between active career self-management and contextual constraints and opportunities within the world of work. Students will use the theoretical concepts and explanations to evaluate factors influencing subjective and objective career success at various life stages, in various local and international contexts, and within and outside of organisations. They will consider careers from their own perspective as well as from the perspective of an external career coach and an internal HR manager.

Syllabus: Career concepts and definitions; changing landscape of careers including traditional versus protean/boundaryless perspectives; careers from individual and organisational perspectives; entrepreneurial careers, fast-track careers and expatriate careers across international borders; different meanings of career success; occupational and organisational choice including psychometric assessment; stage based theories of career development; career development model; individual and organisation-sponsored approaches to career exploration; career goals, career indecision and career competence, career strategies and their implications for individuals and organisations; career appraisal; career and life stage challenges and concerns; contemporary issues in career management including stress, work-family interaction and diversity; role of strategic human resource management systems in career management; role of career coaches and consultants.

PN4038 - DESIGN AND COMMUNICATION GRAPHICS 6
ECTS Credits: 6

School of Education

Rationale and Purpose of the Module: The importance of graphicacy in developing well-balanced citizens stimulates significant debate and discussion within education. Exploring and learning through the medium of graphics begins in early childhood and continues throughout adult life. The role of the education system in developing and nurturing graphical skills is sometimes understated. This module will broaden and develop students' capacity to critically think about their discipline while bringing their knowledge and understanding of graphics to bear on real world problems and challenges. Invited speakers from a range of disciplines (including medicine, humanities, sciences, engineering, etc.) will present their real world graphical experiences and observations through a series of short presentations. In addressing the issues raised in these presentations, students will be expected to be proactive and creative in identifying and driving improvement and positive change to enhance the competencies of these professions through graphicacy. Through a needs analysis, students will autonomously develop, create and innovate towards realising new possibilities and opportunities that enhance graphical capability and professional performance. On completion of this module, students will be expected to professionally and effectively convey ideas relating to the development of graphical capability. As future educators and agents for change, students will also be expected to debate and support the role of graphical education in making substantial and positive contributions to society and active citizenship.

Syllabus: Design and Communication Graphics: Graphicacy, creative problem solving, spatial abilities/visualization, design capabilities, decision-making capabilities, graphical encoding and decoding, cognitive modelling skills, Research methods in Technology Education: classroom case studies, repertory grid technique, expertise development, observational techniques, visual and verbal protocol analysis, capturing knowledge and heuristics, examining graphical thinking possibilities and opportunities that enhance graphical development, create and innovate towards realising new graphical possibilities and opportunities that enhance graphical capability and professional performance. On completion of this module, students will be expected to professionally and effectively convey ideas relating to the development of graphical possibility. As future educators and agents for change, students will also be expected to debate and support the role of graphical education in making substantial and positive contributions to society and active citizenship.

PO4008 - AFRICAN POLITICS: DEVELOPMENT AND DEMOCRACY
ECTS Credits: 6

Politics and Public Admin

Rationale and Purpose of the Module: This module will supply an introduction to major political trends in contemporary Africa. Against a brief historical review of African state institutions since the advent of colonialism the course will explore successive efforts to modernise predominantly peasant economies, using Tanzanian experience as a case study. The factors that many critics believe have contributed to the persistence and accentuation of African poverty will be assessed: these include poor macroeconomic management, weak institutions, and disadvantageous patterns of historically entrenched primary commodity production.

Syllabus: Modern African State Formation: regional contrasts. ‘Development’ from the 1930s (with a Tanzanian case study) African poverty: ‘the bottom billion’ Urbanisation and urban politics: Lagos Structural adjustment and market reform (Zambian case study)0 Democratisation in the 1990s (Ghanaian case study0 Democratisation in the 1990s (South Africa) The developmental consequences of democratisation War and peace in Africa: Sierra Leone ‘The politics of the belly’: the patrimonial politics in Central Africa New social movements

PO4004 - GLOBAL POLITICAL ECONOMY
ECTS Credits: 6

Politics and Public Admin

Rationale and Purpose of the Module: This module aims to familiarise the student with the basic principles and issues in Global Political Economy (GPE). These include the theories associated with GPE and the institutions that manage it. The module, through the assignments and the tutorials, will also develop writing and oral presentation skills.

Syllabus: This module is divided into two sections. The first will deal with the theories used to explain the GPE (mercantilism, liberalism and critical theory) and how they interact and contribute towards the changing nature of global politics. The second will look at the institutional and governmental workings of the global economic, and discuss the context and impacts such governance has had. By the end of the course students should be able to grasp the linkages between politics and economics at the global level and be able to critically evaluate key concepts such as globalisation, the relationship between states and markets, the emergence of multinational economic actors and the role and purpose of institutions such as the World Bank, International Monetary Fund and World Trade Organisation.

PO4015 - GOVERNMENT AND POLITICS OF THE EU
ECTS Credits: 6
**Rationale and Purpose of the Module:** The module aims to develop students' understanding of the way the European Union works and how its policy output and powers affect their lives as citizens. As a result, the module has two objectives. First, to give students a solid understanding of the history, institutions, decision-making processes and major policies of the European Union. Second, to equip students with an appreciation of the principal issues and controversies which currently face the European Union.

**Syllabus:** The course is divided into two main parts: The first part looks at the EU Institutions and introduces the basic theories of European integration. The second part concentrates on policies and current EU issues.

**Prerequisites:** PO4011

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**PO4048 - ISSUES IN WORLD POLITICS**

**ECTS Credits:** 6

**Politics and Public Admin**

**Rationale and Purpose of the Module:** This main focus of this module is to study current themes in contemporary global politics and to understand their historical development. Students will be able to locate current global issues and place them in a wider theoretical context.

**Syllabus:** The module is divided into a number of subsections that engage with an area of study in World Politics and more prominently upon an issue of structural and functional importance in International Relations. The first part of the course looks at the historical development of the International system and introduces questions such as sovereignty and the concept of globalisation, whilst the second part will be made up of a collection of developments and issues that have arisen out of the current structures within world politics.

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**PO4052 - INTRODUCTION TO POLITICS AND INTERNATIONAL RELATIONS II**

**ECTS Credits:** 6

**Politics and Public Admin**

**Rationale and Purpose of the Module:** This module will further introduce students to the study of Politics and International Relations. It will do so by comparing different regime types; by exploring the concepts of democracy, freedom and justice; and by exploring issues in international politics, such as war, terrorism, inequality and development. This module will be offered on the evening degree.

**Syllabus:**

- Democracy and Democratization
- Authoritarianism and Totalitarianism
- Arguments for and against Democracy
- Freedom and Rights
- Theories of Justice
- War and Terrorism
- Inequality and Development

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**PO4072 - CITIZENS AND DEMOCRACY**

**ECTS Credits:** 6

**Politics and Public Admin**

**Rationale and Purpose of the Module:** This module will be offered to students on the new BA Arts programme, and requires no prior knowledge of politics. It will provide an introduction to political science, focusing on citizens' participation and political behaviour. The module takes a comparative approach and focuses primarily on European countries.

**Syllabus:** The module examines the various ways in which citizens engage in democratic politics, and introduces theories and evidence regarding citizens' political behaviour. Topics include political participation, political identities, party attachment, public opinion, voting, protest politics, online political engagement, and deliberative democracy. Contemporary examples and evidence are employed throughout.

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**PO4108 - MULTICULTURALISM AND POLITICAL THEORY**

**ECTS Credits:** 6

**Politics and Public Admin**

**Rationale and Purpose of the Module:** This module takes up some contemporary themes in political theory, examining the concepts of justice, freedom, equality, democracy, pluralism and respect in light of the demands for greater recognition and accommodation that have been put forward by ethnic, racial, religious, and linguistic minorities. The aim of this module is to explore the formidable problems raised by the challenge of cultural diversity from the perspective of normative political theory, and in particular to evaluate the range of alternative justifications for multicultural political policies.

By the end of the module, students should be aware of the various rights claims, policy proposals and political alternatives that have been suggested by and on behalf of minority cultural communities; have a sense of the challenges these pose to established liberal theories and to liberal-democratic practices; be able to critically evaluate the various justifications offered; understand a range of arguments for and against.

**Syllabus:** Multiculturalism and Political Theory; Pluralism; Citizenship; Toleration; The Politics of Recognition; Liberal Culturalism; Cosmopolitan Criticisms; Feminist Objections; Democracy and Minority Representation; Education and Cultural Diversity; Headscarves; Universalism, Ethnocentrism and Relativism

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**PO4107 - METHODS AND RESEARCH IN POLITICAL SCIENCE**

**ECTS Credits:** 6

**Politics and Public Admin**

**Rationale and Purpose of the Module:** This module will develop students' knowledge of research and methods by introducing them to theory building, research design, and methods of data collection and analysis.

**Syllabus:**

1. The Scientific Study of Politics
2. Theory Building
3. Evaluating Causal Relationships
4. Research Design
5. Measurement
6. Descriptive Statistics and Graphs
7. Statistical Inference
8. Bivariate Analysis
9. Bivariate Regression Analysis
10. Multiple Regression Analysis
Rationale and Purpose of the Module: This module aims
To examine the nature and impact of Ireland's membership of the EU
To explore the theoretical interpretations of Europeanisation
To systematically investigate the impact of Europeanisation on specific policy domains in Ireland
To identify the domestic and global factors which mediated the Europeanisation process and to assess the learning and adaptation which led to changes in Ireland's political and policy processes.

Syllabus: Conceptualising and theorising Europeanisation.
Historical and contemporary interpretations of the relationship between Ireland and Europe.
The Irish public and Europe: attitudes and discourse. The institutional and administrative impact of EU membership.
Domestic and global factors which mediate the impact of Europeanisation.
The effects of Europeanisation on specific policy domains namely, the economy, fiscal policy, regional development, agricultural and rural policy, environmental policy, foreign policy, language policy and equality issues.
Europeanisation as a broker of change between Northern and Southern Ireland.
Assessing the impact of Europeanisation and the influence of the mediating factors.
Reflecting on new patterns of governance.
Looking to the future.
Module review.

