**TABLE OF CONTENTS**

**Autumn**  
Introduction 3  
Department Offices 3  
Autumn Semester Modules 4  
Irish Studies 5  
Irish World Academy of Music & Dance 6  
Faculty of Arts, Humanities & Social Sciences 8  
Faculty of Education & Health Science 26  
Kemmy Business School 33  
Faculty of Science & Engineering 45  

**Spring Semester Modules** 92  
Irish Studies 93  
Irish World Academy of Music & Dance 94  
Faculty of Arts, Humanities & Social Sciences 96  
Faculty of Education & Health Science 114  
Kemmy Business School 121  
Faculty of Science & Engineering 132  

**DEPARTMENT OFFICES**

<table>
<thead>
<tr>
<th>Room No.</th>
<th>Department Office</th>
</tr>
</thead>
<tbody>
<tr>
<td>E0001</td>
<td>Admissions Office</td>
</tr>
<tr>
<td>D0035</td>
<td>Accommodation Office (Off Campus Housing)</td>
</tr>
<tr>
<td>E0005</td>
<td>Co-operative Education</td>
</tr>
<tr>
<td>E0030</td>
<td>International Education/Study Abroad Office</td>
</tr>
<tr>
<td>GLG020</td>
<td>Information Technology</td>
</tr>
<tr>
<td>D0033</td>
<td>Plassey Campus Centre (Student Village Accommodation)</td>
</tr>
<tr>
<td>E1006</td>
<td>Print Room</td>
</tr>
<tr>
<td>CM060</td>
<td>Student Health Centre</td>
</tr>
<tr>
<td>E0001</td>
<td>Student Services Office</td>
</tr>
</tbody>
</table>

**Faculty of Arts, Humanities & Social Sciences**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1078</td>
<td>History (HIS)</td>
</tr>
<tr>
<td>MC1002</td>
<td>Languages and Cultural Studies (LCS)</td>
</tr>
<tr>
<td>FG013</td>
<td>Law (LAW)</td>
</tr>
<tr>
<td>F1018</td>
<td>Politics and Public Administration (PPA)</td>
</tr>
<tr>
<td>F1003</td>
<td>Sociology (SOC)</td>
</tr>
<tr>
<td>FG015</td>
<td>Irish World Academy of Music and Dance (IWAMD)</td>
</tr>
</tbody>
</table>

**Kemmy Business School**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>S109</td>
<td>Accounting and Finance (A&amp;F)</td>
</tr>
<tr>
<td>EM023</td>
<td>Economics (ECON)</td>
</tr>
<tr>
<td>S123</td>
<td>Marketing and Management (M&amp;M)</td>
</tr>
<tr>
<td>EM017</td>
<td>Personnel and Employee Relations (P&amp;M)</td>
</tr>
</tbody>
</table>

**Faculty of Science & Engineering**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>B3046</td>
<td>Chemical and Environmental Sciences (CES)</td>
</tr>
<tr>
<td>SR2038</td>
<td>Life Sciences (LS)</td>
</tr>
<tr>
<td>C0063</td>
<td>Physics (PHY)</td>
</tr>
<tr>
<td>ER3015</td>
<td>School of Architecture (MST)</td>
</tr>
<tr>
<td>SR3025</td>
<td>Manufacturing and Operations Engineering (MOE)</td>
</tr>
<tr>
<td>B3027</td>
<td>Materials Science and Technology (MST)</td>
</tr>
<tr>
<td>LI034</td>
<td>Mechanical and Aeronautical Engineering (MAE)</td>
</tr>
<tr>
<td>CS105</td>
<td>Computer Science and Information Systems (CS)</td>
</tr>
<tr>
<td>E2014</td>
<td>Electronics and Computer Engineering (ECE)</td>
</tr>
<tr>
<td>D2034</td>
<td>Mathematics and Statistics (M&amp;S)</td>
</tr>
</tbody>
</table>

**Faculty of Education & Health Sciences**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>DM043</td>
<td>Education and Professional Studies (ED)</td>
</tr>
<tr>
<td>P1025</td>
<td>Physical Education and Sports Science (PESS)</td>
</tr>
</tbody>
</table>
INTRODUCTION

MODULES

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

Normal course load is 5 modules per semester.

MODULE CODES

The first two letters of the code indicate the subject area to which the module belongs. The final numerical digit of the code corresponds to the semester of study in which the module is normally taken by Irish students i.e. year one modules end in 1 (Fall semester) and 2 (Spring semester) - year two modules end in 3 (Fall semester) and 4 (Spring semester) and so on until year four. These codes should be used as a guide to the level of each course.

The three digit codes found at the right of a module title represents the number of corresponding Lecture, Tutorial and Laboratory hours (in this order).

KEY

* Prerequisite standard is necessary for entry into these modules
+ A minimum number of students are necessary before these modules are offered
Δ Resource and scheduling constraints limit places in these modules therefore we cannot guarantee enrolment.
‡ Module has weekly studio/design hours allocated outside of classes/tutorials

Note: The contents of this booklet are for information purposes only and should not be viewed as the basis of a contract between the student and the University. No guarantee is given that modules will not be altered, cancelled, substituted or otherwise amended at any time.
AUTUMN SEMESTER MODULES
IRISH STUDIES

EH4111 The Irish Literary Revival
LCS 2-1-0
The course examines Irish writing in English at a crucial stage in its development. It concentrates on poetry and drama with special attention being given to the work of W.B. Yeats; the fiction-writing tradition is also studied. Background and context form an integral part of the course.

EH4158 From James Joyce to Maeve Brennan: 20th century Irish Fiction
LCS 2-1-0
This module authors such as James Joyce, Elizabeth Bowen, Frank O'Connor, Kate O'Brien, and their less well-known counterparts such as the recently rediscovered Maeve Brennan. We will address the intersection of Irish cultural and social identities and these texts, examine efforts to create an 'Irish national culture' in the period, and construct readings of this literature through contemporary perspectives in literary and cultural theory; provides a critical examination of twentieth century Irish fiction, encompassing

GA4105 Irish Folklore 1
LCS 2-1-0
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; traditional custom and belief including calendar customs. A case study in folklore collection based on field recordings made in county Limerick in 1980.

HI4053 Ireland: 1750-1850
HIS 2-1-0
Diverse societies, economies and cultures: disunited kingdom and discontented colony; owning, managing and working the land; the rural economies; subsistence, markets, production and surplus; the long-term demographic trend and the demographic transition; family and household; gender, sexuality and patriarchy; proto-industrialisation, urban growth, and the modernisation of industry; breaking and making the union; professional society and the urban proletariat; the transformations of language use: Anglicisation 1750-1914; the failure of economic capacity: coping with poverty; rural prosperity and rural crisis; the triumph of capitalism.

MU4135 Irish Traditional Music
IWMC 2-1-0
Sources of traditional music in Ireland; composition and improvisation as creative processes; dance music tradition; tune types, instruments, stylistic features; contemporary developments; changing concepts of harmony; emergence of formal group playing; dynamics of the session; the course also contains practical instruction in traditional music, dance and/or song performance.
Irish World Academy of Music and Dance

The Irish World Academy of Music and Dance is a centre of academic and performance excellence housed at the University of Limerick, Ireland. It offers a suite of taught MA courses and a BA and Grad.Dip in music and dance related subject areas. Its research is at the forefront of these fields of enquiry worldwide. Community outreach, artists in residence and a series of concerts, seminars and a summer school showcase this unique focus to local and international spheres.

Modules with prerequisites/auditions

The practicum modules are designed primarily to develop the performance skills of students and to do this they will work with visiting and resident tutors who represent the cream of performance in Ireland and beyond. The main bulk of performance work will be solo but there will also be a significant amount of ensemble work. Students will also be encouraged to develop second performance skills -making them more versatile as performers.

1. All practicum modules require an audition on arrival
2. A prerequisite level of knowledge is required for students taking these courses - students will need to check with the course leader on arrival to see if they can take these courses

ASSESSMENTS:
Assessment practices vary between modules. In general, practicum modules have a continuous assessment and performance component while lecture-based modules are assessed by written submissions, project-based work, examinations, or any combination of these elements. The assessment criteria for each module are detailed in the course documentation each academic semester, which is subject to change and updating on an ongoing basis.
**MD4001 Practicum 1a - Main Performance Interest and Performance Skills**
Development of the student’s primary performance interest, whether instrumental, vocal or dance, with on-site tutors. Students will be encouraged to engage in a dynamic self-critical process conducive to development and related to the principle of ‘reflective practice’.

**MD4011 Practicum 1b - Secondary Performance Interest and Performance Skills**
Development of the student’s secondary performance interest, whether instrumental, vocal or dance, with on-site tutors. Students will be encouraged to engage in a dynamic self-critical process conducive to development and related to the principle of ‘reflective practice’.

**MD4011 - Practicum 1B - Secondary Performance Interest and Practical Ensemble (Music and Dance)**
Broadening the base of performance skills of a student to include other instrumental, vocal and dance aspects of the tradition, and to develop skills involved in ensemble work.

**MU4135/MD4021 Irish Traditional Music, Song, and Dance**
Regional styles in instrumental and vocal tradition; Irish song tradition - repertoire and style; tradition and change in the music of the Irish harp; traditional music and society in contemporary Ireland. Practical instruction in traditional music, dance, and / or song performance. (note this module is also listed in the “Irish Studies” section and in the main Faculty of Arts, Humanities & Social Sciences booklet)

**MD4023 Irish Traditional Music and Dance Studies**
Three streams of study concerning instrumental music, song and dance, dealing primarily with music, song and dance up to 1900, approaching the historical development of the tradition in pre-twentieth century Ireland and its various roots and equivalent developments abroad.

**MD4031 Introduction to Popular Music and Dance Studies/Audio/Visual Technology**
The Popular Music and Dance studies section looks at the development and structure of popular music and dance production and structures.
The Technology sections aims to give the students a basic understanding of audio and visual technology, enabling them to communicate with technicians and engineers in a recording environment, or in a live performance environment. It allows students to learn the principles of the technology in preparation for future digital sound editing courses.
Faculty of Arts, Humanities and Social Sciences

For students whose talents and interests lie in subjects such as languages, history, sociology, cultural studies, music, politics and law this Faculty is an excellent choice. The Faculty of Arts, Humanities and Social Sciences is a vibrant centre of critical thought and a generator of national and international scholarship. It prides itself on the quality of its teaching and its commitment to research within a context where debate and discussion are an integral part of developing those analytical skills which are much sought after in the workplace. The research objective of the Faculty is to create a vibrant centre of critical thinking and to be a generator of national and international scholarship. It strives to facilitate postgraduate and post doctoral students to undertake research, and encourages them to be actively involved in the dissemination of their work.
CU4027 Visual Cultural Studies

This module introduces students to the fields of cultural studies to develop an understanding of culture from a European perspective. Areas covered include: the concept of culture, the English language tradition, German theories of culture, French theories of culture, gender and race, psychoanalysis, and culture and communication. Tutorials will take the theoretical aspects and apply them to present day cultural phenomena.

CU4127 Cultural Studies 5: Comparative Literature

The aim of this interdisciplinary module is to examine literatures comparatively, both from the point of view of theory, and in practice. The syllabus will deal with the different issues which arise in comparing literatures: cultural similarity and diversity; nationalism; stereotypes and archetypes; post-colonialism; the use of common sources such as the classics and the Bible; cross-national literary and cultural movements such as Romanticism and Feminism; the role of translation in accessing literature; the influence of writers both inside and outside their social, national and linguistic groups; national stereotypes and clichés in literature and varying attitudes to language. A large part of the syllabus will be given over to practical applications of the issues of chosen texts.

EF4021 English as a Foreign Language 1

This module is intended to bring the students to a higher level of proficiency in the four language skills, to advance their knowledge of English grammar, to introduce elements of socio-political and economic issues into the material for language study and to use the acculturation process as the basis for language work. It includes advanced grammar work at intermediate to advanced level, development of listening, reading, writing and speaking skills, debates and discussion of topical issues, exploitation of English language media and essay writing.

In this module, students engage with key science fiction texts and critical statements on the genre. Science Fiction’s aesthetic forms and historical development are examined to discern its complex and multifaceted relationships to contemporary society. Through various methods, students will attend to the ways in which Western (especially Anglo-American) economy, politics and culture inform and shape
specific texts and will explore how SF shapes, critiques and societies in which its producers and readers live.

**EH4158 From James Joyce to Maeve Brennan: 20th century Irish Fiction**

This module provides a critical examination of twentieth century Irish fiction, encompassing authors such as James Joyce, Elizabeth Bowen, Frank O’Connor, Kate O’Brien, and their less well-known counterparts such as the recently rediscovered Maeve Brennan. We will address the intersection of Irish cultural and social identities and these texts, examine efforts to create an ‘Irish national culture’ in the period, and construct readings of this literature through contemporary perspectives in literary and cultural theory.

**FR4141 French Language and Society 1: Introduction to French Studies**

Textual analysis and commentary, translation, summary and essay writing in the context of a variety of issues relevant to contemporary French culture and society; development of oral skills and listening comprehension; revision of all basic grammatical structures of French through the texts analysed in class; development of autonomous language-learning skills.

**FR4143 French Language and Society 3: Education and Work Environment in France**

Introduction to aspects of the world of work in France; course work will include letter writing, preparation of dossiers on specialist topics, economic and commercial translation role plays involving telephone conversations, interviews and presentations etc.

**FR4147 French Language and Society 5: France, Europe and Beyond**

Introduction to key moments in the history of France in European affairs and that of France with the francophone communities language varieties in France and the francophone countries: this will be done through the study of a variety of texts and will provide the basis for language activities including reading and linguistic analysis of authentic texts, development of written skills discussion and debate, oral presentations and translation of authentic texts; in addition students will study a work of literature from a francophone country.

**FR4241 French Language, Culture and Society 1: Introduction to French Studies**

Textual analysis and commentary, translation, summary and essay writing in the context of a variety of issues relevant to contemporary French culture and society; development of oral skills and listening comprehension; revision of all basic grammatical structures of French through the texts analysed in class; development of autonomous language-learning skills.

**FR4243 French Language, Culture and Society 3**

Introduction to aspects of the world of work in France; letter-writing, preparation of dossiers on specialist topics, economic and commercial translation, role-plays involving telephone conversations, interviews, presentations. Prerequisite FR4222

**FR4247 French Language, Culture & Society 5**

Development of language skills through reading and analysis, written and oral of authentic texts: the role of France in European affairs: the francophone communities; current issues in Translation Studies: practice in translation in a variety of areas such as technology, international affairs and commerce. Prerequisite FR4246

**FR4421 French for Engineering/Science 1**

Written and oral French in every day communication situations; essential grammatical structures and basic vocabulary. Introduction to cross-cultural awareness through audio-visual and newspaper materials; introduction to self-access material (CALL).
FR4423 French for Engineering/Science* LCS 2-2-0
Broadening of cross-cultural awareness through examples drawn from the French higher education system in the fields of Engineering and Science. Stress on functional skills in relation to French university/technical college programmes; development of CALL to elicit information from general and more technical text.

FR4621 French Literature and Culture 1: Twentieth-Century Literature in French 1: 1900-1945 LCS 1-2-1
Four literary texts will be studied; works by authors such as the following will be included: Mauriac, Gide, Colette, Giraudoux, Apollinaire, Damas.

FR4623 French Literature & Culture 3: The Enlightenment in France * LCS 2-1-0
The module will concentrate on the following themes in a variety of texts: the cosmopolitan enlightenment campaign for toleration; optimism; the philosophies and the encyclopaedia debate on inequality.

FR4627 French Literature and Culture 5: Intellectual Movement * LCS 2-1-0
Two or three areas will be chosen each year from among the following and a variety of theoretical and literary texts will be addressed: existentialism, structuralism/semiology, post modernism and feministic theory.

FR4921 French for Business 1 (Advanced) LCS 2-2-0
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; focus in the following areas: means of payment, organisational structures of firms, Company types.

FR4923 French for Business 3 (Advanced) * LCS 2-2-0
The use of authentic material (both written and oral) to increase proficiency in relevant work situations which the students are likely to encounter during their professional activity; focus is on communication networks, insurance and advertising. Prerequisite FR4922

FR4925 French for Business 5 (Advanced) * LCS 2-2-0
This module entitled 'Le monde du travail' focuses on the organisational structure of a cross section of French firms and the functions of their various departments; it includes the development of trade unions and the relationship of the social partners; students are asked to participate in a case study involving industrial issues. Prerequisite FR4924

FR4927 French for Business 7 (Advanced) * LCS 2-2-0
"La region et l'Europe"; the socio-economic identity of the regions of France; study of decentralisation and regionalisation; the techniques necessary to give a detailed presentation of an economic issue through the use of statistics, graphs and key economic phrases. Prerequisite FR4925

GA4105 Irish Folklore 1 LCS 2-1-0
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; traditional custom and belief including calendar customs. A case study in folklore collection based on field recordings made in county Limerick in 1980.

GA4115 Irish Language 1 LCS 2-3-0
This is an introductory course in conversational Irish. Topics covered include: introductions and salutations, personal details, home and family, hobbies and talents, occupations, food and drink, daily routines and health and well-being. We will also learn about the geography of Ireland’s Gaeltacht (Irish speaking regions), become familiar with certain dialect features and explore some of the many Irish language materials and resources now available on-line.
SA BHREIS AR A MBEIDH Ó LÉAMH ó thaobh na litríochta de i modúl GA4121, go gcothófaí teagmháil an mhic léinn le tuilleadh nualitríochta ó thús ré na hAthbheochana go 1940 (gearrscéalta, úrscéalta, filíocht agus drámaí); go gcothófaí scileanna anailíse agus léirmheastóireachta na litríochta.

GA4138 Litríocht agus Saíocht 4: Schribhneoiri na Gaeltac

Go bhforbrófaí teagmháil an mhic léinn le litríocht na Gaeilge dúchais; go léifeadh an mac léinn na mórshaothair litríochta a scríobh údair de chuid na Gaeltachta, agus go cuíforfadh sé aithne ar litríocht chomhaimseartha na Gaeilge, a pholaitíocht, amhránaíocht agus an bhfilíocht eile.

Prerequisite: GA4126

GA4147 Teanga, Sochála agus Saíocht 5 *

Go mbeadh ar chumas an mhic léinn an Ghaeilge a ionramháil go cruinn nádúrtha in réimse naonraíbh conamhríochta, agus go mbeadh an mhic léinn in ann an Caithdean an Mheiriceá a thabhairt a dhuine féin le chéile; Go mbeadh an mhic léinn in ann an Ghaeilge a thabhairt a dhuine féin le chéile.

GE4141 German Language & Society 1: Introduction to German Studies

Lecture: The German language, its history and relationship with other languages; political geography of the German-speaking countries; historical background to present day Germany, focus on 1871 to 1939

Tutorials: a) reading of literary texts to provide further access to the period while at the same time introducing reading techniques, principles of textual analysis and text discussion in oral and written form; b) contrastive grammar work; grammatical categories and terminology, graded English/German translation exercises, grammar in use/communicative grammar, language laboratory: exercises in pronunciation, listening comprehension and grammar utilizing CALL facilities.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>GE4143</td>
<td>German Language &amp; Society 3: Living and working in Germany</td>
</tr>
<tr>
<td>LCS 2-1-0</td>
<td>Lecture: education environment; the educational system, universities and university life, the legacy of 1968, work environment; vocational education, industrial relations, company structures, trade unions, working in the east; working in the west; the legacy of state socialism; xenophobic tendencies; Germany as a multicultural nation. Tutorials: a) discussion of authentic text material and a novel to support the lecture; focus on the development of writing skills and cultural awareness; b) grammar in context. Language laboratory: CALL exercises; language related exercises based on German TV programmes dealing with the issues covered in the lecture.</td>
</tr>
<tr>
<td>GE4211</td>
<td>German for beginners 1</td>
</tr>
<tr>
<td>LCS 1-1-4</td>
<td>The German language, its history and relationship with other languages; political geography of the German speaking countries; sociocultural and historical background to the German-speaking countries of Europe in the 19th and early 20th century; introduction to the concepts of gender, number and case and to the basic structures of the German language; German poetry and short stories; approaches to language learning, including developments of autonomous learning skills, exploitation of reference material and dictionaries, etc.; use of all laboratory facilities in their private language study.</td>
</tr>
<tr>
<td>GE4241</td>
<td>German Language, Culture &amp; Society 1</td>
</tr>
<tr>
<td>LCS 2-1-0</td>
<td>The German language, it's history and relationship with other languages; historical geography of the German-speaking countries; historical and cultural background to present day Germany, focus on 1871 to 1939. Tutorial work: Grammar/translation; introduction to basic grammatical categories and terminology; consolidation of existing grammatical knowledge and expansion into more complex structures; contrastive work by means of English/German translation exercises; Text analysis &amp; production: principles of textual analysis and text discussion (literary and non-literary); grammar in use/communicative grammar. Laboratory: 1 hour per week in the CALL/language laboratory will support grammar and oral work.</td>
</tr>
<tr>
<td>GE4243</td>
<td>German Language, Culture &amp; Society 3*</td>
</tr>
<tr>
<td>LCS 1-3-0</td>
<td>Education environment, educational systems, universities and university life, the legacy of 1968 work environment, vocational system, industrial relations, company structures, trade unions, xenophobic tendencies, Germany as a multicultural country; one hour text work; consolidates skills relating to textual analysis production, grammar in use and German English translation one hour oral discussion presentation will also focus on authentic text.</td>
</tr>
<tr>
<td>GE4147</td>
<td>German Language &amp; Society 5: Germany, Europe and Beyond *</td>
</tr>
<tr>
<td>LCS 2-1-0</td>
<td>Lecture: the debate about European unification; Germany and it's neighbours; Germany and the Third World; German economic and cultural activities abroad; the image of Germany abroad and the German self-image; German/Irish relations. Tutorials: a) discussion of texts connected with the lecture b) contrastive cultural studies including students' presentations in the foreign language; c) graded translation exercises focusing on German/English translations.</td>
</tr>
<tr>
<td>GE4213</td>
<td>German for beginners 3</td>
</tr>
<tr>
<td>LCS 1-1-4</td>
<td>The educational system, universities and university life; vocational education, industrial relations, company structures, trade unions; Germany as a multicultural nation; completion of basic structures and vocabulary of the German language, focusing particularly on grammar and lexis in context; consolidation of skills, focusing particularly on the development of speaking and writing skills and cultural awareness; German Erzählung and novel; preparation for living and working/studying in a German-speaking environment (application letters, cvs, practice of short interview situations, using the telephone, etc.)</td>
</tr>
</tbody>
</table>
material written video etc relating to intercultural issues adaptation and identity perceived differences in areas such as value systems social interaction etc: two short literary texts relating to lectures will also be discussed in this class and examined in the oral and written exams; one hour German linguistics continues with past and current developments in the German language: Prerequisite GE4242

GE4247 German Language, Culture & Society 5 *

LCS 1-3-0

Lecture: The debate about European unification; Germany and its neighbours; Germany and the Third World; German economic and cultural activities abroad; the image of Germany abroad and the German self-image; German/Irish relations. Tutorial work: Oral presentation & discussion class: drawing on text and audio-visual materials to develop formal oral skills (analysing tone & register; reporting and commentary); Text analysis & production: analysis & writing of commentaries and critiques; Translation theory and practice: scientific, technical and legal texts. Literature reading course: Students will read two pieces of literature related to the theme of the lecture. This will form the basis of 2 weeks oral discussion work and one essay in German. Prerequisite: GE4246

GE4411/GE4511 German for Engineering/Science 1 (Beginners)  

LCS 2-2-0

Basic grammatical structures and vocabulary necessary to cope in everyday situations; effective dictionary use; autonomous learning.

GE4421 German for Engineering/Science 1 (Advanced)  

LCS 2-2-0

Emphasis will be given initially to improving students’ reading, listening and spoken skills. Video and text material will be exploited to introduce students to aspects of living and studying in Germany and to revise both grammatical structures and vocabulary necessary to cope with everyday situations in such an environment. In addition to the three contact hours, students will be required to spend at least one hour per week working on a self-access basis. Such work will form part of the assessment and may include revision and consolidation of classroom materials in the computer-assisted language laboratory, guided watching of videos and satellite television, and activities reflecting students’ own individual interests in German language and culture. Students will be introduced to the principles of semi-autonomous learning which will enable them to identify their own learning needs and to develop effective learning strategies.

GE4422 German for Engineering/Science 2 (Advanced)*  

LCS 2-2-0

The module concentrates on perfecting practical skills such as writing applications, formulating CVs, and participating in job interviews. Students are also encouraged to recognise and discuss their expectations about living in a different culture. Authentic materials will be exploited throughout to provide students with an insight into potential differences in areas such as attitudes and values, work patterns and work ethic, etc. In their self-access time, students will be encouraged to follow developments in current affairs, industry and technology. Prerequisite GE4421

GE4423 German for Engineering/Science 3 (Advanced)*  

LCS 2-2-0

Further grammatical areas; internal structure of texts; aspects of living in a German speaking context; letters, short reports, CVs.

GE4421 German Literature and Culture 1: Introduction to German Literature  

LCS 1-2-1

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

GE4623 German Literature & Culture 3: Romanticism, it’s Background and it’s Legacy *
LCS 2-1-0

Lecture: critique of the Enlightenment; the Pre-romantics: Sturm und Drang; Romanticism in Europe; Romanticism in art and literature; political Romanticism, particularism and nationalism; Young Germany, Vormärz, 1848: the legacy of Romanticism in the 20th century. Tutorials: Discussion and analysis of selected writers of the romantic era including Novelist, E. T. A. Hoffmann, Eichendorff, Heine and women writers like Bettina von Arnim, Rahel Varnhagen and Dorothea Schlegel. Study of Romantic paintings (C. D. Friedrich, P. O. Runge).

GE4627 German Literature and Culture 5: Aspects of 20th Century Writing in German *
LCS 2-1-0

The works covered in this module may be drawn from the expressionist movement, Weimar and exile literature and post war writing; aspects which may be considered include literature and cultural identity, the role of literature in political change, the writer as social critic and women’s writing.

GE4921 German for Business 1 (Advanced) LCS 2-2-0

The German language, it's history and relationship with other languages; political geography of the German-speaking countries; historical background to present day Germany, focus on 1871 to 1939. Intensive revision of grammatical structures; consolidation of existing language skills and development of a basic competency in the language; equal emphasis on development of accuracy in oral and written expression; examination of socio-economic and political structures and of Germany’s cultural background.

GE4923 German for Business 3 (Advanced) *
LCS 1-3-0

Education environment and educational systems, universities and university life, the legacy of 1968 work environment, vocational system, industrial relations, company structures, trade unions, xenophobic tendencies, Germany as a multicultural country. Emphasis will be placed on enabling students to make presentations on business issues in German, introducing the concept and the importance of trade fairs (Messe); German companies in Ireland / Irish companies in Germany; issues in inter-cultural communication (German/Irish). Prerequisite GE4922

GE4925 German for Business 5 (Advanced) *
LCS 2-2-0

Provision of an adequate ability to interact in the specific situations arising within the areas chosen by students in this semester as their specialisation; familiarisation with the language of marketing and economics; introducing the language of finance and accounting; preparation and oral presentation of a case-study or report, based on the students’ own area of expertise; revision of practical skills to prepare students for Co-operative Education placements. Prerequisite GE4924

GE4927 German for Business 6 (Advanced) *
LCS 2-2-0

Preparation and oral presentation of a case-study or report based on the students’ own experience during Cooperative Education; the translation of general and business texts and documents from the foreign language; how to research Business subject matter. Analysis and familiarisation with current socio-economic issues in Germany. Prerequisite GE4925

GY4013 Social & Urban Geography SOC 2-1-0

Development and scope of social geography, paradigms, patterns and processes; change and development within rural communities; urban patterns, residential location, territoriality, intra-urban mobility,
segregation; urbanisation as a social process, problems of growth and decay.

**GY4016 Economic Geography**  
SOC 2-1-0
The economy and economic geography; manufacturing activity and least cost location theory; Weberian location theory; transportation cost as a factor of location; production costs and location; scale and agglomeration; spatial behaviour of large organisations; deindustrialisation and tertiarisation; nature of service activity; market area analysis; central place theory; quaternary activities and office location; location and public policy.

**GY4031 Introduction To Human Geography**  
SOC 2-1-0
Why human geography is worth doing; what human geography writes for students to read; worldviews through the eyes of the human geographer.

**HI4007 Historiography**  
HIS 2-1-0
The syllabus will be principally designed around discussions on questions of historiography and how past and recent controversies provide insights into interpretative differences for understanding both history and myth; enlightenment and romanticism; thinkers, philosophers and philosophies of history/historicism; empiricism and ‘scientific’ history; the influence of propaganda and secrecy; Marxism; the Annales school; revisionism; post-colonialism; gender and ethnicity; the peripheries of historical knowledge; the archive; subaltern studies; memory and remembering to forget; public history and commemoration; the end of history?

**HI4031 Early Modern Europe and Ireland**  
HIS 2-1-0
Defining Ireland - Anglo-Irish and Gaelic lordships; Habsburg world ascendancy; the revolt of the Netherlands; the Nine Years' War and the Flight of the Earls, 1593-1607; religious conflict in France, 1559-1594; the survival of Spain as a composite monarchy in the seventeenth century; the Thirty Years War, 1618-48; Sweden, Poland and the Baltic world; 'matters of Grace and Bounty' - Wentworth and Charles I; France in the age of Cardinal Richelieu and Louis XIV; crisis and rebellion in the British kingdoms, 1637-53; Dutch economic primacy in the seventeenth century; a catholic King and protestant kingdoms: 'Glorious' Revolution and Williamite conflict; Austria, Britain and the Dutch Republic as rivals to Louis XIV; Leopold I and the re-conquest of Hungary; the partition of the Spanish Monarchy, 1703-1713/14.

**HI4041 Diplomacy, Government and the State, 1560-1660**  
HIS 2-1-0
The political geography of early modern Europe - Ireland in its broader context; diet, demography and disease; reaching out to the hearts and minds of the common people - literacy and preaching during the Reformation and Counter-Reformation; a society of estates - nobles, clergy, merchants and peasants; family life - birth, marriage and death; agriculture and commerce; political and religious conflict in Ireland and Europe; military revolution - battles, mercenaries and professional armies; republics, diplomacy, absolutist states and composite monarchies; the structure of state building; fiscal terrorism; the general crisis of the mid-seventeenth century; the development of capital cities; court society and the world of the favourite; Irish plantation and European expansion; witchcraft, medicine and the scientific revolution.

**HI4043 Europe: Enlightenment and Revolution, 1715-1848**  
HIS 2-1-0
The decline of belief in witchcraft and the scientific revolution; the emergence of Russia as the leading power in eastern Europe; Europe at peace, 1715-40; the expansion of Britain as a world power; the Enlightenment and its impact on economy, society and politics; the Enlightened absolutists: Joseph II and Catherine the Great; Spain in the eighteenth century; the rise of Prussia and the diplomatic revolution of 1756; the role of women at the court of Louis...
XV; the collapse of the Old Regime in the 1780s; the French revolution; European radicalism in Britain, Poland and the Low Countries; Napoleonic Europe; the Congress of Vienna and the balance of power in the early nineteenth century; reaction, conservatism and romanticism, 1815-30; social and parliamentary reform in Britain and France after 1815; Austria in the age of Metternich; the revolutions of 1848.

HI4053 Ireland: 1750-1850

People, time and place; societies, economies and cultures - a disunited kingdom and discontented colony; regionalised society and owning, managing and working the land; landlord, middleman, peasant-proprietor and landless labourer: the rural economies; subsistence, markets, production and surplus; the long-term demographic trend; the demographic transition; the key components of population change, fertility, mortality, migration; family and household structures and functions - gender, sexuality and patriarchy; proto-industrialisation, urban growth, and the modernisation of manufacturing industry; breaking and making the union; political elites and the changing franchise; parties, patriots and politics; professional society and the urban proletariat; the transformations of language use - Anglicisation 1750-1914; a revolution in literacy, schooling and acculturation; the failure of economic capacity - coping with poverty; rural prosperity and rural crisis; the triumph of capitalism.

JA4211 Japanese Language, Culture and Society 1

Listening practice leading to recognition of numbers, times, days, dates, locations; conversation practice based on grammar structures and vocabulary necessary to introduce oneself politely, ask basic questions, explain schedules, and talk about pastimes; reading and writing practice introducing the hiragana and katakana writing systems and 80 kanji, progressing from the understanding of notices and posters to descriptions of people’s everyday lives; writing passages involving self-introduction, daily routines, hobbies, and shopping; also discussion in English about Japanese customs, culture and society.