Syllabus: The module introduces students to:
- The main theories of international conflict
- Criteria for judging the validity of theoretical arguments and the quality of empirical work
- Formal tools for theory building and data analysis commonly used in International Relations research
- The functions and decision-making structures of major international governmental organizations
- Empirical research on current topics in international cooperation and conflict.

PO5010 - GRADUATE SEMINAR IN INTERNATIONAL COOPERATION AND CONFLICT
ECTS Credits: 9

Politics and Public Admin

Rationale and Purpose of the Module: The module develops students' understanding of the theories and methods used in the empirical study of International Relations. Substantively, the module focuses largely on questions of international cooperation and conflict. The module presents the main theoretical approaches to the study of interstate conflict, describes the role, functions, and decision-making structures of international organizations (with a particular focus on the EU and UN), and discusses a range of related topical issues, such as the role of trust for establishing cooperation, the democratic peace thesis, military interventions, and international terrorism.

Rationale and Purpose of the Module: This module will examine contemporary and classic problems in global politics, from the perspective of political theory, focussing in particular on theories of global justice. It will explore the moral status of individuals, states and peoples; global inequality, poverty and distributive justice; theories of human rights; and the ethics of war and humanitarian intervention. Although drawing primarily on arguments in contemporary political philosophy, the module will also incorporate material from the history of political thought.

Syllabus: This module applies the methods of analytic political theory to both contemporary and classic problems of global politics. Topics covered fall under three broad headings. First, some of the central concepts of international political theory are analysed, including sovereignty, nationhood, territorial rights, secession and human rights. Second, rival theories of global justice are compared, including Rawlsian contractualism, cosmopolitanism, nationalism, and theories of human rights. Third, some issues in contemporary political ethics will be explored, including the prospects for global democracy, borders and migration, just war theory and humanitarian intervention.

PS4012 - HUMAN DEVELOPMENT AND THE LIFE SPAN 1
ECTS Credits: 6

Psychology

Rationale and Purpose of the Module: For students to extend and deepen their knowledge of human development through the lifespan within the field of psychology. To develop skills in identifying and critically examining major tenets of psychological theory in relation to development through childhood, adolescence and adulthood.

Syllabus: This module provides students with foundation information about how psychologists have studied human development from prenatal life through childhood, adolescence and the stages of adult life including older adulthood. The course will require students to reflect critically on recent empirical studies examining human development through these life stages. The course will focus on the topics of cognitive, biological, social and moral development, from the field of psychology. These topics are studied from a lifespan perspective.

Prerequisites: PS4032, PS4031

PS4032 - PSYCHOLOGY AND SOCIAL ISSUES
ECTS Credits: 6

Psychology

Rationale and Purpose of the Module: This module will explore a range of contemporary social issues bringing to bear upon them the methods and theoretical perspectives of psychology in an attempt to better understand their causes and consequences. Using the social issue as a focus, students will gain insight into the discipline of psychology and engage in debating and evaluating the theory and method of psychology. Through a psychological analysis of the causes and consequences of social issues students will gain insight into how these issues might be resolved.

Syllabus: Issues covered will include: the media and human behaviour; social conflict; the use and abuse of power; sex and sexuality; society and mental health; social inclusion and exclusion; bullying at work; equality and advocacy; parenting and childcare; the environment

Prerequisites: PS4042, PS4021
PS4034 - EMPIRICAL PSYCHOLOGY 2  
ECTS Credits: 6

Psychology

Rationale and Purpose of the Module: To develop students' ability to design, collect, code and analyse empirical data using non-experimental approaches in psychology.

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 shortcomings associated with the traditional experimental approach and familiarises them with alternative correlation and observational paradigms via a series of practicals. Students learn to design, conduct, code and analyse quantitative psychometric data whilst paying due consideration to the welfare of participants and attending to the appropriate ethical guidelines.

Prerequisites: PS4042, PS4041

PS4037 - COGNITION 1  
ECTS Credits: 6

Psychology

Rationale and Purpose of the Module: To provide core area coverage of the field of cognitive psychology – a sub-discipline of psychology concerned with the study of the mental processes that underlie human behaviour.

Syllabus: Cognitive processes cover a broad range of research domains including: memory, attention, perception, knowledge representation, reasoning and problem solving. In this module, through an empirical (including practical demonstrations) and theoretical examination of cognitive processes, students will develop their knowledge of central aspects of cognition including perception, memory and attention.

Prerequisites: PS4042, PS4021

PS4047 - SOCIAL PSYCHOLOGY 2  
ECTS Credits: 6

Psychology

Rationale and Purpose of the Module: To build upon previous introductory modules in social psychology by providing comprehensive in-depth coverage of the core areas of the subdiscipline as well as alternative critical perspectives.

To introduce students to more advanced epistemological and methodological debates in the subdiscipline as well as to historical and cultural variations in social psychological research.

Syllabus: Social psychology is a 'broad church' in terms of the values, theories and methods applied across the subdiscipline. More than other areas of psychology it also reflects the contemporary concerns and values of the societies in which it occurs. The purpose of this module is to provide students with a more in-depth knowledge of the core topics of social psychology, but also to put these topics in their socio-political and historical context and to critically evaluate psychological research from different epistemological and methodological grounds. Topics will include: advanced group processes; intergroup conflict; discursive social psychology; measurement in social psychology; critical perspectives in social psychology.

Prerequisites: PS4011

PS4052 - PRACTICAL PSYCHOLOGY 2  
ECTS Credits: 6

Psychology

Rationale and Purpose of the Module: To develop students' research and data analysis skills, specifically through the use of experimental methods and inferential statistics.

Prerequisites: PS4011

PS4062 - INTRODUCTION TO PSYCHOLOGY APPLIED TO NURSING AND MIDWIFERY  
ECTS Credits: 6

Psychology

Rationale and Purpose of the Module: The aim of this module is to provide students with an understanding of psychological concepts and explore how these concepts relate to health within nursing and midwifery practice.

Syllabus: An introduction to psychological theory, which includes developmental psychology throughout the lifespan, behavioural psychology, principles of sensation, perception, cognition, consciousness, emotion, motivation and personality, health psychology, stress...
Psychology, coping and foundations of biological psychology, psychological impact of illness and hospitalisation and an introduction to the main categories of abnormal behaviour.

**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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**PS4097 - DEVELOPMENTAL PSYCHOPATHOLOGY**
ECTS Credits: 6

**Psychology**

**Rationale and Purpose of the Module:** To introduce students to the rapidly developing field of developmental psychopathology to improve students understanding of the role that social, psychological and biological factors play in determining mental health and to highlight the importance of the developmental approach to understanding adjustment and maladjustment.

**Syllabus:** The specific focus of this module is developmental psychopathology. Developmental psychopathology is a domain of psychology which concentrates on how psychosocial and biological factors contribute to psychological adjustment and maladjustment. The module will introduce students evidence relating both environmental and genetic determinants of mental health and consider the role that developmental factors may have in the expression of mental health problems.

Prerequisites: PS4012

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**PS4108 - APPROACHES TO SOCIAL IDENTITY**
ECTS Credits: 6

**Psychology**

**Rationale and Purpose of the Module:** For students to develop an understanding of the different theoretical approaches to the study of social identities in psychology as compared to those in other disciplines. To introduce students to the range of epistemologies and methodologies employed in social psychological research and to outline the implications of these for the discipline of psychology more generally.

**Syllabus:** The Social Identity approach in social psychology originated in an interdisciplinary effort to explain large-scale intergroup conflict. Drawing upon sociology, social anthropology and social cognition it aimed to provide a comprehensive account of intergroup relations from the individual perspective to the group level. However, in the four decades since its inception the Social Identity approach has become overwhelmingly cognitive and experimental in focus and lost links with other disciplines and methodologies. This module places the Social Identity perspective in its historical context and introduces students to cognate theories and methods elsewhere in social psychology and in other disciplines with a view to enriching their understanding of social psychology. Topics include: evolution of the Social Identity approach; advances in Self Categorisation Theory; discursive approaches to social identities; ethnography and displays of identity; approaches to national identity.

Prerequisites: PS4011

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**PS6062 - ADVANCED PERSPECTIVES IN SOCIAL IDENTITY RESEARCH**

ECTS Credits: 6

**Psychology**

**Rationale and Purpose of the Module:** The aim of this module is develop students understanding group levels of analysis in social psychology and how this has been informed by social identity and self-categorisation theories. This module will make particular attempts to apply these theoretical approaches to contemporary social issues.

**Syllabus:** The module will give an overview to traditional social identity theory and later developments in the self-categorisation approach. Particular emphasis will be placed on theoretical advances in the field over the last two decades emphasising the emotional components of identity, the strategic use of identity and the multidimensionality and multiplicity of identities. We will cover applications in the areas of health psychology, organisational psychology, and clinical psychology. The overall emphasis in discussing these topics will be on social change and improving personal well-being.

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**PT4008 - DELIVER AND RETURN WITHIN SUPPLY CHAINS**
ECTS Credits: 6

**School of Engineering**

**Rationale and Purpose of the Module:** This module is the third in a stream.

There is a need to appreciate the external operational landscape and the complexities that arise in the multiplicity of processes encountered in international logistics operations. This takes in the processes of getting materials between suppliers facilities, intermediate production facilities and onwards to customers. These processes are subject to incessant disturbances, and also demands from myriad bodies governmental and commercial, with considerable uncertainty and risk components, yet customers expect a smooth supply of their regular products on time, to agreed high quality and sustainability standards, and economically, as if nothing else matters. Framing these activities and applying them to configure and operate supply networks and to optimise their contribution to performance trade-offs is the subject of this module. In the context of the Supply-Chain Operations Reference (SCOR) model these concepts lie in the domain of Deliver and Return activities.