JA4213 Japanese Language, Culture and Society 3

Understanding of instructions, needs and wants, descriptions of events in order. Speaking exercises explaining actions in sequence, telling stories, making requests and asking permission. Reading more demanding passages about Japanese life and society. Written exercises concentrating on descriptions and narratives; also memos, letters and notes. Study of a further 170 kanji to bring the total up to 250 characters. Discussion of modern Japanese culture, literature and films. Prerequisite JA4212

JA4217 Japanese Language, Culture and Society 5

Authentic listening practice, especially broadcast news; test items from JLPT level 2 tests; speaking practice involving further use of polite language; presentations about work experience and current affairs; spoken summaries of reading and broadcast material; reading of authentic passages including news stories and literature; translation of a variety of passages into English; writing of summaries, descriptions, and letters of various levels of formality; study of a further 150 kanji. Prerequisite JA4216

JA4511 Japanese for Engineering/Science 1

Basic daily conversation through role-playing exercises and pronunciation practice in the language laboratory; the Japanese syllabary alphabets (Hiragana and Katakana); elementary grammatical structures: simple question and answer exercises; elementary descriptive writing, introducing oneself: introduction to the first 30 kanji. Prerequisite JA4512

JA4513 Japanese for Engineering/Science 3 *

Further basic grammatical structures including verbal plain forms; vocabulary expansion through functional exercises; introduction of a further 75 kanji; basic personal correspondence and communication. Prerequisite JA4512
JA4911 Japanese for Business 1  
LCS 2-3-1
Elementary daily conversation through role play exercises and pronunciation practice in the language laboratory; simple question and answer exercises; the Japanese syllabary alphabets (Hiragana and Katakana); elementary descriptive writing, such as introducing oneself; introduction of the first 50 kanji; elementary grammatical structures.

JA4913 Japanese for Business 3 *  
LCS 2-3-1
Vocabulary expansion and consolidation through audio-visual materials; introduction of a further 80 kanji; kanji consolidation through selected Japanese texts; basic personal correspondence, i.e. letter of greeting; basic conversation skills through sketch presentation, e.g. visiting, receiving visitors, etc.; further basic grammatical structures.

JA4915 Japanese for Business 5 *  
LCS 2-3-1
Business presentation in Japanese, i.e., describing a company and explaining its products; basic business communication, e.g., discussing trade terms and patents and reporting in business talks on what has been discussed; consolidation of basic grammatical structures; introduction to a further 70 kanji (Total 360).

JA4917 Japanese for Business 7 *  
LCS 2-3-1
Business project in Japanese: advertisements in both written and oral forms; further business communication: discussing price and quantity; introduction and intermediate grammatical structures; introduction of a further 70 kanji (total 430)

JM4001 Professional Skills for Journalism 1  
LCS 1-0-2
In Professional Skills for Journalists students will learn to find stories through observation exercises, vox pops, and internet and other research. They will learn the principles of professional editing for print, including headline and standfirst writing, and cutting to length, and how to design for print and websites. They will be introduced to the principles of broadcast news writing, and the principles of illustrating news, including taking photographs and generating graphics.

JM4021 Journalistic Writing 1  
LCS 0-1-2
In Journalistic Writing 1, students will learn news writing, through practice and by analyzing professional work. They will create their own news stories from their own notes and documents, and will practise writing intros and structuring a news story both for print and the internet. They will be helped to begin writing for student publications and their own blogs and will be encouraged to contribute to web forums on journalistic matters.

JM4441 Shorthand 1  
LCS 0-0-4
Shorthand is the preferred recording method for professional journalists. Through regular practice, students will begin to: develop the listening skills and basic elements of a recognised form of shorthand, learn to read and transcribe their notes fluently and accurately, and identify any particular challenges they have in relation to language skills, rectifying these through independent work. Students will also be expected to look for opportunities outside the contact hours to practise their shorthand skills on a regular basis.

LA4001 Legal System and Method  
LAW 2-1-0
The concept of law, common law, civil law in Europe; sources of law; the administration of Justice in Ireland; Classification of law: municipal, international, substantive, procedural, public, private; elements of the Constitution of Ireland; legal reasoning and methodology.

LA4022 Commercial Law  
LAW 2-1-0
Review of US anti trust legislation, enforcement mechanisms, the relationship between intellectual property rights and competition abuses; remedies at Law and Equity, alternative mechanisms for dispute resolution, arbitration, private courts, negotiation; bankruptcy, personal versus corporate, historical evolution, philosophical
basis. Bankruptcy Act 1988, comparative views for the US.

LA4035 Labour Law

Nature of labour law; protective legislation and conditions of employment; termination of employment; trade unions; courts and tribunals in labour law.

LA4111 Contract Law 1

Formation of contracts: offer and acceptance; intention; doctrine of consideration; formal and evidentiary requirements; void, voidable and unenforceable contracts; construction/interpretation of contracts; intention; parole evidence; express and implied terms; public interest restrictions on contractual freedom; illegality; privity; competition policy; doctrine of restraint of trade; consumer protection.

LA4211 Criminal Law 1

Historical and ethical consideration of criminal law; characteristics of a crime; parties to a crime: principal and accessories; vicarious liability; elements of a crime; actus reus; conduct; omissions; status; mens rea: intention; recklessness; criminal negligence; men in penal statutes; offences of strict liability; general defences; infancy; insanity; automatism; intoxication; mistake; necessity; duress; self defence; inchoate offences: attempt; incitement; conspiracy.

LA4310/LA4330 Law of Torts 1

Nature and function of Torts; negligence; breach of statutory duty; general defences in tort; parties.

LA4410 Public Law 1

The historical background to the 1937 Constitution; the legal nature of the Constitution; the legal personality of the State; sovereignty; the juridical nature of the claim to territory in Articles 2 and 3; Separation of powers; office of the President; the Oireachtas; the Dáil; the Seanad; the executive. The law of local government. International relations and membership of the EC; judicial power; constitutional litigation; constitutional interpretation.

LA4510 Law of Business Association

Introduction to Business Associations: companies sole traders and partnerships; the historical development of company law; effects of incorporation; separate legal personality; torts and contracts; lifting the veil; limitation of liability; distribution of assets on winding up; majority rule; minority protection; formation of a company; Memorandum and Articles of Association; flotation; application for allotment of shares; commencement of business.

LA4610 Land Law 1

The nature of land law and its historical evolution, the concept of estates and tenure; freehold estates; fee farm grants; fee simples; fee tails; life estates; pyramid titles; future interests; incorporeal hereditaments; co-ownership; lesser interests in real property including licences and covenants; registration of interests in real property; extinguishments of interests; adverse possession; merger.

LA4620 Land Law 2

The concept of public control on the use, transfer and development of real property; methods of real property transfer of ownership; public restrictions on the use of real property; landlord and tenant law, nature and creation of the relationship, determination of the relationship, statutory control of tenancies, public welfare codes; the laws relating to succession, statutory control of the right to devolve property upon death, wills and intestacies.

LA4713/LA4723 Law of European Institutions*

The Treaties of the European Communities and European Union as amended; Legal personality - in national and international law: Institutions/bodies; Sources of Community law; Nature of Community law; new legal order; supremacy of Community
law; direct effect; direct applicability; Ireland and the EC and EU; constitutional referenda; method of incorporation; the European Communities Acts, 1972-1995; Oireachtas scrutiny of secondary legislation; Relationship between Community and national law; methods of incorporation in different Member States. Prerequisite LA4001

LA4810 Equity and Trusts 1

LAW 2-1-0

The nature of Equity, priorities, registration and notice, mortgages; equitable doctrines, conversion, election, satisfaction and ademption, performance, donations mortis causa; equitable remedies, the injunction, specific performance, recession, rectification, declaration and tracing.

LA4901 Principles of Law

LAW 2-1-0

The concept of law, common law and equity, historical development, precedent and legal reasoning, the civil law system in Europe, Community Law; sources of Law, the 1937 Constitution, the European Treaties, statutes, case law, custom; the Administration of Justice in Ireland, court structure and jurisdiction, legal and equitable remedies; role of law in the business environment, it's function and methods, legal philosophy in business law, substantive issues of law: constitutional law; property law; law of torts; criminal law; business ethics and the law.

L4113 Language Technology

LSC 2-1-0

Overview of computer applications in modern languages, including machine translation and computer aids for the translator; corpus linguistics; terminology management and on-line dictionaries; CALL applications; practical seminars in the CALL lab; develop skills in word-processing in the target language, text structuring and text editing.

L4211 Linguistics 1

LCS 2-1-0

Definition, properties, functions of language; history and development of linguistics; basic linguistic concepts; grammatical categories; levels of linguistic analysis - phonology, morphology, syntax, semantics; language history and change, language families, the Indo-European heritage; language varieties dialect register, standard issues in pragmatics, text and information structure; conversation and discourse analysis; speech acts, direct and indirect.

LP4003 Language Pedagogy 1

LSC 2-2-0

Theories of language, language teaching/learning, particularly Communicative Approach; teaching vocabulary, pronunciation and grammar; balancing productive and receptive skills; culture and language; traditional and new technologies in language teaching/learning; (non-)traditional assessment procedures; marking, recording and reporting; national syllabi; the professional language teacher; languages in the post-primary curriculum; international links, engendering openness to other cultures and languages.

PA4012 Paragovernmental Organisations

PPA 3-0-0

Paragovernmental organisations (state-sponsored bodies) in the Irish public service; commercial and non-commercial agencies; legal, structural and financial characteristics of state-sponsored bodies; the structure of accountability; ministers, management and the houses of the Oireachtas; the rationale for and impact of state enterprise in Ireland; efficiency and performance appraisal in state enterprise; privatisation; paragovernmental organisations in comparative perspective.

PA4017 Sub National Government in Europe: Challenge and Change

PPA 2-1-0

Using a comparative approach [within a Joint European Module subscribed to by 11 European universities] this course aims to explore the changing relationships between the different levels of government and to examine the origin, nature and implications of the challenges facing sub-national governments in Europe.
PA4021 Ideas & Concepts in Public Administration

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

PL4017 Regional Development

What are regional development policies? Socio-economic data (Ireland and Europe); theoretical perspectives on regional development; regionalism and regionalization; regionalization and economic development; EU regional policy; sustainable development; Irish regional policy; National Spatial Strategy; Irish environmental policy; regional development issues in CEE.

PO4011 Introduction to Government & Politics

The modern state and political regimes: state power, democracy, authoritarianism, totalitarianism, regime change; the main approaches to the analysis of political power; Marxism, elitism, pluralism, corporatism, collective action; political behaviour in democracies; parites and electoral systems.

PO4018 International Relations

International relations at the macro-level; cyclical and linear theories; utopianism versus realism; systems theory; international organisation, interdependence and regime theory economic theories; Marxism, imperialism and neo colonialism; and world society models: foreign policy analysis; decision-making models; the role of personality, beliefs and perceptions; culture; political regimes; and state-society relations.

PO4023 Comparative European Politics

Introduction to comparative European politics; provides a basic understanding of the organisation of European governmental systems; the role of political parties; party families; voting behaviour; majoritarian and consensual Democracies and the politics of individual European states.

PO4027 International Organisations & Global Governance

The origins of international organisations and their place in liberal internationalist thought; the successes and failures of the league of nations system; the united nations system and its internal processes; regional organisations; non-governmental organisations and global governance; international organisations and the search for political and military security; functional-technical co-operation at the regional and global level; global governance and the post-cold war global political economy.

PO4028 The Politics of Ethnic Conflict

The rise of ethnic conflict in Europe; language and religion as sources of division; mechanisms for the regulation or reduction of conflict; selected cases of ethnic conflict in Europe; domestic and external factors influencing the pattern of inter-group relations; the pursuit of solutions to ethnic conflict: the sources of the conflict in Northern Ireland; religion as an ethnic label; the transition from the pursuit of civil rights to the pursuit of national rights; the search for an internal solution based on power sharing; the Irish and British dimensions.
The politics of the Soviet Union and Russia, including some of the most salient features of the Soviet political system; the origins and development of the Soviet system; the Communist Party of the Soviet Union and the Soviet State; the centrally planned economy; the pre-crisis situation at the beginning of the 1980’s; the crisis that it faced in the early 1980’s; the development of the Gorbachev reforms; the rise of Russia and the Republics; the politics of collapse; constitutional dilemmas and economic collapse in the post-Soviet policy agenda; the post Soviet struggle for power; the choices made by Russia’s rulers in 1991-1992; political development in Russia; the progress made towards a market economy and democracy; the new economy; vested interests versus the public good; interest representation, elections and public opinion; sub-national politics, Russia and the World; the Putin Presidency.

This course addresses the question of why national identities and nationalist movements remain so influential in shaping popular politics. In the first part of the course we will begin by considering a range of explanations for the emergence and development of nationalism. Subsequently we will explore the variety of national identities and movement that are generated in different social and historical contexts. We will do this through looking at four case studies.

'INTRODUCTION TO SOCIOLOGY' aims to introduce students to the subject matter of contemporary sociology. It will familiarise students with the key concepts used within sociological analysis and demonstrate, using illustrative materials, the uses and continued importance of sociological analysis in the modern and post-modern world. By the end of this module you should be able to define sociology; appreciate the advantages of a sociological imagination; recognise some of the key figures in the development of sociology and relate them to established sociological perspectives; identify, compare and contrast the key features of these perspectives; distinguish a range of research tools used by sociologists and appreciate key ethical principles of sociological practice.

Theories of modernisation and change, the concept of dependency and underdevelopment, world systems theory; implications for socio-economic change in the third world; social consequences of sectoral growth and decline; organisations of socio-economic activity with particular reference to multinational corporations (MNCs) and small and medium-sized enterprises (SMES); changes in the structure and experience of work and unemployment; the response to local development groups and state agencies to socio-economic change.

Ethnography, fieldwork, participant observation, non-participant observation, evaluation studies, content analysis of both documents and interviews, reliability and validity in qualitative research; the location of these methods within grounded theory; writing up qualitative research.

Sociology and the analysis of media and communications; The Conflict Perspective: Ideological analyses of the media; The Interactionist Perspective: Analyses of message production; Users and Gratification's and Reception Analysis approaches to the Media Audience; The Politics of the Popular; TV Drama and the coverage of social issues with specific reference to Feminist Perspectives on the media. Media Representation of the Economy; The work of the Glasgow Media Group; Media Representation of Poverty and Inequality; Media Globalisation: More Choice or Just More Channels.
SO4048 Women, Welfare and the State
SOC 2-1-0
Social policy; the role of the state; women as supporters or supported; the assumptions implicit in a social welfare system; the nature, extent and source of women’s poverty; the concept of the feminisation of poverty; policies facilitating/inhibiting women’s economic dependency; community care; women as unpaid carers; policies involving the elderly; policies concerning child care - in two parent and lone parent settings and their implications for women; ‘women oriented’ family support programmes; caring for carers.

SO4053 Investigating Social Reality
SOC 2-1-0
Competing assumptions underlying research methodologies, the research process, initiating social research, ethical considerations underlying the research process, designing a research brief, exploring the potential, relevance and effectiveness of a variety of techniques such as interview techniques, non-participant observation and the use of secondary sources.

SP4131 Spanish for Beginners 1
LCS 2-1-0
Students acquire basic reading and writing skills by being exposed to authentic and simplified language material both written and oral; emphasis will be given to oral skills both listening and speaking; special attention will be given to those sounds with which the student is not familiar; introduction to Spanish as a romance language Spanish in Spain and beyond Europe Spanish syntax semantics and phonology.

SP4133 Spanish for Beginners 3 *
LCS 3-3-0
Introduction to new grammatical structures and expansion of vocabulary dealing with a wide variety of real life situations; students will learn the grammar and lexicon needed to give an account of a personal experience, give personal opinions and express judgement and feelings in Spanish and practice translating these structures: the lecture hour will deal with life in Spain and Latin America - the education system, the work environment and general traditions.

SP4141 Spanish Language and Society 1: Introduction to Spanish Studies
LCS 2-1-0
An overall revision of Spanish grammatical structures and their usage; text analysis and exposure to a variety of writing styles; oral discussion and presentations of topics relevant to the theme of the general lectures; Spanish language; it’s history and linguistics; the Spanish-speaking countries; political geography, Spanish variations and dialects.

SP4143 Spanish Language and Society 3: Education, Work and Business in Spain and Latin America*
LCS 2-1-0
Spain and Latin America's relevant issues in the world of education, work and business: a look at legends, traditions, beliefs and fiestas from an anthropological perspective and as preparation for study/work abroad period.