Rationale and Purpose of the Module: To introduce the student to a further range of manufacturing and fabrication processes and the relationship between materials and processes. To emphasise the importance of accuracy and precision.

Syllabus: Engineering measurement.
Length standards.
Standard measuring temperature.
Process Capability.
Quality and Accuracy.
Joint design.
Introduction to engineering materials and their properties.

Prerequisites: PT4111

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

Physical Education & Sport Sciences

Rationale and Purpose of the Module: This module introduces 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, social class, 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.
1. To allow pre-service teachers to become familiar with various ways of looking at curricula which encourage lifetime physical activities as part of the (Irish) post-primary physical education curriculum.

2. To acquaint pre-service teachers with how learning by individual pupils can be facilitated through lifetime physical activities. 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 conduct and apply relevant research as appropriate to pre-service teachers’ teaching context, identifying, critically analysing and integrating new knowledge regarding curriculum, pedagogy and assessment into his or her practice.

**Syllabus:** This module provides an opportunity to understand instructional, curricular, and assessment concepts related to lifetime physical activities (LPAs) as they relate to physical education. It has been designed to further develop the knowledge, content and applications in conjunction with other applied/practical modules. Particular emphasis will be placed on exploring the role that health-related activity (HRA) and regular exercise plays in the maintenance of health and wellness over the lifespan. It is intended for pre-service teachers to understand the need, and assume the responsibility for, maintaining a healthy lifestyle. Through both on and off campus laboratory learning experiences, students explore and participate in lifestyle physical activities. Additionally, using this content, pre-service teachers will continue to use the concepts of appropriate and effective pedagogy as it applies to LPAs in the physical education setting. The preparation of schemes of work and lesson plans for year 2 school placement will be a consistent focus of the module.

**PY4096 - PEDAGOGY OF STRIKING, FIELDING, NET GAMES**
ECTS Credits: 6

**Physical Education & Sport Sciences**

**Rationale and Purpose of the Module:** The aim of this course is to help students develop a practical knowledge, inclusive of theoretical aspects of striking, fielding and net games through a pedagogical context. It will introduce the students to the basics of each strand through participation in and later on through the application of pedagogical principles. The will identify and discuss cultural the cultural diversity of each A variety of teaching methods and equipment will be used. Students will learn how to plan lessons in order for them to be safe, challenging and appropriate for all abilities.

**Syllabus:** Theory:
Overview of striking, fielding and net games from a variety of perspectives (bio-mechanical, physiological, educational, pedagogical)
Striking, Fielding and Net Games in schools - limitations and possibilities
Striking, Fielding and Net Games lessons - planning for mixed ability
Cultural aspects of Striking, Fielding and Net Games

Applying Striking, Fielding and Net Games to Junior and Senior Cycle Syllabus

Practical:
Fundamentals skills of Striking, Fielding and Net Games
Involvement in and creation of ‘Striking, Fielding and Net Games related activities’ (indoors & out)

Teaching second level students the fundamentals of Striking, Fielding and Net Games

**PY4102 - INTRODUCTION TO FUNDAMENTAL MOTOR SKILLS**
ECTS Credits: 3

**Physical Education & Sport Sciences**

**Rationale and Purpose of the Module:** Fundamental motors skills are generic motor activities with specific observable patterns. They encompass one stage in motor skills development, occupying a place between rudimentary movement and complex sport forms. The purpose of this module is to equip students with the skills, knowledge, and attitude regarding fundamental motor skills to enhance their participation and that of others.

**Syllabus:** Fundamental motor skills are generic motor activities with specific observable patterns. They encompass one stage in motor skills development, occupying a place between rudimentary movement and complex sport forms. The purpose of this module is to equip students with the skills, knowledge, and attitude regarding fundamental motor skills to enhance their participation and that of others.

**PY4108 - YOUTH SPORT AND ADVOCACY**
ECTS Credits: 6

**Physical Education & Sport Sciences**

**Rationale and Purpose of the Module:** This module is designed to help pre service teachers understand different forms and meanings, characteristics and trends associated with the development of sport, physical activity and physical education provision predominantly for young people. The core concerns of the module will focus on how sport, physical activity and physical education in schools and communities might be transformed in ways that enhance (young) people’s engagement. The module content will encourage pre service teachers to critically reflect upon the ways in which particular forces shape sport, physical activity and physical education provision for young people in Ireland.
through key philosophical and sociological frameworks and from the perspective of policy development. The module will provide opportunities for pre service teachers to examine the ways in which their commitment to, and informed engagement with, local sports and physical activity providers might have the potential to bring about ‘positive’ change for all stakeholders, while interrogating the extension of what it may mean to be a ‘physical educator’. Through (i) assisting pre service teachers in developing their philosophical and sociological skills, (ii) facilitating them in answering key questions related to sport, physical activity and physical education and, (iii) encouraging them to articulate and defend a personal philosophy of physical education, the module aims to prepare pre-service physical education teachers to become physical education and physical activity advocates and change agents within and beyond traditional perspectives of physical activity and physical education programmes for young people.

Syllabus: The module content will be delivered in the lectures. Topics will include:

- The existing pillars of youth sport (physical education, extra-curricular sport and sport outside school), the relationship between them and implications for physical education teachers;
- Key philosophical and sociological perspectives, for example: the nature and value of physical education and physical activity; ethics, physical education and sport; movement, meaning and subcultures; philosophy and the body;
- Effective teaching, coaching and facilitation strategies (and the relationships between them) that accommodate diverse populations across sport, physical activity and physical education;
- Characteristics and trends in the development of (youth) sport policy.

Pre service teachers will participate in service learning partnerships that provide opportunities for action research. These partnerships will be facilitated by the Local Sport Partnerships and require pre service teachers to engage in reviewing, evaluating and modifying aspects of their service activity based on reflection and feedback from key stakeholders. Pre service teachers will be asked to consider how physical activity providers, coaches and/or physical education teachers can impact and be impacted by these (youth) sport contexts.

PEDAGOOGY OF HRA

ECTS Credits: 6

Physical Education & Sport Sciences

Rationale and Purpose of the Module: This course is a unique opportunity to become familiar with key concepts in kinesiology, the study of human movement, and physiology, the study of how the body functions. It will also examine the role of physical activity (PA) and related themes (link with sport, health, etc.), while particular emphasis will be placed on the role of Health-Related and Skill-Related Fitness (HRF / SRF) in Physical Education (PE). To enable students to understand the basic anatomy of the musculo-skeletal system and how the system functions in normal motion such as walking gait. To enable students to understand the basic physiology of the systems which support movement in the body. Apply the concepts to a physical education/ activity environment.

Syllabus: Anatomical terms and definitions. Identification and functions of the musculo-skeletal system. Structure and type of bones and muscles. Kinesiological analysis of simple joint movements and analysis of posture. Forms of motion. The nervous system and the brain; nerve structure and function, nerve transmission; the action potential, the neuromuscular junction, neurotransmitters; The central nervous system, the peripheral nervous system, autonomic and somatic nervous systems. Structure and function of muscle fibres; organisation into motor units; Motor unit recruitment in muscle contraction. Functional properties of muscle. The circulatory system; structure and function of the heart; blood vessel structure and function; blood pressure and its measurement. The respiratory system; structure and function of the upper respiratory tract, the lungs, pulmonary ventilation, and pulmonary gas exchange. Practical application will include an introduction to the concept and application of fundamental movement skills, in addition to the various components of HRF & SRF; an introduction to, and personal experience of, field tests for both; warm up and cool down procedures; health appraisals and screening; components of physical fitness (PF); principles of training specific to HRF and PF; and field tests for physical fitness. Principles of effective measurement (validity, reliability, safety, objectivity, etc.) will play a key role throughout this course and this will become particularly evident during physical assessments and testing. Students will also be introduced to the concept of a personal profile and all related issues that combine to create such a synopsis of an individual’s physical status (assessment results, change over time, training log, etc.).

PY4118 - PHYSICAL ACTIVITY BEHAVIOUR, PROMOTION AND HEALTH
ECTS Credits: 3

Physical Education & Sport Sciences

Rationale and Purpose of the Module: To create awareness and to motivate individuals to become involved in physical activity is a complex process and is interdisciplinary in nature. Students will have the opportunity to critically examine current concepts, issues and outcomes related to participation in physical activity. The physical education profession plays a key role in the promotion of physical activity within schools and society. A key focus of the module is that students will be able to evaluate and incorporate into their professional practice the relationship between physical activity participation and promotion, physical education provision and individual and national health status.


PY4122 - GAELIC GAMES
ECTS Credits: 6

Physical Education & Sport Sciences

Rationale and Purpose of the Module: This module is designed to give an introduction to Gaelic games from a practical and cultural perspective. It will offer an introduction to the history of the Gaelic Athletic
Association (GAA) and the development of the association from its foundations in 1884 through to the present day. The module will also introduce students to Hurling, Camogie and Gaelic Football specifically through participation in 'Gaelic Games related' learning activities as well as practical labs. Emphasis will be placed on developing knowledge and basic competency with respect to the core skills of these games and principles of play (e.g. defending and attacking). Students will become aware of how to provide a safe environment and ensure personal safety as well as that of others in Gaelic Games activities. Understanding the rules and regulations of each game will also be developed through the practical labs. Basic coaching skills will also be introduced.

**Syllabus:** Foundations of the GAA; Development of the GAA (1884-2016); Key strategies, programmes, policies and initiatives (1894-2016) (e.g. Go-games Initiative, Grassroots to National Programme); Gaelic Games Associations (e.g. Gaelic Players Association, Ladies Gaelic Football Association); Gaelic Games Worldwide. Introduction to the core skills of Hurling, Camogie and Gaelic Football; Common principles of play; Structures, rules and regulations; Skill development, including fundamental movement and basic motor skills; Warm-up and cool-down; Games vs drills; Basic tactics; Introducing activities and progressions including modified and full-sized games; Safety aspects (environmental, personal and player safety); Coaching styles and methods; Planning practical sessions for different ability groups; Developing communication and organisations skills in practical environments; Player and self-evaluation in a practical context.

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**PY5021 - EVIDENCE BASED PRACTICE**  
**ECTS Credits:** 12  
**School of Allied Health**

**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.

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**RE4006 - SPATIAL ROBOTICS**  
**ECTS Credits:** 6  
**Electronic & Computer Engineering**

**Rationale and Purpose of the Module:** This module covers a broad range of the necessary enabling and advanced technologies required for the design, integration and operation of Modern Robots including industrial robotic arms and mobile robots.


Advanced topics: Robot arms: Payload analysis, Jacobians, Quaternions, Dynamics. Robot navigation: Explicit incorporation of uncertainty in Robotic Systems design, parametric approaches stochastic models of uncertainty, Kalman Filter design, specification and implementation.

**Prerequisites:** ET4224

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**RM4002 - RESEARCH METHODS IN LANGUAGES, LITERATURE AND CULTURAL STUDIES 2**  
**ECTS Credits:** 6  
**School of Modern Languages and Applied Linguistics**

**Rationale and Purpose of the Module:** This module introduces students to the academic study of languages, literature and cultural studies, with a specific focus on the theoretical approaches used in languages, literature and cultural studies. The module provides training in essential research skills, equipping participants to pursue self-directed study, to individually research a topic, to apply the appropriate tools and methods of research, to source and use primary archival materials, and to present findings appropriately. The aims of the module are:

- To introduce students to the theoretical approaches used in languages, literature and cultural studies;
- To equip students with the necessary skills to carry out a research project and to present findings appropriately;
- To equip students with the research skills for sourcing, storing and presenting research data;
- To enhance students awareness of the information technology skills necessary to develop the above research skills.

**Syllabus:** Students undertaking research in languages, literature and cultural studies will be introduced to the theoretical approaches used by researchers in each of these disciplines and will engage in the evaluation of the critical readings of scholars in their discipline in light of such theoretical frameworks. Incorporating a practice-based element, students will be equipped with the necessary skills to design and carry out a research project in their selected discipline. Through small group discussion- and writing-focused workshops, students will be engaged in activities to develop the appropriate skills to collect, interpret and present research data appropriately, and to share their research findings with peers in verbal, visual and written forms.

**Prerequisites:** RM4001

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**SE4016 - ADVANCED SCIENCE PEDAGOGY**  
**ECTS Credits:** 6  
**School of Education**

**Rationale and Purpose of the Module:** To make the students proficient in planning, teaching post-primary
Senior Cycle Science syllabi (Biology, Agricultural Science, Chemistry, Physics), with an emphasis on learning sciences-informed approaches to effective pedagogy in various classroom, field and laboratory settings, attentive to safe working practices and risk assessment in the science classroom. New developments in the senior cycle curriculum will be incorporated and emphasis will be placed on emerging trends in pedagogy.

**Syllabus:** Nature of Science (NOS); Review of the post-primary syllabi with a focus on Senior Cycle Science (Biology, Agricultural Science, Chemistry, Physics, as appropriate); structure and rationale for the syllabus; Structures of subject knowledge; investigative and inquiry-based approaches in the classroom/laboratory and workshop; Theory and practice of curriculum and syllabus design and development including 'teachers as designers'; Rationale for inclusion of science subjects on the curriculum; Mixed ability teaching; varied approaches to assessment to include formative, summative and diagnostic strategies; fostering a community of learning (FCL) and self-directed learning in science programmes; classroom/workshop/laboratory organisation; international achievement testing and scientific literacy (i.e. TIMMS-R and PISA); Literacy and numeracy in science teaching; Cross-curricular integration.

**Prerequisites:** EN4015, EN4025

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**SO4002 - GENDER: SOCIOLOGICAL PERSPECTIVES**

**ECTS Credits:** 6

**Sociology**

**Rationale and Purpose of the Module:** The aim of this module is to introduce the students to sociological approaches to gender including the main theoretical frameworks in the study of gender and society.

**Syllabus:** This module equips students with a critical understanding of key concepts in gender studies and feminist thought and how these are informed by, and inform, sociological enquiry. It offers in introduction to the main sociological perspectives on gender; key debates in feminist theory; debates in the study of masculinity; and perspectives on substantive topics such as work and care in the context of these frameworks. The module also examines the operation of gender divisions across national and transnational social contexts and their articulation with other major social divisions such as class, sexuality, ethnicity and race.

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**SO4006 - THE SOCIOLOGY OF CRIME DEVIANCE AND SOCIAL CONTROL**

**ECTS Credits:** 6

**Sociology**

**Rationale and Purpose of the Module:** The purpose of this module is to explore the manner in which society seeks to control particular ways of behaving, being and thinking. The broad framework of both informal and formal sanctions will be adopted, but the module will focus in particular on the latter. A critical approach to the ideas which underpin the criminal justice system, its remit and functioning, will be encouraged. Questioning will be facilitated through introducing students to sociological theories of crime and deviance, through their application to contemporary case studies and through comparison to other cultural and historical contexts. Particular attention will be given to inequitable experiences of criminal justice including on the basis of social class, gender, ethnicity and racialized identities, sexuality and legal status.

**Syllabus:** The social construction of deviance and crime; Theories of deviance; Informal social control; Formal social control; The law and social change; Social hierarchies of victims and offenders; Hate crime; Social stratification and the Criminal Justice System - Policing, Sentencing, Incarceration, White collar crime; Sociological perspectives on restorative justice; Victimisation as social control.

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**SO4008 - SOCIOLOGY OF MEDIA AUDIENCES**

**ECTS Credits:** 6

**Sociology**

**Rationale and Purpose of the Module:** The purpose of this module is to introduce students to the emerging area of media audiences. It is built around a number of key issues and concerns that exist around studying media audiences and will address the significant theories and debates on media audiences. Emphasis will also be placed on the development of practical audience research skills which students will be asked to demonstrate and apply to the tasks outlined in their course assignments.

**Syllabus:** Working from a sociological perspective, this module will document the changing theoretical and methodological paradigms that the study of media audiences has gone through and the impact that these frameworks have had on the nature of research produced and knowledge acquired about the composition and abilities of media audiences in an increasingly media saturated society. The impact of such processes as globalisation, politics and the public sphere, the rise of popular entertainment, the internet and the recent explosion of new media products (e.g. online/offline gaming, Facebook, Myspace, Twitter, and YouTube), and the study of media fans will be discussed. Overall it is hoped that students will become more reflexive about their media usage and develop a new level of understanding about the role that media consumption has on their daily lives.

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**SO4032 - INTRODUCTION TO SOCIOLOGY 2**

**ECTS Credits:** 6

**Sociology**

**Rationale and Purpose of the Module:** This module aims to better acquaint students with the discipline and field of sociology, including the work of contemporary sociologists, and to provide them with strong foundation of knowledge in preparation for further sociology modules.

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. Finally, this module also seeks to promote valuable skills in critical thinking, writing, referencing, and research.

**Syllabus:** An introduction to deviance, crime and control; Crime Statistics; Sociological approaches to explaining crime; Sanctions; Prison; Concepts of race and ethnicity; Manifestations of diversity; Representations of race and ethnicity in the media; Racism and public attitudes towards cultural diversity, minorities and immigrants; An introduction to the sociology of religion; Secularisation; Civil Religion and Invisible religion; Social class; The continuing relevance of class; Class, consumption and identity; Class, cultural capital and consumption.
Syllabus: This module aims to broaden and deepen students engagement with and understanding of the development of sociology as a discipline following on from their introduction to the sociological classics. It introduces students to a selection of modern and contemporary theories as a way of understanding how sociological theory has developed to reflect changing social and intellectual contexts. The course will identify the extent to which the selected theories build on key classical presuppositions or offer more radical departures in terms of the key analytical debates within sociology. As a way of elucidating these issues, substantive topics will be discussed in relation to the different theoretical perspectives. The range of theoretical perspectives will encompass the following: social constructionism (Berger and Luckmann); the sociology of the everyday (e.g. Goffman, Blumer); critical theory (e.g. Foucault, Habermas, Feminist Theory and theories of late/post-modernity; theories of rationality (Rational Choice/Rational Action theory); and the theory of social practice (Bourdieu).

**S04036 - CONTEMPORARY SOCIOLOGICAL THEORY**
ECTS Credits: 6

**Rationale and Purpose of the Module:**

**a)** Introduce students to a selection of modern and contemporary theories following on the classical tradition.

**b)** Develop students understanding of the discipline of sociology in the contemporary context, taking account of changing intellectual and social contexts.

**c)** Demonstrate how these theories have been influenced by classical social theories in terms of how they - challenge key classical presuppositions about the nature and scope of sociology in understanding the social world; - their level of indebtedness to or departure from classical theoretical antecedents.

**d)** Enable students to differentiate between different theoretical approaches in relation to key sociological concepts such as structure and agency, rationality and reflexivity, objectivism and subjectivism, micro-analysis and macro-analysis, realism and constructivism, modernity and postmodernity.

**Syllabus:**

- Introduces students to a selection of modern and contemporary social theories following on the classical tradition.
- Develops students understanding of the discipline of sociology in the contemporary context, taking account of changing intellectual and social contexts.
- Demonstrates how these theories have been influenced by classical social theories in terms of how they challenge key classical presuppositions about the nature and scope of sociology in understanding the social world; their level of indebtedness to or departure from classical theoretical antecedents.
- Enables students to differentiate between different theoretical approaches in relation to key sociological concepts such as structure and agency, rationality and reflexivity, objectivism and subjectivism, micro-analysis and macro-analysis, realism and constructivism, modernity and postmodernity.