SP4147 Spanish Language and Society 5: Spain Europe and Beyond *
LCS 2-1-0
Vocabulary and grammar problem areas for English speakers; contrastive language analysis by use of translation of various types of text; cultural, linguistic and political relationship between Spain and hispanoamerica; Spain's political role within the EU; EU legislation and developments and their effects on Spanish soil; Spanish-Irish relations; Latin American-Irish relations.

SP4231 Spanish Language, Culture & Society 1 (Beginners)
LCS 1-4-1
An overall revision of Spanish grammatical structures and their usage. Text analysis and exposure to a variety of writing styles. Oral discussion and presentations of topics relevant to the theme of the general lectures. Spanish language: it’s history and linguistics; the Spanish-speaking countries: political geography, Spanish variations and dialects.
SP4233 Spanish Language, Culture & Society 3* (Beginners)  
LCS 1-4-1  
Spain and Latin America's relevant issues in the world of education, work and business. A look at legends, traditions, beliefs and 'fiestas' from an anthropological perspective and as preparation for study/work abroad period.

SP4241 Spanish language, culture & Society 1 (Advanced)*  
LCS 2-1-0  
An overall revision of Spanish grammatical structures and their usage. Text analysis and exposure to a variety of writing styles. Oral discussion and presentations of topics relevant to the theme of the general lectures. Spanish language: it's history and linguistics; the Spanish-speaking counties: political geography, Spanish variations and dialects.

SP4243 Spanish Language, Culture & Society 3* (Advanced)  
LCS 1-2-1  
Spain and Latin America's relevant issues in the world of education, work and business; a look at legends, traditions, beliefs and 'fiestas' from an anthropological perspective and as preparation for study/work abroad period;

SP4247 Spanish Language, Culture & Society 5* (Advanced)  
LCS 1-2-1  
Students are introduced to a variety of EU-related topics which are then covered in more detail during the discussion hour, Spain's political role within the EU, EU legislation and developments on Spanish soil, Spanish-Irish relations and Latin-American-Irish relations are examples of these topics, students also pursue more advanced translation and writing.

SP4001 Who are the Spaniards: Introduction to Spanish Culture  
LCS 1-2-0  
This module offers an introduction to the most important events and movements in Spanish culture. It focuses mainly on the cultural impact of the Spanish Empire, the Spanish Civil War, the dictatorship of Francisco Franco, and the Transition to Democracy. Through the use of literature, music, film and other forms of culture, the module will serve as a platform for the exploration of up-to-date socio-political issues in Spain and their effect on cultural production.

SP4623 The Spanish Golden Age  
LCS 1-2-0  
One weekly lecture which will focus on the historical and socio-political background to the era being studied, and which will introduce the artists and writers whose works will be studied in this course; Velazquez; El Greco; Garcilaso de la Vega; Cervantes; Lope do Vega; Tirso de Molina; two tutorials in which literary and artistic works will be studied in detail.

SP4627 Twentieth Century Trends in Hispanic Literature  
LCS 1-2-0  
This module aims to analyse the major cultural developments in Hispanic literature of the twentieth century and to focus in particular on four major trends: Latin American modernismo and it’s legacy in Spain; surrealism in art and literature; magical realism; and the 1980’s boom in women’s writing with particular regard to the relationship between feminism and popular culture.

TW4115 Technical Writing1  
LCS 2-2-0  
Cognitive processes; reader analysis, readability factors; language/text structures; usability factors; peer review; user testing; practice on a range of writing techniques and strategies.
WS4003 Contemporary Women's Writing

This module introduces students to key issues in contemporary women’s writing, through a historically-grounded analysis of women’s fiction from the 1960s to the present day; topics to be covered include: the feminine mystique and women’s postwar fiction; motherhood and the politics of reproduction; working-class women’s fiction; woman-centred and feminist fictions; the confessional narrative and lesbian fiction; diasporic women’s writing; fantasy, science fiction and detective fiction; postmodern fiction. Possible authors for discussion include Doris Lessing, Alice Walker, Sylvia Plath, Amy Tan and Jeanette Winterson.

WS4011 Feminist Perspectives: An Introduction

The nature of women’s studies; an introduction to the main theoretical frameworks (viz Liberal; Radical; Psychoanalysis; Marxist and socialist; Existentialist and post-modern); exploration of topics (paid work; motherhood; violence etc.) in the context of these frameworks; a critical evaluation of multifactorial frameworks and their relevance in understanding the position of women in Irish society.

WS4018 Gender, Identity, Culture, Society

The aim of this inter-disciplinary course is to examine the historical, literary and social construction of identity and citizenship as this relates to women in contemporary society. It will examine the extent to which the sense of self, of home, of community, of nationality are gendered notions and their consequences for women. In addition, a comparative approach will be used to allow for an exploration of these themes within a multi-cultural context.
The Faculty of Education and Health Sciences (EHS) is an exciting development at the University of Limerick. The Faculty was newly created in January 2008 as part of a substantive academic restructuring at the University. This has resulted in bringing together in a new Faculty a number of related disciplines in the Department of Education and Professional Studies, Department of Physical Education and Sports Sciences, Department of Physiotherapy, Department of Psychology, Department of Nursing and Midwifery, Department of Occupational Therapy, Department of Speech and Language Therapy and the School of Medicine (Graduate Entry).

Those interested in post primary teaching as well as those interested in working in the health sector will find some of the most progressive programmes in these applied fields of study in the country. There are opportunities for clinical and educational placements as well as dedicated supervision from faculty members committed to the highest standards of teaching and quality research.
**EN4001 Introduction to Teaching**  
**ED 2-1-2**

Participants will be able to develop the personal and technical skills to enable them to fulfil their role as facilitators of learning, though an emphasis on small-group work and through the strategies of micro-teaching in an enquiry-oriented, reflective approach. They will study and implement the following elements of the teaching role: the nature of teaching and learning by self planning and preparation, lesson presentation skills, using questioning, group work, independent studies, lesson management, equity, classroom climate, assessment, reflection and evaluation.

**EN4003 The Planning & Management of Classroom Learning**  
**ED 2-1-0**

The Junior Certificate considered as a context for school learning and curriculum planning; the objectives model and the process model; using the models appropriately; assessment of student learning; curriculum evaluation; understanding the pupil from psychological, cognitive and humanistic perspectives; various theoretical and empirical approaches to learning and classroom management, learning styles; the social psychology of the classroom; roles, group dynamics, social interaction. Prerequisite **EN4002**

**EN4005 Education & Society in Ireland**  
**ED 2-1-0**

Introduction; the changing economic and occupational structure 1926-91; the changing social structure; the role of the state in education provision and control; the role of the churches in education provision and control; patterns of demand and provision; 1924-1956; patterns of demand and provision; 1956-1991; external influences; OECD, council of Europe and EU; reforming provision and control; 1960-90; assessing the significance of educational change.

**EN4007 Studying School Organisation**  
**ED 1-1-1**

The school as a social organisation; structure and organisation of schools; managerial bodies; church state relations in education; classification and framing of knowledge; ritual in education; co-education; selection and streaming; research methods in education.

**PS4031 Psychology and Everyday Life**  
**2-1-0**

This module will introduce students to a range of fundamental theoretical perspectives and issues in general psychology through examining their relevance in everyday life. Through exploring everyday issues students will not only learn about theoretical perspectives but will also gain a basic knowledge of how psychology may be applied. In addition, through exploring some key studies in psychology, students will gain a basic understanding of the main investigative techniques used by psychologists. The range of topics will include: definitions of psychology; attachment; sleep, eating aggression and biological basis of behaviour.

Numbers are limited on PS4031. The module is subject to availability on arrival at the University of Limerick.

**PY4011 Physical Education Curriculum and Assessment**  
**PESS 2-1-1**

This module will examine physical education in contemporary Irish society, focussing on Junior Cycle, Senior Cycle and Leaving Certificate. Discussion of teaching styles, curriculum models and instructional models in physical education will be encouraged as will the rationale for assessment in physical education and examinable forms of the physical education subject in Scotland, Ireland, England and Wales, Australia.

Numbers are limited on PY4011. The module is subject to availability on arrival at the University of Limerick.

**PY4031 Foundations of Teaching and Learning Physical Education**  
**PESS 2-1-1**

The module will examine possible models of pedagogy and identify how each can be justified within contemporary Irish physical education. Students will teach individuals and small groups within their own class and then in a school context where they will work as an ‘assistant teacher’ within a structured context.
Numbers are limited on PY4031. The module is subject to availability on arrival at the University of Limerick.

**PY4041 Applied Studies in Health Related Activity/Aquatics**

Health Related Activity: Structure, phases and components of cardio-vascular endurance and resistance training classes/sessions. Safe selection, structuring and teaching of appropriate exercises. Adaptations and progressions and training principles. Aquatics: Effects of being in water on balance, propulsion and resistance; observation of differences in buoyancy; entering water safely in a variety of ways; analysis of concepts outlined above and understanding of efficient movement related to stroke technique.

Numbers are limited on PY4041. The module is subject to availability on arrival at the University of Limerick.

**PY4043 Applied Studies in Athletics/Aquatics**

Introduction to athletics via specific events and ‘athletics related activities’, both derive from the learning of fundamental motor skills (namely running, jumping & throwing) and all are taught with an emphasis on safety. The aquatics element concentrates on stroke work, lifesaving skills and other water-related activities. There is an equal emphasis on the student as learner and student as teacher, teaching points & ideas will be stressed throughout the course.

Numbers are limited on PY4043. The module is subject to availability on arrival at the University of Limerick.

**PY4045 Applied Studies in Dance/Games**

Games: Skills and rules/concepts of games will be addressed from the perspective of developmental physical education. The skills, initially fundamental and then sport specific related to net and fielding games will be examined. Attention will be given to the developmental of tactics and individual/team plays in a game context.

Dance: Content will include the theoretical context of dance, planning dance material, stimuli, observation and the process of making, rehearsing and performing a dance.

Numbers are limited on PY4045. The module is subject to availability on arrival at the University of Limerick.

**PY4053 Philosophy and Aesthetics in Physical Education**

This module in philosophy aims to introduce students to a mode of inquiry that will allow them to analyse and reflect on human movement in Physical Education and in the Arts. The branch of philosophy called Aesthetic will be of particular relevance in this inquiry.

Numbers are limited on PY4053. The module is subject to availability on arrival at the University of Limerick.

**PY4054 Applied Studies in Outdoor Adventure Education**

This module will allow you to design and deliver a themes based approach to outdoor and adventure education in Ireland. Adventure themes will include building trust, communicating, team challenge and problem solving, and low level initiatives. Additional concepts to be developed include a full value contract, challenge with choice, and processing of the adventure. The outdoor focus will be camp craft, basic skills of orienteering, hill walking, dragon boat paddling, basics of kayaking, prevention, causes and treatment of hypothermia in the outdoor environment, care of the environment, selecting an Adventure centre and developing its use as a compliment to your physical education programme.

Numbers are limited on PY4054. The module is subject to availability on arrival at the University of Limerick.

**PY4055 Sociological Concepts of Teaching and Learning in Physical Education**

The module will introduce socialisation into and through physical education and sport. Theoretical paradigms in the sociology of sport will be examined. Social development through physical education will also be
examined and inequality issues arising within school physical education. Content related to the body, culture and physical activity, the games ethic, media and commercialisation will be examined in relation to how such issues have affected, and are currently affecting, the teaching of school physical education and games. Numbers are limited on PY4055. The module is subject to availability on arrival at the University of Limerick.

PY4063 Applied Studies in Dance / Gym

An understanding of how tasks for teaching are compiled and developed in both movement forms will be pursued. Students will be given opportunities to select and develop appropriate movement stimuli for use in teaching, applying principles of composition to the themes of unison/canon, assisted balance, rhythmic patterns, counter tension and assisted flight. Also in gymnastics students will develop themes including locomotion, transference of weight, flight, body shape, levels and directions and partner work. Numbers are limited on PY4063. The module is subject to availability on arrival at the University of Limerick.

PY4065 Integrated and Inclusive Physical Education


SS4105 Psychology 4 Analysis of Motor Skill Performance

Psychology and learning; psychology and motor skills; the scientific method and motor skills; development of motor skill theory; defining and classifying motor skills; stages of learning; information processing in skill; structure and function of the neuromuscular system; roles of vision and proprioception; attention; memory; individual differences; implications for teaching/coaching and performance; consideration of the ecological approach to motor skills; practice and learning; structuring practice, demonstration, feedback, transfer, guidance, effects of fatigue, theories of motor learning. Numbers are limited on SS4105. The module is subject to availability on arrival at the University of Limerick.

SS4127 Applied Exercise Psychology

The aim of this module is to provide students with current knowledge and a sound understanding of psychological issues pertaining to exercise and physical activity behavior. Physical inactivity is recognized as a lifestyle that carries considerable risks for poor health. The challenge of increasing the level of physical activity in the population requires an understanding of individual and situational factors, which inhibit regular activity. This module will deal with the psychological theory and practice of increasing physical activity. Finally, the psychological benefits of physical activity are important health benefits which will be explored in this module.

SS4202 Physiology 1: Introduction to Human Physiology

The power-endurance continuum of sport and exercise. The physiological requirements
of selected sports. An introduction to systems physiology concentrating on structure and function. An introduction to homeostasis and homeostatic control.

SS4203 Physiology 1: Introduction* \Delta
PESS 2-0-2
Organisation of the human body into systems, organs, and tissues; introduction to the following systems in exercise and sport: nervous, cardiovascular, respiratory, endocrine, uro-genital and digestive systems; the musculo-skeletal system with respect to movement and exercise. Prerequisite BC4902 Numbers are limited on SS4203. The module is subject to availability on arrival at the University of Limerick

SS4205 Physiology 3: Physiological Monitoring*\Delta
PESS 2-0-2
A critical examination of methods of evaluation of and monitoring the various aspects of physical fitness including cardio-respiratory fitness, local muscle endurance, muscle strength, muscle speed, joint flexibility and body composition; research methods including note-taking, record-keeping and referencing; writing and regular reporting to supervisor; adherence to academic standards of accuracy and honesty. Prerequisite BC4204 Numbers are limited on SS4205. The module is subject to availability on arrival at the University of Limerick

SS4207 Physiology 4: Nutrition, Fluid and Electrolyte Balance* \Delta
PESS 2-0-2
Food as a source of energy and essential nutrients; metabolism of food; energy balance; diet and health; obesity and eating disorders; measurement of nutritional status; intake of nutrients, water and electrolytes before, during and after exercise; fluid balance; carbohydrate loading and other sports nutritional techniques; ergogenic aids; drugs in Sport including 'blood doping'. Numbers are limited on SS4207. The module is subject to availability on arrival at the University of Limerick

SS4302 Anatomy & Kinesiology\Delta
PESS 2-0-2
Anatomical terms and definitions; identification and function of musculo-skeletal systems; joint articulations, motions and range of movement; origin, insertion and action of main skeletal muscles; kinesiology of head and neck, shoulder girdle, arm, trunk, pelvic girdle and leg; basic neuromuscular kinesiological analysis of simple movements including posture; injury prevention analysis and programmes; functional anatomy. Numbers are limited on SS4302. The module is subject to availability on arrival at the University of Limerick

SS4305 Biomechanics 3* \Delta
PESS 2-0-2
Calculation of loads acting on participant in sport and exercise; net joint movements and forces; bioengineering models; measurement or estimation of muscle forces including the use of EMG; estimation of loads in bones and soft tissues; mechanical properties and behaviour of biological tissues; injury causes and prevention; aspects of techniques in sport and exercise; surfaces; shoes; other protective equipment; effects of equipment on movement patterns and their optimisation; other equipment; evaluation of rehabilitation procedures. Prerequisite SS4303 Numbers are limited on SS4305. The module is subject to availability on arrival at the University of Limerick

SS4308 Biomechanics 5 (3d analysis of sports activities)* \Delta
PESS 2-0-2
To develop skills in 3D analysis of motion and apply 3D analysis techniques to selected sports activities. To examine the effects of advanced methods of data smoothing. Advanced examination of gait: subtalar joint motion and motion of knee and hip joints in the transverse plane. To examine the effects of orthoses on the kinematics and kinetics of human movement. Prerequisite SS4305 Numbers are limited on SS4308. The module is subject to availability on arrival at the University of Limerick
SS4312 Qualitative Biomechanics

Description of: Forms of motion; translation, rotation and general motion; effects of forces; momentum and impulse; qualitative analysis - deterministic models and their applications in human movement: projectile based motions in sport: Jumping and throwing, striking activities etc.. Cyclical movement patterns : Running, walking. Centre of gravity, line of gravity; mechanical determinants of balance equilibrium and stability. static and dynamic posture; analysis of balance related situations; angular motion of body free of support - axis of rotation, torque and angular impulse, moment of inertia applications to sports situations; motor development and qualitative kinematic analysis

Numbers are limited on SS4308. The module is subject to availability on arrival at the University of Limerick

SS4401 Coaching Science and Performing

Sport: Student will choose from athletics, basketball, volleyball, and netball.