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**S04042 - VIOLENCE IN SOCIETY**
ECTS Credits: 6

**Syllabus:**

- Introduces students to a selection of modern and contemporary theories following on the classical tradition.
- Develops students understanding of the discipline of sociology in the contemporary context, taking account of changing intellectual and social contexts.
- Demonstrates how these theories have been influenced by classical social theories in terms of how they challenge key classical presuppositions about the nature and scope of sociology in understanding the social world; their level of indebtedness to or departure from classical theoretical antecedents.
- Enables students to differentiate between different theoretical approaches in relation to key sociological concepts such as structure and agency, rationality and reflexivity, objectivism and subjectivism, micro-analysis and macro-analysis, realism and constructivism, modernity and postmodernity.

**Rationale and Purpose of the Module:**

- Enable students to consider the relative merits and limitations of such definitions. The module invites students to consider the place of state coercion in modern governance.
- Equally, students are invited to consider modes of political protest in the contemporary period and the relationship between violence and popular legitimacy.
- The module gives attention to the relationship between institutional and interpersonal violence and societal inequality. Finally, students are invited to critically consider arguments regarding the association of modernity with a decline in violence in society.
- This is to be added to the new BA LM002.

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**S04046 - QUANTITATIVE METHODS FOR SOCIOLOGICAL RESEARCH**
ECTS Credits: 6

**Syllabus:**

- Defines violence; exploring concepts relating to physical force, coercive control and symbolic violence; coercive state power and governance in the 21st century; protest and resistance - methods and responses; violent crime and social control; normalisation and oppression; interpersonal violence and social inequality; state responses to interpersonal violence; retributive justice; theorising the link between violence, pacification and modernity.

**Rationale and Purpose of the Module:**

- This module aims to develop students’ knowledge gained in S04053 to increase and deepen their understanding of and facility with quantitative research methods; particularly to develop their facility in the analysis of quantitative data. The primary objective of the course is to ensure that students are able to understand and use basic quantitative methods. The course begins by reviewing the role of quantitative methods in sociology, with consideration of the theoretical implications of the method and of the sorts of research it permits. It then moves on to a practical core, introducing basic techniques for data collection, processing, presentation and statistical analysis. The lectures run in parallel with lab sessions, in which students use SPSS and other relevant software.

**Syllabus:**

- This course introduces students to the basic statistical analysis of social data, including simple descriptive statistics and presentations, samples, surveys and elementary probability theory, inferential statistics, bivariate measures of association and multivariate techniques including an introduction to linear regression and correlation. The class will provide the practical skills to analyse and draw conclusions from quantitative social science data. Emphasis will be placed on understanding, computing and interpreting basic statistics; interpreting and evaluating survey research findings; and analysing quantitative data with statistical software programmes such as SPSS.

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**S04078 - INEQUALITY AND SOCIAL EXCLUSION**
ECTS Credits: 6

**Syllabus:**

- Focus on the Irish context as it seeks to examine the structural, cultural and ideological dynamics underpinning inequality and social exclusion and their implications for individuals and groups. It will introduce students to the central approaches to measuring inequality and social exclusion. Key will be a focus on the relationship between poverty, inequality and social exclusion. A central theme across the substantive areas covered will be the exploration of the continued significance of class, gender, sexuality, ethnicity, disability, and racial divisions as bases for both social exclusion and inequality. Additionally the module will examine the impact of media texts with particular reference to media discourses about those who are excluded. Finally, the module will refer to institutions and agencies engaging with the above themes.

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**Rationale and Purpose of the Module:**

- The aim of the module was to introduce the students to the dynamics and processes implicit to inequality and social exclusion. Further, to make them aware of the complexity of the conceptualisation and operationalisation of equality and social exclusion. At the end of the module students will be able to apply their understanding of both concepts to key substantive areas in Irish society.
SO4088 - SOCIOLOGY OF GLOBALISATION
ECTS Credits: 6

Sociology

Rationale and Purpose of the Module: a. To provide an opportunity for the student to examine of key theoretical perspectives and central debates relevant to the study of globalisation
b. To offer ways of evaluating the work of major sociological schools/theorists in the study of economic, cultural and political globalisation.
c. To develop the ability to analyse and evaluate various outcomes of globalisation through a critical framework.

Syllabus: The aim of this course is to provide a comprehensive introduction to the various discourses of globalisation. It will explore some of the key meanings, history and differing theoretical perspectives and interpretations of globalisation in contemporary research, and will identify main policy issues related to economic, cultural and political globalisation. The focus will be the development of transnational communities and cultures including emergent new forms of worldwide political protest; the challenge for trade unions; culture and the local-global interests and identities; the inequalities and global society or culture; the inter-meshing of cultural and political globalisation. It will explore some of the key meanings, interpretations of globalisation in contemporary research, history and differing theoretical perspectives and central debates relevant to the study of globalisation. It will address the main policy issues related to economic, cultural and political globalisation. The focus will be the development of transnational communities and cultures including emergent new forms of worldwide political protest; the challenge for trade unions; culture and the local-global interests and identities; the inequalities and global society or culture; the inter-meshing of cultural and political globalisation.

SO4178 - THE SOCIOLOGY OF THE BODY
ECTS Credits: 6

Sociology

Rationale and Purpose of the Module: Aims: This module introduces students to the sociology of the body/embodiment. Key theoretical work is reviewed, incorporating reference to various perspectives from a range of disciplines and approaches (e.g. biology, anthropology, sociology and feminism). Empirical studies in the social sciences, exploring a range of bodily issues and practices, are also considered.

Objectives:
1) Locate sociological interest in the body/embodiment within its larger social context.
2) Describe and critically assess the main theoretical approaches for studying human embodiment and bodily practices.
3) Ground theoretical discussion on human bodies in empirical work from sociology and the social sciences.

Syllabus: This module explores the twin themes of bodies and sexualities in the spaces of contemporary Western culture. Utilising a range of popular cultural forms, sites and events which are most accessible television, cinema, magazines; households, shops and workplaces; and popular understandings of medicine, science and technology the module involves students in a series of critical engagements. The module addresses a number of issues; why the subjects of sexualities and the body become the focus of so much interest across a broad range of disciplines; How we can de-naturalise and problematize normative gender categories by setting gendered identities in cultural contexts; What important contributions have been made to the field by recent work on masculinities; How the practices of everyday life can be interrogated to yield insights about the relationships between the body, gendered identities and prevailing cultural norms.

SP4132 - SPANISH FOR BEGINNERS 2
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 herself/himself to, and communicate with native speakers of Spanish.

SP4132 - SPANISH FOR BEGINNERS 2
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 herself/himself to, and communicate with native speakers of Spanish.
To foster autonomous language learning skills.
To introduce the student to Spanish and Latin American cultures.
To develop listening and speaking skills in Spanish.
To equip the student with basic writing skills.

Syllabus: Lecture: introduction to contemporary Spanish and Latin American cultures and societies. These include: transculturation and indigenous cultures in Latin America; contemporary Spanish and Latin American literature, basic concepts of Spanish linguistics. Tutorials and lab: working with set text-book, back-up audio-visual and online materials, students are introduced to past tenses, pronominal verbs and more complex structures in the Spanish language.

Prerequisites: SP4131

SP4134 - SPANISH FOR LEGAL STUDIES (BEGINNERS)
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: Students within the BA in Law and European Studies who take Spanish as their foreign language benefit from a module that gives them an overview of the Spanish legal system and basic legal terminology. Students will compare the Irish legal system to the Spanish legal system and will acquire basic knowledge of Spanish legal terminology.

Syllabus: Extracts from newspapers and magazines, dealing with topical issues specifically related to the field of law in the Hispanic world- will be selected for reading comprehension and other related language work, developing a critical view through discussion. A selection of audio and video material will be used for oral and aural skills facilitating integration of all language skills. Practice of new grammatical aspects of Spanish will also be included. A class will be devoted to introducing, practising and improving the use of specific grammatical areas such as the past tenses and the introduction of the subjunctive in Spanish.

Prerequisites: SP4133

SP4142 - SPANISH LANGUAGE AND SOCIETY 2
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 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.

Prerequisites: SP4141

SP4146 - MODERN AND CONTEMPORARY SPAIN
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 and second years and expands grammatical competence to include complex use of the subjunctive. Further development of knowledge of contemporary Spain and Latin American cultures and societies, with a particular focus on the interaction between Spain, Europe and the wider world.

Syllabus: Tutorials: Working with set textbook, complementary audio-visual material, as well as advanced literary texts.

Prerequisites: SP4133, SP4143, SP4134, SP4934

SP4148 - MEDIA AND CURRENT ISSUES IN THE SPANISH SPEAKING WORLD
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 developed further their understanding and command of Spanish grammar, vocabulary and usage.
* have improved their ability to use Spanish fluently and accurately and to make brief presentations in the language.
* have the ability to identify some of the characteristics of a variety of styles and genres, particularly in the area of media language.
* have a greater awareness of issues in translation and an enhanced ability to translate a variety of text types from Spanish to English and vice versa, particularly in the area of media language.
* understand more about a variety of issues of central importance to Spain and/or Latin America, with particular reference to the media and to other key aspects of language and society.
* have developed a critical understanding of an extended example of modern Hispanic fiction.

Syllabus: The programme is centred around a variety of topics of relevance to students of Spain and Latin America. The intention is to provide variety but a theme running through a substantial part of the module is that of the media and communication. Additionally, there will be attention given to questions of democracy, violence and the rule of law, as well as issues of gender in contemporary society, particularly with reference to the media.

Prerequisites: SP4147

SP4232 - SPANISH LANGUAGE,CULTURE AND SOCIETY 2 (BEGINNERS)
ECTS Credits: 6

School of Modern Languages and Applied Linguistics
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.

Syllabus: Lecture: introduction to contemporary Spanish and Latin American cultures and societies. These include: transculturation and indigenous cultures in Latin America; contemporary Spanish and Latin American literature, basic concepts of Spanish linguistics. Tutorials and lab: working with set text-book, back-up audio-visual an online materials, students are introduced to past tenses, pronominal verbs and more complex structures in the Spanish language.

Prerequisites: SP4231

SP4242 - SPANISH LANGUAGE, CULTURE AND SOCIETY 2A
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 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

Prerequisites: SP4241

SP4246 - SPANISH LANGUAGE, CULTURE AND SOCIETY 4
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 and second years and expands grammatical competence to include complex use of the subjunctive. Further development of knowledge of contemporary Spain and Latin American cultures and societies, with a particular focus on the interaction between Spain, Europe and the wider world.

Syllabus: Tutorials: Working with set textbook, complementary audio-visual material, as well as advanced literary texts.

Prerequisites: SP4243, SP4233

SP4248 - SPANISH LANGUAGE, CULTURE AND SOCIETY 6
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 developed further their understanding and command of Spanish grammar, vocabulary and usage.
* have improved their ability to use Spanish fluently and accurately and to make brief presentations in the language.
* have the ability to identify some of the characteristics of a variety of styles and genres, particularly in the area of media language.
* have a greater awareness of issues in translation and an enhanced ability to translate a variety of text types from Spanish to English and vice versa, particularly in the area of media language.
* have a developing awareness of issues in liaison interpreting and an ability to interpret a variety of text types from Spanish to English and vice versa, particularly in the area of media language.
* understand more about a variety of issues of central importance to Spain and/or Latin America, with particular reference to the media and to other key cultural aspects within the Spanish-speaking world.
* be able to interpret a variety of text types from Spanish to English and vice versa, particularly in the area of media language.

SYLLABUS: The programme is centred around a variety of topics of relevance to students of Spain and Latin America. The intention is to provide variety but a theme running through a substantial part of the module is that of the media and communication. Additionally, there will be attention given to questions of democracy, violence and the rule of law, as well as issues of gender in contemporary society, particularly with reference to the media.

Prerequisites: SP4247

SP4622 - INDIGENISMO AND NEGRISMO IN LATIN AMERICA LITERATURE
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: Aims & Objectives:

To analyse Latin American literature from the marginalised perspective of two distinct ethnic groups as a way of examining the authenticity and specificity of Latin American peoples and their literature. To broaden and enrich students’ critical thinking by exposing them to issues closely related to the quest for human rights and freedom of marginal groups in Latin America.

SYLLABUS: Students will analyse poetry, novels and testimonies by/about black and indigenous populations to include some of the following: Alcides Arguedas (Bolivia), Jorge Icaza and Adalberto Ortiz (Ecuador), Miguel Angel Asturias (Guatemala), Josú Marýa Arguedas,
Rationale and Purpose of the Module:
Linguistics

School of Modern Languages and Applied

women's writing in the Hispanic World.

modes in 20th-century Hispanic culture.

Objectives:
ECTS Credits: 6
SP4628 - WOMEN'S NARRATIVES OF RESISTANCE IN THE HISPANIC WORLD
ECTS Credits: 6
School of Modern Languages and Applied

Rationale and Purpose of the Module: Aims & Objectives:

To develop the students’ knowledge of different literary modes in 20th-century Hispanic culture.
To introduce students to political and testimonial women's writing in the Hispanic World.
To develop the students' understanding of different literary and political discourses.
To further develop students’ analytical skills, with a special focus on political women’s writing.

Syllabus: The module will concentrate on the exploration of women’s narratives of resistance to power in different textual modes, from testimony to literature, in order to study the different ways in which women have experienced and represented the oppression/repression of dissidence in colonial, neo-colonial and authoritarian regimes in Latin America and Spain

SP4934 - SPANISH FOR LAW STUDENTS (ADVANCED)
ECTS Credits: 6
School of Modern Languages and Applied

Rationale and Purpose of the Module: Students within the BA in Law and European Studies who take Spanish as their foreign language benefit from a module that gives them an overview of the Spanish legal system and basic legal terminology. This module will help students:
- To consolidate and further develop productive and receptive language skills at an advanced level.
- To facilitate students’ understanding of legal terminology used within the Spanish legal world.
- To develop basic translation skills of legal documentation from Spanish into English: contracts, wills, powers of attorney, etc.

Students will compare the Irish legal system to the Spanish legal system and will acquire certain knowledge of Spanish legal terminology.

Syllabus:
- A series of articles from newspapers, magazines, journals, textbooks and the Internet dealing with topical issues specifically related to the field of law in the Hispanic world- will be selected for text analysis and as source material for essay writing.
- A selection of audio and material recorded on DVD will be used for oral and aural skills. A debate class in groups will facilitate integration of all related language skills. A variety of topics relating to issues in legal ethics, i.e. human rights, euthanasia, death penalty and terrorism will be discussed.
- A class will be devoted to practise and improve the students’ command of Spanish concentrating on difficult grammatical areas and the pragmatics of the language.
- Basic translation of legal documentation from Spanish into English.

Prerequisites: SP4143

SP6012 - ISSUES IN CONTEMPORARY SPAIN AND LATIN AMERICA
ECTS Credits: 9
School of Modern Languages and Applied

Rationale and Purpose of the Module: To arrive at an understanding of key issues in contemporary Spain and Latin America through the study of societal, political and cultural developments and to enable students to analyse these issues in a comparative framework. The module further aims to enable students to engage at a postgraduate level in written and oral debate on contemporary issues in Hispanic society. As a first semester module, it also offers students analytical and discourse skills in contemporary Hispanic issues which will aid them in the second semester modules in the programme in which this module is offered.

Syllabus: This course will involve a thorough analysis of current socio-cultural and political developments in contemporary Spain and Latin America. It will explore the interplay between society, culture and politics on various levels, e.g. the political ramifications of cultural production; the study of cultural politics; the cultural dimensions of power and/or the study of power and politics in recent examples of Spanish and Latin American culture. Students will be given seminars on topics such as contemporary social movements in Spain and Latin America, cinema and culture in the Hispanic world and politics and power in Spain and Latin America. Research papers shall then be undertaken by students which will address the above issues and enhance their analytical understanding of the processes of contemporary Hispanic societies.

SS4103 - PSYCHOLOGY OF MOVEMENT DEVELOPMENT FROM INFANCY TO ADOLESCENCE
ECTS Credits: 6
Physical Education & Sport Sciences

Rationale and Purpose of the Module: To advance

Enrique Lpez Alb-jar and Nicomûdes Santa Cruz (Per´), Lydia Cabrera and Manuel Cofi±o (Cuba) among others.

Prerequisites: SP4003

SP4914 - SPANISH FOR BUSINESS 4
ECTS Credits: 6
School of Modern Languages and Applied

Rationale and Purpose of the Module: The module aims to prepare students to communicate effectively and confidently when using Spanish in a Spanish or Latin American working environment and to give them an overview of the organisation of public administration, national firms and some relevant economic issues in Spain and other Spanish speaking countries.

Syllabus: A series of articles from newspapers, magazines, journals, textbooks and the internet dealing with topical issues specifically related to the business in the Hispanic world will be selected for text analysis and as source material for essay writing. A selection of audio and material recording on DVD will be used for oral and aural skills. Course work included preparation of CVs and letters of presentation when looking for a job. Simulation of job interviews with special attention to the use of formal language and negotiation of working conditions.

Prerequisites: SP4143
the students’ knowledge and understanding of psychological development from infancy to adolescence from both motor development and psychosocial perspectives

**Syllabus: MOTOR SKILL DEVELOPMENT**
Motor development as a part of human development; motor development as (a) a process and (b) as a field of study. Descriptions of the phases of motor development from infancy through adolescence to adulthood (reflexive, rudimentary, fundamental skills, sport specific skills) noting the changing characteristics. Factors influencing motor development (growth, maturation, genetics (nature), environment (nurture); historical overview of theories to explain motor development with focus on the maturation perspective of 1930s and more recent dynamic systems theory; influences of the individual, the environment and task demands. Methods of investigation. Concepts of direction of development, readiness, critical/sensitive periods. Motor development in infancy, childhood and adolescence; early and late developers, implications for teaching and coaching. Importance of a developmental philosophy. Perception and perceptual development with focus on vision. Balance and its development. Evaluation of stimulation and perceptual motor training programmes at various phase of development.

**PSYCHO-SOCIAL DEVELOPMENT**
This module aims to develop a fundamental knowledge and understanding of how developmental issues from childhood to adolescence can influence participation and performance in sport and physical activity. This module will include content relating to youth sport participation and development including models of development in sport, the influence of significant others, stages of development, motivation and participation in sport, and burnout and dropout in sport. This module will compare and contrast readiness for youth sport competition from the biological, social, cognitive and psychological perspectives. The module content will consider psychological considerations of participation in sport and physical education from childhood to adolescence and will critically examine current practices in this area. This module will also critically consider best practices in this area based on research from youth sport and motor development, specifically addressing issues such as long term participation patterns, competition, and program characteristics.

**SS4142 - SCIENTIFIC PERSPECTIVES OF SPORT AND EXERCISE PSYCHOLOGY**
ECTS Credits: 3

**Physical Education & Sport Sciences**

**Rationale and Purpose of the Module:** The module aims to introduce key theoretical and applied concepts in sport and exercise psychology. In addition the module will provide a foundation in the methods, issues and application in sport and exercise psychology.

**Syllabus:** Psychology as a scientific discipline and mode of enquiry to investigate the mind and behaviour. Major concepts studied in psychology (e.g. personality, motivation, stress, attention, perception, memory, learning, nervous system). Methodologies employed in psychology and the changing scientific paradigms. Evolution of sport and exercise psychology. Psychological skills training, Psychology of physical activity and health. Relevance of psychology to sport coaching and participation in physical activity. Psychology and skill acquisition. Professionalization of the discipline and applications.

**SS4198 - EXERCISE PSYCHOLOGY**
ECTS Credits: 6

**Physical Education & Sport Sciences**

**Rationale and Purpose of the Module:** The aim of this module is to provide students with a critical understanding of theories, concepts and practice in exercise psychology.

**Syllabus:** This module will study the brain, cognition, emotion and behaviour in physical activity in both physical activity and exercise setting. The core topics of study will include the key concepts and theories, exercise and mental health, and the psychology of physical activity behaviour. It will also include hot topics under contemporary issues which will comprise half of the module.