Pedagogy: microteaching; criteria for effective teaching; verbal communication; planning and presentation skills; questioning skills; appraisal. Physical conditioning: principles of training; warm-up and cool-down procedures; endurance training.

Numbers are limited on SS4401. The module is subject to availability on arrival at the University of Limerick

SS4403 Sports & Exercise Applications 3

Sports from outdoor pursuits, Gaelic football, hurling, hockey, soccer and rugby: organisation of events and competitions; record keeping, first aid; structuring of content and planning of schemes; teaching/coaching experience; introduction to exercise to music; structure and phases of exercise to music class, purpose of each phase, choice of music, steps, adaptations and progressions.

Numbers are limited on SS4403. The module is subject to availability on arrival at the University of Limerick

SS4407 Sport and Exercise Applications 6

The emphasis in these modules is placed on applying scientific methods to sport and exercise through a series of selected mini-projects carried out in groups. The projects themselves determine the syllabus content and the emphasis is placed on students developing important practical skill in sport and exercise science. The projects will involve the students in for example: testing the theory of projectiles in track and field athletics; investigate the physiological rationale for warm up and cool down; evaluation of the merits of field and laboratory based tests of performance; test the theory of the benefits of stretching and flexibility to increase performance; investigate the relationship between anxiety and performance in sport and / or exercise;
assess methods of intervention for overcoming problems related to anxiety, motivation or concentration; examine the physiological, psychological and biomechanical demands of a selected sport exercise activity; muscular strength and power development for sport; resistance training for specific populations. e.g. children, elderly.

Numbers are limited on SS4407. The module is subject to availability on arrival at the University of Limerick.

**Note**: Students who want to join any module with the symbol ∆ should note that resource and scheduling constraints limit places, therefore, we cannot guarantee enrolment. Modules with SS or PY code followed by a ∆ symbol: Available places are allocated to Sports Science majors first and are subject to interview and/or skills assessment.
These are exciting times for the Kemmy Business School (KBS), which is home to 2,900 students and 100 faculty and staff. Founded in 1972 and renamed the KBS in 2003 the School will consolidate its locational future in a new state-of-the-art building due for full occupation in September 2008 at the Limerick City end of the main UL campus. The new building will incorporate a Wall St. style trading room, specialist HRM and Marketing laboratories, executive education teaching rooms, breakout rooms and a self-contained conference centre. We offer a wide range of business and management education opportunities at undergraduate and postgraduate levels that are of particular interest to international students. As a Study Abroad student at the Kemmy Business School you will join a welcoming, vibrant and exciting community of students and faculty. You will enjoy world class facilities during your stay with us and an academic environment that is second to none.
AC4001 Principles of Accounting

A&F 2-1-0

This module introduces the student to the fundamental concepts and practices of financial accounting. Accounting is presented as a manifestation of various social and political pressures, which required that techniques be developed to account for trading and wealth. The topics covered include: accounting in its political, regulatory, historical, social, economic, corporate governance and international contexts; introduction to the theoretical, conceptual and regulatory frameworks of accounting; traditional accounting model; capital, income and profit and measurement; principles of double entry bookkeeping; books of prime entry, ledgers, trial balance, internal controls, use of computers in recording and control of data, construction of final accounts for sole traders, partnerships and limited companies; accruals, prepayments and adjustments; depreciation and stocks; distribution of profits; profit and loss accounts and balance sheets, cash flow statements; reconciliation of operating cash flows to operating profits; financial statements analysis, financial ratios and performance analysis. This module is designed to be a prerequisite for the module AC4204 Management Accounting and Finance, offered in the spring semester.

AC4213 Financial Accounting (non-business)

A&F 2-1-1

This module introduces the non-specialist student to the fundamental concepts and practices of financial accounting. Accounting is presented as a manifestation of various social and political pressures, which required that techniques be developed to account for trading and wealth. The topics covered include: accounting and auditing in their political, regulatory, historical, social, economic and international contexts; introduction to the theoretical, conceptual and regulatory frameworks of accounting; corporate governance; traditional accounting model; nature, purpose, scope and framework of auditing; the impact of information technology on accounting systems; capital, income and profit measurement; accruals, prepayments and adjustments; depreciation and stocks; distribution of profits; profit and loss accounts and balance sheets, cash flow statements; reconciliation of operating cash flows to operating profits; financial statements analysis, financial ratios and performance analysis. This module is designed to be a prerequisite for the module AC4204 Management Accounting and Finance, offered in the spring semester.

AC4305 Financial Information Analysis *

AC&F 2-1-0

The nature of accounting information and its role in financial and other markets; accounting information and the needs of users; accounting information as an aid to decision-making; regulatory, political, conceptual and theoretical frameworks; efficient market hypothesis; accounting information and security prices; presentation of accounting information: companies acts, EU directives, ASB, IASB and FASB; use of graphical, pictorial and narrative representations; analysis of financial statements: ratio analysis, uses and limitations; performance indicators; recognition and measurement issues; substance over form; creative accounting: off-balance sheet financing; FRS 4, Capital Instruments; FRS 13, derivatives and other financial instruments, IAS 32; corporate governance: regulatory and stakeholder perspectives; corporate social reporting; international accounting issues and developments: globalisation and harmonisation; future reporting forms, requirements and media; current issues. Prerequisite AC4204.
AC4407 Intermediate Accounting 2 *  
AC&F  2-1-0  
This accounting module deals with the preparation and reporting of information to external users of financial information, especially, but not exclusively, equity investors. These accounting standards and issues are examined in the light of their historical development. The module includes a discussion not only of the actual content of regulations but also what that content ought to be or might be. These rules may be established in many ways (from experience of what is generally acceptable, by compromises between vested interests or by recourse to theory). The module includes a discussion not only of the actual content of regulations but also what that content ought to be or might be. Attention is also paid to who sets accounting rules and by what process. Students will be introduced to the relevant International Financial Reporting Standards, given the recent trend towards a single body of internationally accepted accounting standards. From a practical perspective, the aim of the course is to show students how to make the calculations that are required by theory or by regulation and how to communicate the results and implications of these calculations.  
Prerequisite AC4315.

AC4417 Management Accounting 1 *  
AC&F  2-1-1  
Objectives, scope and framework of management accounting; management accounting and the business environment; cost terminology, concepts and classification; cost accumulation for inventory valuation and profit measurement; cost allocation and revenues; cost systems and design; job costing; process costing; activity-based costing and management; joint and by-product costing; spoilage, rework and scrap; quality costing, reporting and management; time drivers and costs of time; the theory of constraints; throughput costing and contribution analysis; inventory costing and capacity analysis; variable versus absorption costing debate; inventory management and materials requirements planning; inventory management and just-in-time; backflush costing; cost accumulation information for decision-making; cost behaviour and analysis; cost-estimation methods; learning curve and non-linear cost functions; cost-volume-profit relationships.  
Prerequisite AC4204.

AG4307 Agribusiness  (offered only in AY2008/9)  
M&M  3-0-0  
Analysis and prescriptions for the major agribusiness sectors; dairy products, the meat and food industries, horticulture and arable crops. Particular features of the Irish food industry; seasonality of supply, distribution including "the cold chain", adding value, branding and "price making" as against commodity trading and "price taking"; developing agribusiness strategies, particularly in the food sector, at the macro-and micro-levels; new developments in food technology; production techniques, extension of shelf life, packaging product presentation and quality assurance; the role of marketing research; identifying opportunities, including agri-tourism and "green" organic products; establishment of innovative agribusiness projects - the process, including feasibility studies; integrated rural development; national and EU initiatives, including the "LEADER" programme; environmental issues; the role of the EPA, Environmental Protection Agency, and the implications of national/EU legislation for agribusiness.

CM4203 Communications for Business  
M&M  2-1-0  
Communications in it’s social, economic and cultural context: information society; role of new technologies; media; postmodernism; argument analysis, reasoning, structuring and defending arguments; persuasion: psychology of persuasion and motivation; advertising as persuasion, including codes of visual communication; persuasion and the spoken word; style: effective writing strategies for various contexts [academic, journalistic, informative, persuasive etc.] and presentation.
EC4003 Intermediate Microeconomics  
This module builds on the introductory microeconomics module. It extends the analysis of producer and cost theory. It also extends the analysis of market structures (focusing on imperfect market structures) and introduces the issue of pricing and allocation of the factors of production. The latter part of the module looks at the economics of information and how choices are made under conditions of uncertainty. Finally, the student is introduced to the notion of general equilibrium and welfare. Using this framework, market failure and the rationale for government intervention (government sector) are examined. Theory of production and costs. Models of imperfect competition and game theory. Factor markets. The economics of information and choice under uncertainty. General equilibrium and welfare.

EC4035 Economics of Integration  

EC4045 Economics of Natural Resources  
Nature, scope and key concepts of natural resource economics; market efficiency and sustainability; Optimal level of pollution; Public policy instruments (Tax, subsidy, emissions, trading, command and control); Economics of renewable resources (forestry and fishing); Economics of non-renewable resources (coal, oil and gas; uranium); Economics of bio-diversity wild life preservation; Natural resources and economic growth.

EC4101 Microeconomics  
Introduction: Scope and method economics; the theory of consumer choice; individual and market demand; theory of production; the costs of production; profit maximisation and the competitive firm; monopoly (including multiplant and price discrimination models).

EC4111 Microeconomics (non business)  
What is economics; Scarcity, Individual decision-making, Trade-offs; Opportunity cost; Microeconomics vs macroeconomics; Normative vs positive economics; Markets; Model of supply and demand; Market equilibrium; Scarce resources; Price ceilings; Price floors; Elasticity; Consumer choice; Indifference curves; Costs of production; Revenue; Profits; Market structures; Perfect competition; Monopoly.

EC4213 Intermediate Economics (Non-Business)  
Intermediate microeconomics: imperfect competitive market structures, monopolistic competition, models of oligopoly (collusive and non-collusive models) pricing and allocating factors of production, labour demand and supply, competitive labour markets, effects of unions, human capital differences, wage differentials; Intermediate macroeconomics: labour markets, real and nominal wages, money illusion, labour markets in the extended Keynesian model, monetarism, neo-classical model-rational expectations, Phillips curve, purchasing power parity and real exchange rates, Irish experience in the EMS.

EC4307 Econometrics  
What is econometrics? The Linear Model; ordinary least squares; the use of dummy variables in multiple regression; analysis of residuals; multicollinearity; autocorrelation; heteroscedasticity; one-way analysis of variance; multi-way analysis of variance; analysis of covariance; time series econometric analysis and forecasting; introduction to statistics/econometrics packages.

EC4333 Economics of European Integration  
Introduction: member states’ major economic indicators; theory of economic...
integration (new international trade theories), and stages of economic integration; monetary integration – the road to economic and monetary union; the EU budget; the common agricultural policy; regional and social cohesion (polarisation trends; convergence; employment issues; impact of structural funds); industrial and technological policy; external economic relations of the EU; Lome Convention and EU-Asia relations; conclusion; current issues in European economic integration; diversity, flexibility and coherence of economic policies.

EC4407 Ireland in the World Economy

International demographic trends; labour force analysis - employment and unemployment trends; industrial change and industrial policy; Irish fiscal policy in an international context; Ireland and the European community - performance and prospects; sectoral developments in the international economy - effects for Irish employment and output; discussion on international economics; trade theories.

EC4417 Industrial Economics

Scope and method of industrial economics: a new version of the firm; the structure - conduct - performance paradigm and its limits; (structuralists - contestable markets - game theory); market structures in the European community, (concentration, entry barriers); firms restructuring in the EU, (integration, diversification, merger, takeover); technological and product innovation; performance of firms; aspects of industrial policy, (merger control, abuse of dominant positions in the EU); interactions between corporate integration and regional integration; case studies, (machine-tools, textile, pharmaceuticals).

EC4427 Managerial Economics

Constrained and unconstrained optimisation techniques; demand analysis, demand estimation (including introduction to econometrics); demand forecasting, decision-making under uncertainty, pricing models to account for production relationships capacity relationships, demand relationships; transfer pricing, mark-up pricing; decision making in the public sector introducing the rationale and means of government intervention in the case of market failures, cost-benefit analysis; capital budgeting and investment decisions.

EP4003 Entrepreneurship and Innovation

The module provides an introduction to the nature, development and strategic importance of entrepreneurship and innovation, the entrepreneur process, schools of thought on entrepreneurship, the environment for entrepreneurship, corporate entrepreneurship, theories and models of creativity and innovation in products, services, processes, product strategy, new product/service development, business planning and development, market entry strategies, marketing, inventions and innovations, technology transfer, intellectual property and success factors integral to the development of an entrepreneurial culture.

EP4315 Enterprise Formation

The role of entrepreneurship in economic development, innovations, business opportunities, entrepreneurial skills and characteristics; the entrepreneurial process; marketing strategies, the business plan, support systems and sources of finance; growth strategies, management development, high-technology entrepreneurship, strategic planning and entrepreneurship.

EP4407 Enterprise Development *

Evaluating business opportunities; preparation of a formal business plan; industry analysis; market research, market/sales strategies; product development, patent manufacturing/operations; cash flow projections, projected profit and loss accounts, balance sheets, establishing project credibility, exhibition and project presentation. Prerequisite EP4315
EP4607 Product Design & Development
M&M 2-1-0
Nature and development of entrepreneurship, innovation, new product development, market research, screening new ideas, business analysis, prototype development, testing, commercialisation, preparing a business plan, industry analysis, marketing strategy, production/operations, funding requirements, cash flow, profit and loss accounts, balance sheets, managing the new business; engineering design history of the 20th century, design approaches, constraints and alternatives. KJ. Type solution processes.

FI4003 Finance
AC&F 2-1-0
Students are introduced to and learn to use and evaluate a range of discounted cash flow techniques. Qualitative aspects of capital budgeting and investments are also covered. The concept of market efficiency and of the link between risk and return are illustrated by reference to historical returns. Basic issues around share valuation are also discussed, and the students are introduced to derivative instruments, and how they may be used both defensively and aggressively.

FI4005 Advanced Corporate Finance
AC&F 2-1-0
The course covers the more advanced capital budgeting, taking into account inflation, uncertainty and tax. Simulation and scenario analysis are covered. The concept of a real option is introduced. Agency theory, dividend policy and capital structure are all covered in some detail. The capital markets are introduced, and approaches to share valuation are discussed. Portfolio theory is covered as a means of reducing risk. Prerequisite FI4003.

FI4007 Financial Institutions & Markets*
AC&F 2-1-0
This course introduces students to key areas and trends of the financial environment, the financial system and the financing, saving and risk management activities of pivotal players and intermediaries. The application of ethics within financial services pervades the teaching of the module. Topics to be covered include: agency theory, and it's application both to the stakeholder/manager relationship and to lending intermediaries; properties of financial assets; bond and annuity valuation; interest rate determinants and theories; the term structure of interest rates; basic corporate governance and equity valuation; categorisation of equities; fundamental and technical analysis; investor sentiment and behavioural finance; the evolution and role of financial intermediaries; global differences within the banking industry; risk management in banking; determinants of bank failure; bank regulation theories and practice; new developments in banking and financial services. Prerequisite FI4305.

FI4407 Financial Institutions & Markets*
(Offered only in AY2008/9) AC&F 2-0-0
The initial public offering process, pricing issues, and the role of the underwriter; stock market analysis, the drivers of stock market behaviour, fundamentals versus sentiment, efficient market hypothesis; mergers and acquisitions theory, the importance of creating shareholder value; treasury management and hedging, futures, options, swaps, FRA's; an introduction to real options theory; project and investment appraisal, relevant cash flows, the net present value rule, real options methodologies; investor relations theory. Prerequisite FI4305.

IN4003 Principles of Risk Management
AC&F 2-1-0
Concepts of risk, pure and speculative risk; paradigms of risk; risk communication; perceptions of risk; risk and regulation; risk and society; risk in the economic and legal environment; risk in a corporate context; probability and risk management; modelling risk management; portfolio theory and diversification; identification, analysis, evaluation, control, financing of risk; theory of risk retention; risk funding including alternative risk transfer; monitoring the process; financial models for the justification of risk management expenditure; risk management in an organisation; formulation and implementation of risk management strategies.
**IN4005 Risk Analysis**  AC&F  2-1-0  
Decision making under conditions of uncertainty; Bayesian decision theory; economic value of information; Design of retention programme; probability of ruin; solvency concepts; Behavioural theories of accident prevention; role of heuristics; Control of intellectual property; reputation management; crisis management; Net present value & risk control/ derivation of annuity formulae/ determination of discount rate. Prerequisites: IN4004 and IN4014.

**IN4007 Governance and Risk**  (offered only in AY2009/10)  AC&F  2-1-0  
Risk Management as a response to governance, the relationship between risk and governance, stakeholders and risk, governance and risk in an international context, risk and the structures of organisations, the control of risk through ethical, legal, economic, social, psychological and technical means. Codes of practice (Turnbull) and relevant regulation; Environmental risk and its control; Governance and compliance.

**IN4015 Risk and Insurance**  AC&F  2-1-0  
Nature of Risk; insurance as a risk management device; statistical treatment of data, inferential statistics; utility theory and buyer behaviour, insurability; corporate demand for insurance. Prerequisites IN4004 and IN4014.

**IN4407 Risk Analysis * (offered only in AY2008/9)**  AC&F  2-1-0  
Decision making under conditions of total uncertainty, Bayesian decision analysis, Design of retention programmes, Risk control, Total risk management, Risk analysis - Intellectual Capital, Theory of accident causation, E-commerce, Introduction to statistical simulation. Prerequisite IN4305.

**IN4417 Risk and Insurance**  (offered only in AY2008/9)  AC&F  2-1-0  
Descriptive statistics and probability theory, Inferential aspects, Utility theory and purchasing behaviour, Demand and supply aspects, Economic context, Physical environment for risk, Regulatory issues, Reinsurance, Socio-cultural environment.

**IN4427 Insurance Organisations & Markets**  AC&F  2-1-0  
In the course of this module we will examine the function of the insurance industry plays in modern economic and social structures. At the same time we will study the impact of a changing international environment on the insurance industry. In the last twelve months the insurance industry has taken central stage in the financial media. Post September 11; there is a growing appreciation of the role the insurance industry plays in promoting stability (and creating problems) in the Irish, European and world economies. Insurance is an evolving business. We see an increasing range of products on offer, both in the developed and developing world. There is also much interest in the area of the regulation of the insurance industry. High insurance costs here in Ireland have led to calls for the government to take action. Insurance in the early part of the twenty first century is a fascinating area, not only viewed from the disciplines of accounting and finance, but also from the humanities in general.

**MG4031 Management Principles**  M&M  2-1-0  
Management concepts and evolution, the business environment, functions of management, planning, organising, staffing, leading and controlling, decision making, organisation structure and design leadership, motivation, work design, organisational control introduction to ethics and social responsibility, change management.

**MG4035 International Management**  M&M  2-1-0  
The domain of international management concepts of industry, location and firm specific advantage models of cross-border business, managing multinationals mergers and acquisitions and strategic alliances, international business networks, coordinating international value chains, extended supply chain management, technology diffusion, subsidiary initiatives, political and cross-cultural issues, managing in developing countries.
MG4037 Strategic Management
(offer only in AY2009/10) M&M 2-1-0

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.

MG4045 Change Management
M&M 2-1-0

Nature of organizational change context specific change, managerial skills of change agents, change options and variables contextual analysis formulating and formation of implementation paths, mobilizing for change, change levers and interventions, strategic change frameworks, monitoring, control and resourcing change.

MG4047 Knowledge Management
(offer only in AY2009/10) M&M 2-1-3

This module introduces the student to the strategic role that information and knowledge play in modern organizations. The role of knowledge in organizations: a historical perspective. The nature of knowledge as an organizational capability: as object, as subject, as knowledgeability inherent in practice. Models and conceptual frameworks for knowledge management. The development of organizational structures to leverage knowledge. Knowledge management systems, knowledge codification, the transfer of knowledge at an individual, group, organizational and inter-organizational level. Cross-cultural issues for managing knowledge.

MI4001 Information Management 1
M&M 2-1-3

This module introduces the business student to a perspective of the organisation as an information processing system. It introduces organisational decision-making principles as a foundation for the design of Information Systems. It studies the role of data and database management as a corporate resource for decision making and the business systems that support this; data mining, ERPs, CRMs. It covers corporate responsibility for data integrity and protection.

MI4407 Social & Organisational Aspects of Information Management
M&M 2-1-2

Provide a social and economic framework for understanding the nature and interaction of information, technology, people, and organisational components. Explain how IS can both constrain and enable organisations and explore the relationship between IS and organisational structure. Drawing on Structuration Theory and Institutional Economics the students will be provided with an understanding of the characteristics of the information economy. Consider the role of the Internet and networking technology in modern organisations. The above concepts will be reinforced and developed through the use of web and collaborative software.

MK4005 Marketing Intelligence
M&M 2-1-0

Sources and Use of Marketing Intelligence; The Role of Research and Intelligence in the Marketing Organisation; Role of Marketing Information and Composition of Marketing Information Systems; Research for Marketing
Decision Making; Approaches to Data Capture – Databases, EDI and Point-of-Sale; Marketing Research in Different Contexts; Research Methods; Commissioning and Evaluating Marketing Research.

**MK4007 Applied Marketing 1**  
(offered only in AY2009/10) M&M 1-1-1

Through the management of an extensive project students will be exposed to and should develop skills in relation to developing research objectives, creating a research design, and assembling a research proposal. Further, students will gain experience in data collection, interpretation and both in terms of primary and secondary sources. Finally, students will be expected to present research findings.

**MK4017 Marketing Leadership**  
(offered only in AY2009/10) M&M 2-1-0

Marketing vision, marketing planning, the marketing management process, the relationship between marketing and the other functional areas, the role of marketing in the boardroom, value-based marketing, internal marketing, organisational renewal through marketing.

**MK4025 Marketing Communications**  
M&M 2-1-0

Role of communications; communications theory; audiences; how advertising works; the management of marketing communications; the advertising industry; creative aspects of advertising; media aspects of advertising; ethics and advertising standards; the role of the media; communication vehicles; integrated marketing communications; the effects and effectiveness of marketing communications.

**MK4437 Channel Management & Retailing *  
(offered only in AY2008/9) M&M 2-1-0**

Tasks performed by marketing channels; channels; channel participants; channel structure, strategy and design; power and conflict in marketing channels; channel management and leadership; vertical marketing systems; evaluating channel performance; channel dynamics; international distribution channels; future distribution arrangements. Role of the wholesaler; role of the retailer; retail types; store location strategy; store layout; retail merchandising; retail information systems; the retail marketing mix; consumer behaviour in retailing; customer communications; retail marketing planning; managing retail brands; store loyalty; international retailing; the future of retailing. *Prerequisite MK4305.*

**MK4447 Product & Services Marketing *  
(offered only in AY2008/9) M&M 2-1-0**

Product concepts; product segmentation; product portfolios; new product development; product screening, product testing, market testing; inventory management; branding strategies; product management; economic role of services; characteristics of services; nature of the service experience; service product design; service facility design; managing service operations; customer expectations; service quality; customer retention; the human dimension in service management; corporate culture and service management; demand and the management of service capacity; pricing strategies in services; distribution of services; competitive strategies in service marketing. *Prerequisite MK4002: Marketing.*

**MK4457 Selling & Sales Management *  
(offered only in AY2008/9) M&M 2-1-0**

Overview of personal selling, sales responsibilities and preparation, personal selling process, personal selling skills, negotiation techniques, territory management, account management and relationship marketing; overview of sales management, the planning process, sales structures and organisations, recruitment, selection and training of salespeople, motivation, organisation and compensation of salespeople, sales forecasting, telemarketing and the use of information technology in sales, management of sales promotions. *Prerequisites MK4305.*

**MK4603 Marketing (Non-Business)  
M&M 2-1-0**

Marketing in society; strategic market planning; marketing information systems; new product development; pricing; promotion; channels of distribution; competition analysis; consumer behaviour services marketing; market segmentation,
consumer research methods, identifying marketing information requirements; formulating research projects, the scientific method – its characteristics and practices, experimental research designs, attitude measurement, questionnaire design; marketing research applications: product research, advertising research, corporate image research, market testing; ethical issues in marketing research.

MN4003 Project Management  
M&M 2-0-2

Project process, project lifecycles, selection methods, stakeholder management, developing project objectives, initiating, scope definition, WBS, planning, controlling and closing out, estimating techniques, logic diagrams, CPM, PERT, developing schedules and budgets, allocating resources, tracking using earned value, progress reporting, change control, managing uncertainty, risk management, post implementation audits, introduction to project management software.

PM4003 Human Resource Management 1  
P&M 2-1-0

The syllabus covers core issues surrounding managing people at work including critical perspectives on the enterprise; the processes of human resource planning, recruitment and selection; induction and socialisation; managing performance; work and job design; managing rewards; learning and development at work; from personnel to HRM.

PM4005 Management Consulting  
P&M 2-2-0

Defining management consultancy. The context of management consultant, management consultancy in the context of human resource management and development, applications of management consultancy, management of change, organisation development and training and development. The ethics, power and politics of management consulting. The key stages of the consultancy assignment; modules of management consultancy; the consultant as change agent; agreeing the consultancy brief; selecting and using data gathering techniques; analysing qualitative and quantitative data; selecting interventions; designing interventions; analysing performance gaps. Level of performance change required; establish, improve, maintain and extinguish using interventions to address each performance change; implementing interventions. Writing up the results of a management consultancy project. Presenting and defending your findings. Disengaging from the consultancy relationship.

PM4007 Organisation Behaviour 3  
(offered only in AY2009/10)  P&M 2-1-0


PM4017 Human Resource Practice  
(offered only in AY2009/10)  P&M 2-1-0


PM4015 Employment Relations 2  
P&M 2-1-0

Contexts concepts and values in Employment Relations. The nature of the employment relationship - The various theoretical approaches – Dunlop, Pluralism, Marxism and the Social Action approach -. The historical origins of Trade Unions and collective bargaining in Britain and Ireland and theories of trade union purpose. Conflict and Strikes Management Strategies in Employment Relations Human Resource Management the Non Union Firm and its effectiveness as an alternative to traditional methods of managing employment relations Worker
participation trade unions in the context of a democratic polity.

PM4027 Social Psychology of Organisations (offered only in AY2009/10)  P&M  2-1-0
Approaches to the study of social psychology; Culture, Society, Socialisation and Individual Freedom; The Construction of Attitudes, Values and Ideologies; The Landscape of Organisational Form in the Social World; Beyond Bureaucracy and the Rise of Modern Organisational Hegemony; The Boundaryless Organisation; Organisational Citizenship; Future Directions in the Social Psychology of Organisations.

PM4035 The Psychology of Work  P&M  2-1-0
Exploring the reality of work; The meaning of work; Work Orientation; Employment and Unemployment; The psychological contract and the work socialization process; The changing context of work; Workforce Management; Changing Workforce Composition; Career Re-conceptualisation; Work Life Balance and Work Family Conflict.

PM4407 Industrial Relations 2* (offered only in AY2008/9)  P&M  2-0-1
Industrial relations theory; the social action and systems approaches; frames of reference; unitarism, pluralism, radicalism and Marxism; management strategies in industrial relations; comparative national industrial relations strategies including neo-corporatism, voluntarism and market control strategies in a comparative context; theories of conflict and conflict resolution; collective bargaining and alternatives such as employee participation and non-unionisation in a comparative context; trade unions; union growth and decline in selected countries, white collar unionism; reform of industrial relations - a critical view; labour market issues and structures; contemporary and industrial relations in selected countries. Prerequisite PM4305.

PM4417 Personnel Management Practice (offered only in AY2008/9)  P&M  2-0-2
Introduction to interviewing; theory and application of selection and interviewing techniques; the use of references, ratings, assessment centres and biodata - a critical examination; interviewing skills in the areas of selection, appraisal and counselling; the use and practice of psychological testing in the selection process; selecting tests; test manual evaluation; test norms using different types of tests/inventories. The law and selection - the 1977 Employment Equality Act.

PM4427 Employment Development 1 (offered only in AY2008/9)  P&M  2-1-0
The context of employee development; culture, technology, environment, structure and management style; training, development and education; models of employee development; establishing an employee development function; the role of the training and development specialist; designing learning interventions; identification of training needs; writing learning objectives; choosing learning methods; planning and delivering learning; learning transfer and evaluation of learning; the institutional framework: national policy and practice; role of state agencies; adult training and education; youth training initiatives; apprenticeships training; employee development and the single market.

* Numbers are restricted on PM4417 but if places are available then applications from Study Abroad students will be considered on their merits. Student will be required to have fluency in English as assessment is by way of role play.

PM4603 Employee Relations for Engineering /Science  P&M  2-1-0
The employment of relationship; the individual and work groups; the basics of recruitment and selection; motivation techniques; effective supervisory and management; industrial relations; communications in employee relations; the role of management and trade unions; line management and shop stewards; labour law; the basics of negotiation; national and local pay bargaining.
PM4613 Personnel Management 1

Introduction to personnel management: line versus staff role in personnel management; manpower planning; recruitment and selection; employee development; performance appraisal; reward systems; contract of employment; industrial relations framework.

TM4005 Critical Issues in Tourism

Tourism as a social phenomenon; the changing nature of travel; social and psychological factors influencing participation; the desire to travel; tourist – host interaction; tourist – destination interaction; traditional and modern forms of tourism; destination decision-making process; national identity and tourism imagery; the concept of free-time in contemporary society.

TM4007 Irish Tourism Analysis

Defining tourism; organisation of the Irish tourism industry and its main stakeholders; Irish tourism data collection and analyses of the key tourism performance indicators; customer and market segmentation of both inbound and outbound visitors; Irish tourism policy development and review; government intervention; marketing evaluation; North-South tourism developments; the role of the EU; investing in tourism attractions, quality issues in tourism; the labour market and tourism, access transport and tour operators; industry analysis and profitability; tourism forecasts.

TX4305 Taxation Theory and Practice *

Market possibilities and prescriptions, failures in the market system, need for taxation; tax theory, basic concepts; public failure and public expenditure growth; cannons of taxation; structure and administration of the taxation system, assessment, appeals, collection, audit and penalties; computation of personal income tax liability, charges, reliefs and allowances; the measurement of taxable business profits, allowable and disallowable expenditures, Schedule D, Cases III, IV and V and commenceents and cessations; taxation effects of capital asset investment decisions, capital allowances, leasing, location based incentives; efficient employee remuneration, benefits in kind, employee share schemes, the PAYE system; taxation of investment income, from financial instruments, dividends and real property, Schedule D, Cases III, IV and V and Schedule F; tax based sources of finance, the Business Expansion Scheme; tax planning, review of the tax based incentives, optimal use of business losses; partnership taxation; the effects of residence and domicile on tax liability, the Irish/UK double taxation treaty. Prerequisite AC4203.
The Faculty of Science and Engineering offers exciting opportunities for career and personal development in an environment that supports a high quality undergraduate and post graduate experience. The faculty prides itself on the quality of its teaching and learning personnel and programmes having three world-class research institutes in the areas of Materials and Surface Sciences, Software Engineering and Mathematics which are underpinned by well established links with industry. Cooperative Education (work placement in industry or teaching practice as appropriate) is an integral part of all our undergraduate programmes and we continually keep all programmes under review to ensure they meet the requirements of employers as well as national and international bodies. Emphasis is placed on easing the transition from second level to third level by providing special guidance and care for first year students entering our programmes. The Mathematics Learning Centre and the Science Learning Centre offer one-to-one support, additional tutorials and a supervised study area. Access to personal tuition and additional learning resources is open to all students. We value the participation and contribution that students from different backgrounds and cultures make to campus life in particular through their involvement with the many University sport and recreational clubs and societies that are on Campus.
Science Modules

BC4401 Introduction to Industrial Biochemistry  
CES 2-1-0
Genetic information and Genetic Engineering; overview of approaches and applications. DNA fingerprinting; applications of fingerprinting to forensic science, edgare test and paternity testing. The Human Genome Project and its impact on society; the cloning of mammals and mammalian body parts. Human cloning. The Biochemistry of HIV; viral structure and biology. Biotechnical approaches to developing a cure/vaccine. Prion biology; BSE and CJD. Dangerous microbes; concept of mobile DNA. Molecular biology of cancer; oncogenes and cellular transformation. Biotech strategies to cure cancer. The approach to research; case studies; identification of a problem, planning and pursuing a research strategy. Evaluating the results. Pharmaceutical biology and biotechnology; approaches to drug discovery; the discovery of aspirin, antibiotics and taxol. Products of pharmaceutical biotechnology and their medical uses. Gene medicines; gene therapy. Life at the extremes; the unique biology of hyperthermophiles. Biological warfare.