**SS4204 - SUPPORT SYSTEMS TO MUSCLE CONTRACTION**
ECTS Credits: 6

**Physical Education & Sport Sciences**

**Rationale and Purpose of the Module:** The energy requirements of exercising muscle are carefully regulated and supported by fuel and oxygen delivery and the removal of waste products including heat. The purpose of this course is to provide an understanding of the regulation and adaptation of cardiovascular and pulmonary function in response to exercise. An experimental laboratory component provides an opportunity to challenge theoretical concepts by empirical analysis and to competence in measurement techniques.


**Prerequisites:** SS4202

**SS4318 - NOVEL METHODS IN BIOMECHANICS**
ECTS Credits: 6

**Physical Education & Sport Sciences**

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

* To give students an understanding of new and developing methodologies in the biomechanics of sport and exercise.

* To give students an understanding of the applications of existing methods using novel and developing techniques of data analysis.

* To provide students an understanding of the merits of mathematics for biomechanics research.

**Syllabus:** Syllabus

* Methods to examine variability in human movement: single subject analysis, considerations of movement variability.

* Methods to examine coordination and stability in human movement: Applied Dynamics systems theory for
analysis of movement, measures of coordination and variability in gait patterns.

SS4332 - INTRODUCTION TO BIOMECHANICS FOR SPORT AND EXERCISE
ECTS Credits: 3

Physical Education & Sport Sciences

Rationale and Purpose of the Module: Module created due to restructure of Year 1 of the BSc Sport and Exercise Sciences programme. Originally this module (SS4304) was a week 1-15 6 ECTS module and is now being changed to a week 7-12 3 ECTS module to suit the restructure.

Syllabus: Introduction to segmental modelling techniques including cadaver dissection data. Centre of mass centre of pressure, centre of gravity and radii of gyration. Fluid mechanics and air flow effects with applications to cycling, skiing, and aquatics. Friction. Angular momentum. Stability & balance. Analysis of specific movements; including Walking and running, diving, throwing and striking skills, jumping and throwing and sprint start.

SS4404 - COACHING AND SCIENCE PERFORMANCE
ECTS Credits: 6

Physical Education & Sport Sciences

Rationale and Purpose of the Module: To give students a theoretical and practical learning experience in the areas of sport administration and organisation and sport coaching.

Syllabus: Administration and organisation: Structure and function of Irish NGB's. National coaching development programmes. The module includes an introduction to the management issues related to sports administration and allows students gain practical experiences in the organization of a sports event. Students explore how to operate within an organization, e.g. minutes, meetings and time management, planning, budgeting, promoting, sponsorship, safety and legal aspects, running the event, media, legal and ethical aspects and evaluation.

Coaching: Planning, delivery and evaluation of phases of a single session, and of a number of sessions. Coaching, experience gained by placement of students with mentor coaches or exercise leaders in an ongoing practical setting. Maintenance of a coaching and reflective log.

Exercise Prescription: Specific case studies of asymptomatic participants for health related activity and sports specific training. Health appraisal, knowledge of participants goals, selection of appropriate field tests, assessment and evaluation of field tests, programme design for six weeks, delivery of programme, ongoing monitoring of participant and programme, post programme evaluation, guidelines for future work.

Prerequisites: SS4403

SS4418 - CLINICAL APPLICATIONS OF EXERCISE
ECTS Credits: 6

Physical Education & Sport Sciences

Rationale and Purpose of the Module: This module is designed to provide students with an appreciation of the techniques and approaches used in designing and applying exercise interventions in specific clinical conditions. the aim is to allow students to apply aspects of physiology and applied exercise science to understanding the treatment / prevention of disease.

Syllabus: The course begins with a structures review of the evidence for benefits of exercise and health. Practical aspects of exercise prescription, including pre-participant screening, components of exercise prescription, outcome measures and progression. The course covers the application of exercise in the following conditions: people with: neuromuscular disorders, with a focus on multiple sclerosis. cardiorespiratory disorders, including COPD and myocardial infarction. vascular disease, with a focus on peripheral arterial disease. osteoporosis. learning disorders, focusing on autistic spectrum disorder. pregnancy.

Prerequisites: SS4202, SS4203

SS4422 - EXERCISE AND FITNESS
ECTS Credits: 3

Physical Education & Sport Sciences

Rationale and Purpose of the Module: To provide students with a foundation and understanding of effective prescription of exercise/physical activity for health and sport performance.


SS6032 - ENDURANCE SPORTS
ECTS Credits: 6

Physical Education & Sport Sciences

Rationale and Purpose of the Module: Endurance is required in a wide range of sports activities and can be expressed in various forms depending on the duration and intensity demands of the activity. A wide range of factors influence performance in endurance activities including: Physiological, nutritional, biomechanics and psychological factors. This module will provide core knowledge of endurance development and an understanding of how the physiological, nutritional, biomechanical and psychological factors influence this development. The module will be delivered using a combination of lectures, lab sessions as well as case based and problem based learning activities. The emphasis of this module will be on gaining an understanding of the methodologies to develop an endurance based athlete and applying these techniques and methodologies in a practical setting.

Measurement of the biomechanical responses to fatigue using force platforms, EMG and Motion Analysis.
Nutritional Aspects of Endurance Development
principles of nutrient intake for sports performance; macro and micronutrients; body water and fluid composition; nutrient intake and body composition; nutrient interaction with exercise and competition; adaptation and recovery.
Physiological Aspects of Endurance Development
muscle adaptation to endurance training; cardiovascular and respiratory adaptation to endurance training; environmental effects of endurance training and competition.
Central and peripheral fatigue in endurance exercise.

SS6042 - STRENGTH SPORTS
ECTS Credits: 6
Physical Education & Sport Sciences
Rationale and Purpose of the Module: This module aims to provide opportunities to develop knowledge and understanding of the principles and theories of strength and conditioning practice, and their application to a variety of sports and performance-based settings. The module content will be drawn from a broad base of research theory and applied methodologies that currently form the basis of contemporary strength and conditioning practice. Additional content will focus on developing proficiency in the fundamental performance aspects of strength training such as Olympic Weightlifting and aspects of complex training. This module will also provide video and notational analysis workshops, as well as coaching feedback methodologies, which will be delivered through lectures, lab sessions and student centred learning. Aspects of nutrition for elite performance in this field will also permeate throughout the module content. Ethical issues as they relate to the field of strength and conditioning training will also be addressed.
Syllabus: Principles and theories of strength/conditioning practice; application of this to a variety of sports and performance-based settings; muscle anatomy, group names and physiology; bone and connective tissue; research theory and applied methodologies in strength and conditioning practice; developing proficiency in the fundamental performance aspects of strength training; fundamental strength/conditioning training; stability and balance methods; complex strength conditioning training; Olympic Weightlifting; programme design and implementation; safety issues in strength/conditioning; testing protocols and administration; provision of video and notational analysis workshops; critical analysis of performance technique through video analysis; coaching feedback methodologies; nutrition for elite performance; current concepts in performance nutrition; nutritional requirements for strength sports.

TE4012 - ENGLISH AS A FOREIGN LANGUAGE 2
(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. Integrated tuition and practice is given in the four language skills. The following grammatical areas are covered: adjective order, hypothetical time, countability and plural nouns, quantifiers, gerund or infinitive after verbs, clauses of contrast, clauses of purpose and reason, reporting verbs, use of the passive, as/like
Lexis: wordbuilding, homonyms, frequent collocations, common expressions, conversational responses and idioms, discourse markers (oral and written) e.g. connectives, sequencing, signposting.

TE4032 - ENGLISH AS A FOREIGN LANGUAGE 2
(ADVANCED)
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 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.
TE4106 - TEACHING ENGLISH TO SPEAKERS OF OTHER LANGUAGES (TESOL) 1  
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: To provide students with an introduction to the Teaching of English to Speakers of Other Languages (TESOL). This is the first of a three-module suite, and starts with an overview of the main approaches and methods in language teaching and learning, the different theories of language and language learning and the concept of learning styles. To enable students to comprehend theoretical aspects of the grammatical and phonological aspects of the English language relevant for teaching purposes. To enable students to develop an understanding of the different levels of language competency of English language learners.

This is the first of a three-module suite, students also complete TEXXXX (TESOL 2) and TEXXX (TESOL 3). This suite of modules is intended to give students a foundation in Teaching English to Speakers of Other Languages which is validated by TESOL certification from the University of Limerick. This suite of modules is intended to give students a foundation in Teaching English to Speakers of Other Languages which is validated by TESOL certification from the University of Limerick. The areas covered in language systems include: grammar; future forms, language skills.

Silent Way, Suggestopedia, Community Language Learning, The Natural Method, Communicative Language Teaching, Task Based Learning, the Lexical Approach, Eclecticism. The Theory of Multiple Intelligences.

ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: This module covers aspects of the theory and practice of language teaching and language systems. This is the last of a three-module suite, preceded by TEXXXX (TESOL 1) and TE4026 (TESOL 2). This suite of modules is intended to give students a foundation in Teaching English to Speakers of Other Languages which is validated by TESOL certification from the University of Limerick. The module concludes with a description of the conduct of infrastructural projects.

Syllabus: This covers the theory and practice of public finance. The module begins with an examination of how an efficient market should function in theory. Using this concept as a benchmark, the course then moves on to examine various ways in which actual markets fail and demonstrates why these lead to inefficiencies in the allocation of resources. The theoretical rationale for government intervention and its role in correcting market failures through regulation and the disbursement of public monies is then examined. The module then turns to examining the impact of government interventions on market efficiency. The impact of commodity taxes on market allocation of resources is first examined, followed by a description of how labour taxes affect incentives to work. The role of fiscal policy and social welfare systems in modern economies is then examined before the module concludes with a description of the conduct of cost benefit analysis when examining major public infrastructural projects.