BC4405 BioProcess Technology 1*  
CES 2-1-3
Fluid mechanics; momentum transfer; the Bernoulli equation; flow in pipes and vessels; dimensional analysis; principles of heat and mass transfer; heat transfer coefficients; heat exchangers; structure and use of design equations for biochemical reactor systems; bulk mass transfer effects; quantitative treatment of large scale sterilisation. Prerequisite CH4404

BC4705 Industrial Biochemistry 1*  
CES 2-2-0
Plant cell biotechnology; plant cell structure and lignocelluloses; extraction of plant cell products; algal biotechnology; bio affinity purification; industrial uses of enzymes; enzyme stabilisation; yeast technology and brewing science. Prerequisite BC4915 & BC4904

BC4803 Microbial Technology 1*  
CES 2-2-3
The prokaryotic and eukaryotic microorganism; systematics in microbiology; industrial micro-organisms; mycology; processes mediated by fungi; industrial mycology; introduction to viruses; microbial ecology; GEMs’ control of microbial activity. Prerequisite BY4001

BC4825 Microbial Technology 2*  
CES 2-2-3
Growth of microorganisms; principles of fermentation technology; animal and plant cell tissue culture; food microbiology; food infections and poisoning; microbial toxins; pathogenic microorganisms; immunology. Prerequisite BC4803 & BY4001

BC4903 Biochemistry 1 (Bio molecules)  
CES 2-2-3
The foundations of biochemistry and the molecular logic of life; bio molecules; proteins, carbohydrates, lipids, nucleic acids, vitamins; bioenergetics and metabolism.

BC4905 Biochemistry 4 (Genetic Engineering)*  
CES 2-1-3
Gene structure, function and control; techniques to manipulate DNA; DNA transfer methods; polymerise chain reaction; cDNA; northern, southern and western blotting; cloning in plants and animals; introduction to bio informatics; gene therapy. Prerequisite BC4903/BC4904

BC4907 Biochemistry 6 (Cell Biochemistry)*  
CES 2-2-3
Receptor biochemistry- mode of hormone action; protein folding, protein targeting via glycosylation; protein engineering; cell
communication neural transmission; biochemistry of vision; the biology of cancer; oncogenes. Prerequisite BC4903 & BC4904

BC4947 Immunology* CES 2-2-0
Overview of the immune system; cellular and humoral responses; regulation; passive vs active immunity; complement; T cell structure and differentiation; antibody structure and function; immunology of AIDS, prion diseases; tumour immunology; molecular immunology. Prerequisite BC4903/BC4904

BC4957 Bioinformatics in Genetic & Protein Analysis* CES 2-1-0
DNA sequence data; gene structure in eukaryotes, archaeobacteria and prokaryote; genome projects; techniques and methodologies; gene functionality; accessing bioinformatics databases; searching databases; analysis of protein sequences; protein modelling; phylogenetic analysis Prerequisite Biochemistry 2/4, BC4904, BC4905

BY4001 Biology 1 CES 2-0-2
Introduction to biology; characteristics of life, scientific methodology; cell structure and function; membrane structure and function; chemistry of the cell and organism; bio molecules; animal physiology; respiratory, circulatory, digestive, reproductive and nervous system; mammalian hormones, sense organs, muscular skeletal system; introduction to micro-organisms; prokaryotic and eucaryotic organisms.

BY4003 Biology 3* CES 2-0-2
Invertebrate phyla: Protozoa, Porifera, cnidaria, Platyhelminthes, annelida, Arthropods, mollusca, Echinodermata; examination of representative examples from the following groups: algae, fungi, bryophyta, pteridophyta, coniferphyta, anthophyta.

BY4005 Vertebrate Structure and Function* CES 2-0-2
Definition of the phylum chordata; major groups of chordates; evolutionary trends within the phylum; homeostasis and control in mammalian body systems; introduction to animal behaviour.

BY4006 General Biochemistry* CES 2-0-2
Introduction to biochemistry; enzymes; kinetics; and application; metabolism: ATP; central metabolism; principal sequences; food and nutrition; macro nutrients, micro nutrients; cholesterol, fibre, additives, eating disorders; biosenergetics; biological membranes as interfaces; biochemistry of muscle action, nerve action, and vision; hormone action mechanisms; introduction to the analysis of biomolecules, metabolites; cholesterol, and enzyme kinetics. Prerequisite BY4001.
BY4011 General Biology

Introduction to biology; characteristics of life, scientific methodology; cell structure and function; membrane structure and function; chemistry of the cell and organism; bio molecules; Evolutionary theories; introduction to taxonomy; principles and scope of ecology; ecosystems; cycles in nature; energy flows; population and community dynamics; limiting factors; food chains; succession, environmental concerns; introduction to micro-organisms; procaryotic and eucaryotic organisms.

BY4013 General Microbiology

Microbial structure and function; microbial growth; nutrition; identification and enumeration; introductory systematics; bacterial endospore; applied aspects of microbiology and microbial ecology; microbiology of water; medical microbiology; disease and pathogenesis; food microbiology; preservation and spoilage; microbiology of soil biochemical cycles; biodegradation; some traditional and novel processes in industrial microbiology; microbes and biotechnology. Prerequisite BY4001

BY4205 Agriculture 1

Overview of agriculture in Ireland; fertilisers and their use; environmental pollution and its avoidance; cultivation machinery; cultivation of cereals and roots, crop rotation; grassland production; grazing management of grassland, extensive and intensive methods; dry matter production; conservation of grass as hay and silage; commercial forestry production; silvicultural practice; forest rotation, environmental factors; utilization of forest products. Calculation of loads acting on participant in sport and exercise; net joint movements and forces; bioengineering models; measurement or estimation of muscle forces including the use of EMG; estimation of loads in bones and soft tissues; mechanical properties and behaviour of biological tissues; injury causes and prevention; aspects of techniques in sport and exercise; surfaces; shoes; other protective equipment: effects of equipment on movement patterns and their optimisation; other equipment; evaluation of rehabilitation procedures.

BY4215 Soil Science

Geology and soil parent materials; weathering; soil composition; soil texture, structure, aeration and water movement; soil temperature; soil biology; soil organic matter and its decomposition; influence of organic matter on soil fertility; soil chemistry, cation exchange capacity, pH, liming of land; soil fertility and plant growth; soil genesis and classification, soil types, soil mapping.

CH4003 Physical Chemistry 2 (Spectroscopy and advanced Kinetics)

Advanced topics in chemical kinetics with application to photochemistry, fast reactions, polymerisation, heterogeneously and homogeneously; catalytic and biochemical reactions; simple absorption isotherms; applications to selected examples of industrially important reactions; Basic photochemistry and spectroscopy; Rate laws, integrated and differential forms. Zero, first and second order rate laws. Mechanism of reaction, steady state approximation, Lindemann hypothesis, role of equilibrium; Arrhenius equation, collision theory, activated complex theory, Fick’s law, diffusion. Photochemistry, fast reactions, polymerisation. Langmuir adsorption isotherm, catalysis. Michaeis-Menten kinetics, monod kinetics. Applications to selected examples of industrially important reaction. Introduction to the basis of IR and UV spectroscopy. Fluorescence and phosphorescence, Beer-Lambert Law, Stern-Volmer equation laser action. Prerequisite CH4002

CH4005 Physical Chemistry 4(Electrochemical Applications & Technology)


CH4055 Environmental Catalysis * CES 2-1-3

Introduction to catalysis, defining the environmental problem, catalyst structure and preparation, deNOx from stationary sources, deNOx from mobile sources, destruction of VOCs, SO2 control, control of dioxins, wet air oxidation, catalyst characterisation, surface area analysis, XRD, XPS. Prerequisite CH4202

CH4103 Organic Chemistry 2* CES 2-0-3


CH4107 Industrial Process Chemistry 1* CES 2-0-0

Insecticides: organophosphates and carbamates: Malathion, parathion and carbayl, synthesis, mode of action as inhibitors of acetylcholinesterase, role of acetylcholine and acetylcholinesterase. Herbicides 2,4,5-T and 2,4-D, mode of action as auxin analogs, synthesis, dioxin formation, nucelophilic aromatic substitution reactions. Antibiotics: sulfonamides, synthesis, mode of action; penicillins, mode of action as inhibitors of cell wall synthesis, role of transpeptidase enzymes, synthesis of semi-synthetic penicilln structures. Analgesics and antiarthritic compounds: aspirin, ibuprofen and naproxen, synthesis of naproxen, resolution and racemisation aspects. Review of functional group chemistry. Prerequisite CH4102, CH4103, CH4104

CH4153 Organic Chemistry 2B* CES 2-0-2


CH4203 Inorganic Chemistry 2* CES 2-0-3

biological importance of the elements
Prerequisite CH4701, CH4202

CH4253 Inorganic Chemistry 2*
CES 2-1-3
Periodic Table and important trends; polarising power; chemistry of s and p block elements; electrode potential diagrams; hard and soft acid and base theory; complexes; properties of transition metals; organometallic compounds; lanthanides
Prerequisite CH4701, CH4252

CH4303 Analytical Chemistry 1*
CES 2-1-3
The electromagnetic spectrum; spectrophotometry; atomic spectroscopy; infra-red spectroscopy; NMR spectroscopy; uv-vis spectroscopy Prerequisite CH4701, PH4202

CH4305 Analytical Chemistry 3*
CES 2-1-3
Errors in chemical analysis and the statistical evaluation of analytical data; analytical separations; introduction to chromatography; gas chromatography; liquid chromatography; surface analysis; mass spectrometry; surface analysis.
Prerequisite CH4303, CH4304

CH4405 Process Technology 2*
CES 2-1-2
Fluid mechanics; momentum transfer; the Bernoulli equation; flow in pipes and vessels; dimensional analysis; size reduction of solids; settling; fluidised beds; filtration; heat transfer; heat transfer coefficients; heat exchangers.
Prerequisite CH4404

CH4407 Process Technology 4*
CES 2-1-2
Prerequisite CH4404, CH4405

CH4415 Process Technology 3
CES 2-1-3
Reaction engineering: calculation of equilibrium conversion and reaction enthalpy; material and energy balances; ideal reactor types and design equations; design for single and multiple reactions; temperature effects on reactor design; assessment of and models for non-ideal reactor behaviour; reactor design for heterogeneous reactions.

CH4417 Pharmaceutical Formulation
CES 2-1-0
This module covers the fundamental physical and chemical interactions which govern the stability and reactivity of the active pharmaceutical agents. It will deal with the principles of formulation of pharmaceutical active ingredients into solutions, creams and ointments for medicinal application (injections, topical liquids, powders, tablets, capsules, cachets, depot products, inhalation products, transdermal products).

CH4701 General Chemistry 1
CES 2-0-2
applications of chemistry in domestic, Medical and industrial environments.

CH4751 Introductory Chemistry
CES 2-0-2
Atomic structure and theory, orbitals, the build up of the periodic table, periodicity of chemical behaviour; the mole concept; stoichiometry; oxidation and reduction processes; the balancing of chemical equations. Gay Lussac’s Law and Avogaro’s Hypothesis, atomic and molecular weights. Chemical equilibrium, equilibrium constant, Le Chatelet’s Principle. Theories of acids and bases, the pH scale, the gas laws and kinetic theory gases. Thermochemistry: Heats of reaction. Chemical bonds, ionic covalent and metallic models, hydrogen bonds, Van de Waals forces. Introduction to organic chemistry, common functional groups - standard nomenclature and characteristic reactions. Organic polymers.

CH4807 Computational Chemistry*
CES 2-1-2
Chemical applications of numerical methods; Chemical structure and energy calculations; software packages. Prerequisite ME4642

CH4817 Quantum Chemistry*
CES 2-2-0

ER4101 Systematic Environmental Science
CES 2-1-0
Ecosystem functioning; environmental monitoring; environmental technology.

ER4405 Conservation Ecology
CES 2-0-2
Legislation; governmental and other agencies; Selection of areas for conservation; theory and practice of management for conservation; habitat rehabilitation and creation.

ER4407 Environmental Management 1
CES 2-1-0
The relationship between economic development and the environment; the evolution of the concept of environmental management; and global analysis of the contemporary environment; the interaction between nature, society and enterprise; resources, technology and management.

ER4417 Environmental Impact Assessment *
CES 2-1-0
Selection of topical project; scoping, alternatives, baseline data criteria, assessment of impact, mitigating measures, contingency measures, public involvement, EIS production. Prerequisite ER4707

ER4428 Utilisation of Non-Renewable Resources*
CES 3-0-3
Production and sources of the major industrial minerals (metallic and non-metallic), fossil fuels and water resources; environmental problems associated with the extraction and utilisation of mineral, energy and water resources, problems of resource depletion, conservation, recycling, substitution; case studies of specific resources relevant to Ireland: base metals, limestone, groundwater, peat and natural gas, world trade in non-renewable resources; strategic minerals; global issues related to non-renewable resources. Prerequisite: CH4554

ER4438 Environmental Fate Modelling
CES
Atmospheric emissions, dispersion modelling, emission impact; pollutant transport in surface waters, air water exchange, physical transport; groundwater movement, pollutant characteristics, retardation factors; computer modelling, prediction of transport patterns.
ER4507 Effluent Control Waste Management 1
CES 2-1-0
Principles of waste water management; effects of waste on receiving water sites and groundwater; pollutant tests; legislation; technology of waste water treatment and disposal; biological treatment of waste water - biological kinetics: activated sludge, trickling filter; sludge disposal; tertiary/advanced process; waste water reclamation.

ER4607 Clean Technology 1*
CES 2-1-2
Survey of methods of improving or optimising the process chemistry for specific industrial processes; the development of alternative processes with lower energy and material demands or waste production; the role of biotechnology and the use of biological raw materials in developing clean processes.

ER4627 Safety and Industry
CES 2-1-0
To provide an understanding of the principles of accident causation and prevention in the workplace. To familiarise the student with hazard and process safety analysis techniques as practised in industry. Principles of accident prevention; accident causation modes, risk identification, evaluation and control, hazard reduction techniques, design out, safety devices, warning devices, Hazard analysis, HAZAN, frequency, consequence, ALARA, Fatal Accident Rate, Hazard rate, Process Safety Analysis, HAZOP, guide words, what if reports, Fault tree analysis, primary and intermediate events, gate symbols, transfer symbols, Fire & explosion Indices. Selected industrial case studies.

ER4707 Monitoring and Research Methods
CES 2-1-2
Environmental impact assessment and it's role in the management of projects; scoping; data collection; impact assessment; impact evaluation; the environmental impact statement; interaction with the wider community; strategic environmental assessment; sea with regard to the energy sector, coastal zones; monitoring of emissions, including noise; environmental auditing; collection and encoding of data; multivariate approaches.

ER4708 Biometrics
CES 2-0-2
Hands-on Experience at analysis of community ecology data; detailed consideration of the problems encountered in taking the data from field observations, encoding, options for input to computer packages, preliminary explorative statistics, multivariate options: dendrograms, TWINSPAN, correspondence analysis, canonical correspondence analysis CANOCO.

EQ2001 Horsemanship 1 Δ
LCS 2-0-3
The principles of the riding and training of the horse for leisure, sport or sale. The theory, practice and psychology of the methods used. Safety for both the horse and rider while riding, training and handling of the horse. Developing a philosophy about riding and training. Definition of lay and scientific terms commonly used in the horse industry. Basic horse and stable management.

EQ2003 Horsemanship 3 Δ
LCS 2-0-3
Basic and elementary standard dressage requirements; lateral work, lengthened and shortened paces; jumping exercises; problem solving both on the flat and over fences.