ECTS Credits: 6

School of Culture and Communication

Rationale and Purpose of the Module: This module is
designed to replace TW4116: Workplace Issues in Technical and Professional Communication. This module is being developed to fully de-couple undergraduate and postgraduate modules which were historically taught together, but are now fully separate. The new title is also clearer. The module's purpose is: to develop an awareness of the social context in which technical and professional communicators work, and the responsibilities associated with the provision of content, considered from ethical and legal perspectives; to develop students' writing skills, especially in the area of writing for online media; to develop students' online information design skills; to develop students' ability to design and write for online media, especially blogs and web sites.

**Syllabus:** Ethical issues in professional communication; codes of practice; legal issues (consumer protection, patent, copyright, trademarks, trade secrets). Writing for new media; blogging; web design; information design for special needs; trends in technical communication. Web design: Dreamweaver and other web design tools.

**Syllabus:** Explanation of the Irish domestic legislative provisions which govern the territorial rules for assessing individuals and companies to income tax/corporate tax and capital gains tax; Concept of double taxation and foreign tax credit relief including both bilateral and unilateral reliefs; Interpreting the OECD Model Double Taxation Convention and explaining how companies can interpret domestic laws in different jurisdictions and relevant conventions to create tax planning opportunities; Explaining the concept of Transfer pricing and the rationale behind the CCCTB; Explaining the different territorial rules in other countries explaining residence, source and territorial concepts; Considering other countries anti deferral tax rules including Controlled Foreign Company legislation; Evaluation of the types of business models used by multinational companies to reduce their global effective rate of tax; Explain the rationale for changes in both domestic and International Tax legislation and policy in relation to corporates and individuals.

**Rationale and Purpose of the Module:** The aim of the module is to give students an understanding of the principles underpinning, and the risks inherent in, double taxation relief and other international tax issues including EU tax harmonisation, the implications of the single market, the impact of offshore business, transfer pricing and trends in world tax systems.

**Syllabus:** To provide students with information on the project management and quality issues in a content development environment, along with practical issues concerning indexing and editing. To give students an introduction to theory and practice of instructional design and e-learning. To give students an opportunity to put their learning into practice through a project which incorporates e-learning and project management. To introduce students to multimedia tools used in content development.

**Rationale and Purpose of the Module:** This module introduces the most common material encountered in the construction industry by exploring soil mechanics beginning with the fundamentals in civil engineering geology. The course is designed to challenge the student to seek the key concepts in geology and soil mechanics and apply these concepts in projects and self-directed learning to achieve the following key objectives:

- To provide a clear understanding of the role of geology and soil mechanics in achieving a successful construction project.
- To form the basis for subsequent modules on Soil Mechanics and Geotechnical Engineering Design.
- To generate enthusiasm for the subject through field trips, practical experimentation and case histories.

**Syllabus:** PART I The Earth and its formation; plate tectonics; physical and chemical processes; erosion and...
deposition; Quaternary geology; Rock types; igneous, sedimentary, metamorphic; geological maps and terminology; role of geology in civil engineering.

PART II
Setting the context using the soil mechanics triangle; soil composition and chemistry; clay bonding and double layer; classification and identification; phase relationships; soil compaction and improvement techniques; effective stress concept and flow of water in soils; permeability and flow nets; drained and undrained shear strength; site investigation.

WT4208 - BUILDING SERVICES 2
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: The aim of this module is to provide a comprehensive introduction to the more complex building services and equipment being adopted in modern non domestic buildings. It is also an aim to introduce the student to key elements of services design for buildings. This module builds on the learning of WT4504

* Introduction to building services in non-domestic construction including both active and passive services.
* Understand design, build and operation implications of these services.
* Have good knowledge of water installations to multi-storey buildings
* Understand the essentials of electrical and gas distribution and supply
* Identify the principle firefighting equipment needs for modern buildings
* Understand the principles of providing appropriate lighting within buildings

Syllabus:
* Heating and air-conditioning services: energy performance measurements using, SBEM and NEAP; heating and air conditioning, temperature drop through structures; gas supply and distribution, gas controls, ventilation ducts and fans, solar heating, heat pumps and bio-mass.
* Hot and cold water services: Pipe sizing for hot and cold water multi-storey buildings, force and pressure, hydraulics.
* Drainage services: sustainable urban drainage, retention tanks, oil separation, green roof, grey water recycling
* Electrical services: electrical terms and installations, supply and distribution of electricity, supply controls, protection, conductor and cable rating, methods of wiring and distribution systems, single phase power circuits; electrical installations in large buildings; site electricity, electric space heating
* Access services: lifts, escalators and service ducts, automatic control
* Lighting services: integration with electric light, natural lighting, artificial lighting, design of lighting, lighting controls
* Safety services: classification of fire risks, safety devices, heating and flues; sprinklers, risers and hose reel installations, dry and wet risers; portable and fixed extinguishers, automatic fire detectors, alarms and dampers, pressurisation of escape routes, automatic fire ventilation fire detection, security systems
* Electrical services: supply to non-domestic buildings micro generation (solar and wind)
* Data services; audio visual, broadband and telephony.

Prerequisites: WT4504

WT4502 - CONSTRUCTION TECHNOLOGY
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: This module builds on the material covered in WT4401 through applied practical coursework based on residential construction practice. The course emphasises best industry practice and is framed around the relevant legislative instruments governing residential construction in Ireland.

Syllabus:
* Site selection and analysis for residential construction addressing engineering, planning and Irish architectural heritage and conservation.
* Soil identification, properties and behaviour factors affecting drainage & foundation choice.
* Concrete technology and mix design.
* Environmental considerations in residential construction sustainable technologies for waste disposal and energy.
* Introduction to housing estate development and planning applications.
* Interpretation of construction drawings.
* Trouble shooting residential building problems via case histories.

Prerequisites: WT4401

WT4504 - BUILDING SERVICES 1
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: The aim of this module is to provide a comprehensive introduction to building services and associated technology.

Key objectives
* Introduction to active and passive building services in domestic construction.
* Understand design, build and operation implications of these services.

Syllabus:
* Heating ventilation and air conditioning services; district heating, heat loss calculations, thermal insulation, ventilation, air filters, heat recovery systems; principles of air conditioning, dual duct and convector air conditioning systems, DEAP.
* Hot and cold water supply services; low, medium and high pressure hot water heating.
* Drainage services; below ground drainage systems, pipe materials and pipe laying, soakaways, drain testing and inspection.
* Waste services; soil and waste systems, modified single stack and ventilated stack systems; resealing and anti-siphon traps, air pressure in discharge stacks; irrigation systems, sewage pumping, refuse disposal systems; sewage disposal, settlement tanks, bio-filters.

Prerequisites: PH4032

WT4604 - LAND SURVEYING
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: The aim of this module is to provide an understanding of principles of land surveying and the use of specialist surveying equipment. The principles and techniques of surveying are applied to a wide variety of realistic construction project applications. The specific objectives are to provide:
* An understanding of surveying fundamental principles and use of surveying instruments
* Knowledge of the application of these to conduct land and site surveys
* Practical experience in using these modern instruments in the solving of a variety of site problem situations.
Syllabus: Surveying fundamentals, tape & offset surveying; levelling, the theodolite and its use, tension determination, steel taping differential levelling, traversing, angle measurement electromagnetic distance measurement, satellite positioning systems, survey methods, analysis & adjustment of measurements, areas & volumes, setting out, curve ranging, topographic surveying, construction control surveys, geographic information systems, global positioning systems, construction applications, field coding, automatic target recognition, typical field operations. Practical case studies and fieldwork.

WT4704 - BUILDING MEASUREMENT
ECTS Credits: 6
School of Engineering
Rationale and Purpose of the Module: The overall aim of this module is to illustrate measurement techniques and procedures for buildings and associated works.

Syllabus: Setting down dimensions, alternative systems, applied mensuration, general rules for taking-off; measuring substructures, excavations, formwork areas, various foundation types and measurement; walls, floors, concrete, blockwork, masonry, partitions and suspended ceilings; internal surface finishes, dry linings roofs, structural elements, roof finishes and coverings, waterproofing; internal finishes, windows, doors, staircases, fixtures and fittings; reinforced concrete structures, columns, beams, slabs, formwork, concrete finishes, reinforcement, precast elements; structural steelwork; structural timber, standard joinery components; plumbing, fittings, mechanical and electrical installations; drainage, underground and above ground, external works, roads, pavings, earthworks and groundworks, landscaping; demolitions, alterations and renovations.

WT4804 - ESTIMATING AND COSTING
ECTS Credits: 6
School of Engineering
Rationale and Purpose of the Module: The overall aim of this module is to introduce some standard estimating and costing techniques that apply to building construction works.

The key objectives are to
* Describe the role of the estimator in the tendering process
* Illustrate standard estimating techniques and the process for preparing a cost estimate for building works
* Introduce value for money concepts and techniques to identify alternative solutions to deliver value for money.

Syllabus: Organisation of the estimating function, estimating methods, project appreciation, enquiries to suppliers and tender planning; resource costs, unit rate pricing, sub-contractors, fluctuations; provisional sums, preliminaries, cash flow forecasts, completing the estimate, tender submission and follow up; impacts of new developments on estimating, new procurement methods, target cost estimating, gain share, negotiations and development of incentives; value engineering and developing value for money solutions.

WT4902 - MODEL MAKING
ECTS Credits: 6
School of Design
Rationale and Purpose of the Module: To introduce the student to skill and techniques that will enable them to make realistic models that will enhance their design presentation. To explore the use of a variety of materials and methods with particular emphasis on the safe use of wood and metal working machinery and both power operated and manual hand tools.

Syllabus: An introduction to Health and Safety in the workshop An introduction to machines, equipment and tools for cutting, shaping, joining and finishing. Model making techniques using wood, plastics, metals and plaster of Paris, involving mould making for vacuum forming and plaster casting. Analysis of shapes and graphic presentation relative to material and process selection for designing the model.

Prerequisites: PN4111