EQ2101 Horsemanship 1A Δ
LCS 2-0-3
Students will develop foundation skills to enable them to ride, demonstrate and teach safe basic methods of equitation.

EQ2103 Horsemanship 3A Δ
LCS 2-0-3
The teaching methods and various systems of training used for riding and elementary dressage; lateral work, lengthened and shortened paces; jumping exercises; modern methods of solving problems both on the flat and over fences from a teaching point of view.
EQ4001 Principles of Equitation Δ LCS 2-0-3
Principles of equine management; equine welfare; basic equine psychology; history and evolution of equitation; the classical and academic approach to riding.

EQ4003 Equine Exercise Science 2* Δ LCS 2-0-3
Practical application of detailed biomechanical and video analysis of dressage show jumping and eventing techniques with particular reference to movement analysis; analysis of the effects of stress to the joints and main muscle groups; conditioning and supplying exercises and their beneficial effects. Prerequisite EQ4001

EQ4005 Equine Performance* Δ LCS 2-0-2
Concept of Physical Fitness including the parameters and specificity: Endurance training Strength and Power Training Interval Training Expected changes associated with different training methods. Evolution of training methods. Comparative study of the similarities and differences in the approaches to the training of the human and equine athlete. The course will be taught through lectures, seminars, tutorials and practical work.

EQ4007 Equine Competition 1* Δ LCS 2-0-3
Classical dressage including its historical background and social significance development from 16th century to the present day; study and analysis of the science and sport of show jumping; methods of training, breeding and production; importance of showjumping to the Irish horse industry; analysis and study of the evolution of eventing from the military use of the horse to the present day international requirements. Prerequisite EQ4026

EQ4017 Equine Teaching Principles 1 Δ LCS 2-0-3
The teacher; the pupil and the equine; conceptions of teaching; class management; discipline-communication and respect; aims and objectives; experience and learning; lesson plans; short term and long term; group lessons and individual Lessons; equestrian teaching methods; teaching aids.

EQ4026 Advanced Riding Techniques and Problem Analysis Δ LCS 2-0-3
Analysis of advanced techniques and methods of training. Evaluation of mechanical aids to riding. Identification and analysis of specific problems associated with advanced training. Corrections based on scientific, practical and psychological theory. Problems caused by unsoundness or injury.

EV2001 Irish Horse Industry LCS 3-1-0
The nature and scope of the Irish horse industry; principles of agricultural economics as applied to the horse industry; structure; supply and demand factors; impact of national, EU and world trade; development opportunities; the statutory and regulatory organisations that operate, control and administer the horse industry.

EV3005 Equine Breeding and Genetics LCS 3-0-0
Review of basic genetics; transmission of genetic material; sex-determination and sex-linkage, combination of traits, selection of dominant and recessive genes; blood factor and genetic tests, blood typing and registration. Genetics and disease; contribution of chromosome abnormality to congenitics malformations, subfertility and infertility; abnormal single genes and polygenic inheritance: relationships and inbreeding; importance of relationships; pedigree records: principles of selection for quantitative traits; key factors in selection; selection of traits; breed improvement; application of relative's record to selection.
EV4005 Grassland and Grazing Management  
LCS 2-0-2

EV4013 Equine Physiology  
LCS 2-0-2
Integrating the student’s 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.  The module will be offered in a multi-media format, by lectures, practicals and tutorials.

EV4015 Equine Health and Disease*  
LCS 2-0-2
Diseases, disorders and other causes of equine ill health through:  the digestive system, the cardiovascular system;  the respiratory system;  reproductive disorders; skin diseases; disorders of musculoskeletal system;  ocular diseases;  nervous system;  the liver and kidneys;  blood and haematological disorders; plant and chemical-induced toxicities; causes; cycle of events; recognition and management of parasitic diseases; bacterial infections; fungal diseases; viral infections; immunologic-mediated conditions; management of infectious diseases and preventive measures; diseases of foals.  Prerequisite : EV4012, EV4044, EV4014

EV4017 Equine Pharmacology*  
LCS 2-0-2
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 equine body; antimicrobial drugs; anthelmintic medication; applied toxicology; drug assay methodology.  Prerequisite : BC4902, EV4013

FT4105 Food Process Engineering 1 *  
LCS 2-2-0
To provide food technologists with an understanding of the engineering principles involved in food processing. Introduction to the basic principles of material and energy balances/transfer and the application of these principles to the areas of fluid flow, drying and evaporation as specifically required in the food industry.  Prerequisite : CH4404

FT4107 Food Process Engineering 2 *  
LCS 2-1-0
Application of basic engineering principles to those unit operations which are of particular relevance to the food industry.  Such unit operations would include mixing, size reduction, separation, distillation and the use of flow diagrams.  Prerequisite : CH4404

FT4411 Introduction to Food Science and Technology  
LCS 2-2-0
Scientific principles in the safe production, preservation and distribution of foods; role of food processing technologies in ensuring food safety; role of food chemistry in monitoring food quality; current food issues of consumer concern including bovine spongiform encephalitis (bse), genetically
modified foods, e.coli 0157, h7 etc.; current technology trends to ensure greater safety and quality.

FT4415 Food Technology 2 LCS 2-2-0
Food processing/preservation technologies (chemicals, freezing, drying, canning, irradiation, microbiological, physiological, chemical and physical effects in foods, safety aspects of processes and post-processing storage, chilled foods, food formulation and product development, applications of hydrocolloids as gelling and thickening agents.

FT4417 Food Technology 3 LCS 2-2-0
Production of chemicals and biochemicals from conventional and novel crops and from slaughterhouse by-products; whole crop harvesting, agricultural refineries, integration of food, feed, energy and chemical production; biomass as an alternative renewable energy supply, bioethanol production, gasification, combustion, oil crops and the Elsbett engine.

FT4427 Food Technology 4 LCS 2-2-0
Physical properties of foods; instrumental methods for measurement of colour, texture, viscosity; organoleptic procedures; relationship between instrumental and sensory methods of analysis; chemical aspects of flavour; microbiological quality standards; ISO 9002; quality systems, effects of food packaging technology on food quality during distribution and storage; human nutrition issues in food quality.

FT4437 Milk Proteins as Food Ingredients LCS 2-2-0
Milk protein chemistry; caseins, whey proteins, minor constituents; functional properties of milk proteins; emulsification; foaming; gelation; significance of milk protein variants to the processing properties of milk; rennet coagulation; cheesemaking; heat stability; enzymatic hydrolysis of milk proteins; commercial proteinases; hydrolysate characterisation, milk protein allergenicity; immunoreactive peptide sequences; reduced/hypoallergenic milk protein hydrolysates. Nutraceuticals/bioactive peptides; angiotensin-I-converting enzyme inhibitors; special assignments will involve review and discussion of relevant research papers.

HC4305 Land and Landscape Management LCS 2-1-2
Vegetation/habitat types in Ireland; agricultural land as a habitat; vegetation development in Ireland and Northern Europe since the last glaciation; succession models and examples; commercial forestry in Ireland; species used, site-types, silvicultural sequence; introduction to landscaping; interior plant scheduling; landscape management.

PH4011 Physics for Engineers PHY 2-1-2
Mechanics: vector algebra; Newton's laws; motion; moment of inertia; conservation of linear and angular momentum; collisions; conservation of energy; elasticity; Hooke's law; the atom; semiconductors; free electron theory; elementary quantum theory; insulators, semiconductors, conductors, superconductors; electronic devices; diodes; bipolar transistor.

PH4031 Physics for General Science 1 PHY 2-1-2

PH4017 Medical Physics PHY 2-1-0
Introduce the student to the scientific basis of the well known radiological equipment commonly in use in our hospitals and medical research institutes, and provide a working knowledge of the operation of this equipment. Introduction to radiation transport in tissue, absorption/scattering theory, Monte Carlo modelling, X-RAY/CT generation and propagation. Computed Tomography, slicing the living human body. Ultrasound, Doppler effect, limitations.
Radio/contrast imaging, contrast agents. MRI/MRS basics, superconducting magnets, 3D map of hydrogen atoms, properties and amount of water in tissue. Distinction between contrast and content/functional imaging.

PH4101 Physics 1 (Mechanics and Heat) PHY 2-1-2

PH4103 Physics 6 (Mechanics)* PHY 2-1-2
Review of the principles of mechanics; linear and angular momentum; rotational dynamics; impulsive motion; gyroscope motion; mechanical vibrations; simple and damped simple harmonic motion; forced oscillations; coupled oscillations; waves; transmission lines. Prerequisite PH4101.

PH4113 Mechanics/Heat/Electricity/Magnetism PHY 3-1-0
Introduce the student to basic mechanics, to the mechanical, fluid and thermal properties of matter and to the basic concepts in electricity and magnetism. Mechanics, vectors, Newton's laws, motion, conservation of energy, conservation of linear and angular momentum, gravity, Kelper's laws. Elastics, Hooke's law, fluids, heat, heat transfer, Kinetic theory, heat engines. Electricity, electric field, Coulomb's law, Gauss's law, Ohm's law, Kirchhoff's laws, RC circuits. Magnetism, magnetic field, Ampere's law, Electromagnetic Induction, Faraday's law, Lenz's law.

PH4141 Principles of Physics PHY 3-1-0
Will present an overview of physics in terms of its history, logical structure and the scientific method. Introduce and develop the fundamental techniques of experiment in physics. Physical theory, structure and logic, nature of physical law, logic of scientific discovery. Quantities, variables and relationships, dimensions and dimensional analysis, scientific notation, problem solving. Measurement techniques and instruments. Presentation of lab reports. Experimental error.

PH4145 Experimental Physics 1 PHY 0-0-4
Develop the experimental and reporting skills of the student. Allow the students to explore and test physical concepts. Expose the students to experiments in mechanics, heat, electricity and magnetism. Experiments in: Mechanics; forces, Retcher's trolley, conservation of momentum. Heat; specific heat capacity/transfer, Boyle's law, Charles's law. Electricity; electrostatics, Faraday's ice pail, Ohm's law, RC circuit. Magnetism; field lines, Faraday's law of EM induction, Lenz's law, Ampere's law.

PH4203 Applied Optics 1 PHY 2-1-3
Geometrical Optics: Combinations of lenses; aperture stops; lens aberrations; image formation; microscopy. Introduction to matrix methods. Wave Theory: Development of the wave equation; solution for SHO. Fourier analysis/synthesis. Coherence. Physical Optics: Interferometry; Diffraction; Polarization Double Refraction; Optical Activity. Interferometer applications. Photometry: Diffuse reflectors and radiators, Luminance and illumination of an image in an optical system. Photometric units; standard sources and absolute photometry.

PH4218 Optical Fibre Communications* PHY 2-1-0
Optical Fibres: review of wave propagation; Maxwell's equations; refractive index; dispersion; waveguide theory; weak guidance approximation; optical fibre modes; types of optical fibres; intermodal dispersion; approximation techniques; equivalent step index; Gaussian, chromatic dispersion. Material and waveguide dispersion; optical fibres for dispersion control; attenuation and sources of loss; fibre cables; connectors; special polarisation and
laser fibres; fibre devices; fused tapered couplers; symmetric and asymmetric couplers; wavelength division multiplexers; fibre measurements, loss measurement; dispersion; cut off wavelength; index profile; numerical aperture; optical time domain reflectometry; optical fibre systems; transmission circuits; receiver circuits; digital system planning; analogue system planning; applications; public networks; consumer electronics; industrial sensors; LAN’s

Prerequisite PH4217

PH4301 Physics 2 (Electricity and Magnetism 1)

PHY 2-1-2
Electrostatics; Coulomb’s law; Gauss’s law; current and circuit; Ohm’s law; RC circuits; magnetostatics; magnetic effect on current carrying conductors; electromagnetic induction; Faraday’s law; Lenz’s law; LR circuits; ac circuits; ac theory.

PH4308 Applied Electromagnetics*

PHY 2-1-0
Maxwell’s equations; and electromagnetic waves, solutions of Maxwell’s equations, electromagnetic waves in free space, dielectrics and conductors; intrinsic impedance, wave attenuation, power and Poynting vector; wave reflection from conductors and dielectrics; skin effect, SWR, Brewster angle, oblique reflection, total internal reflection, polarization, power transmission, wave momentum; transmission lines; field and circuit parameters, impedance, standing waves and Smith chart, attenuation; application of Maxwell's equations. Prerequisite PH4304

PH4401 Physics 3 (modern physics)

PHY 2-1-2
Special relativity; the atom; quantum mechanics; the nucleus; radiation; radioactivity; introduction to the elementary particles.

PH4403 Physics 7 (Quantum)*

PHY 2-1-2
Failures of the classical theory; experimental basis for the quantum theory; wave mechanics; De Broglie’s hypothesis; Heisenberg Uncertainty principle; Schrodinger’s equation; solving the Schrodinger equation. Prerequisite PH4401

PH4405 Atomic and Nuclear Physics

PHY 2-1-2
Atomic structure; atomic spectra; wave mechanics; spin and exclusion principle; Zeeman effect.

PH4511 Introduction to Physics

PHY 2-1-0
The history of physics and the development of physical theory, scientific thought and the scientific method: Aristotle and the Greeks, the middle ages, the scientific revolution, Galileo and Newton, the 18th and 19th centuries, the successes and failings of classical physics; the development of modern physics, relativity and quantum theory. Methods and techniques: quantities, variables and relationships, the nature of a physical law, dimensions and units, dimensional analysis, scientific notation, orders of magnitude and their estimation; problem solving using physics, the application of theories and principles. Applied physics in engineering and technology: the role and relevance of the applied physicist in industry and other practical contexts.

PH4607 Solid State Physics 1*

PHY 2-1-0
Theories of conduction and magnetism; breakdown of classical theories; magnetic properties of solids; classification of types of magnetism. Crystal dynamics: lattice vibrations; phonons; anharmonic effects; thermal conduction by phonons. Energy band theory; quantum theory of conduction. Superconductivity. Magnetism; diamagnetism; paramagnetism; magnetic order. Prerequisite PH4403.

PH4705 Instrumentation 2*

PHY 2-1-2
Accuracy of measurement systems; dynamic characteristics of measurement system elements; loading effects; signals; noise; interference reduction; filtering; data acquisition; GPIB, HPIL; RS232; Signal processing; sampling; specialised measurement systems. Prerequisite PH4704
PH4805 Industrial Physics B*

Review of electronic materials; electronic components; IC fabrication; electronic production; PCB process; SMT thin/thick film hybrid circuits; statistical methods for process control; reliability theory.

Note: Δ Students who want to join one of the following Equine modules: EQ2001, EQ2101, EQ2003, EQ2103, EQ4001, EQ4003, EQ4002, EQ4007, EQ4017, EQ4026, EQ2002, EQ2102, EQ3006, EQ4004, EQ4008, EQ4018 should note that resource and scheduling constraints limit places, therefore, we cannot guarantee enrolment. Available places are allocated to Equine Science majors first and are subject to interview and/or skills assessment. It is unlikely that any student will be able to enrol for more than one of these modules. Students who want to join one of these modules are also required to enrol for one of: EV2001, EV4005, EV3005, EV4013, EV4015, EV4005, EV4017, EV4008, EV4012, EV4014, EV4022

ENGINEERING MODULES

ID4811 Industrial Design 1
MAE 1-2-4
Design methods; an approach to design working to a brief; design techniques; drawing and modelling skills, practical development of the manual and mental skills of idea development and communication; design history; an overview of industrial design in the context of social and economic conditions.

IE4115 Introduction to Industrial Engineering
MOE 2-2-0
Objectives and tools; work design methods; performance prediction; interest calculations; risk assessment; replacement decisions.

IE4218 Operations Management 2
MOE 2-1-0
Evaluations; value analysis; job evaluation; operator ratings; decision theory; tables and trees; discounted decision trees; decision making under certainty; risk and uncertainty; optimisation; response surface analysis; steepest ascent/descent; Fletcher-Powell plane-cutting, Rosenbrock star-search, golden section, Hooke & Jeeves; case studies; each examined from aspects such as facility location, scheduling, ergonomics, materials handling; each specialist assesses the case from his/her particular viewpoint; students work in groups; on their own under the guidance of different specialists; verbal presentations and written reports.

IE4318 Plant Reliability and Maintenance
MOE 3-1-0
Fundamentals; concepts and formulae, hazard rate calculations, use of redundancy and considerations of implications on costs of purchase, operation and maintenance, system reliability using block diagram reduction and state transition analysis techniques; reliability estimation; from observed failure characteristics, use of Weibull Hazard Plotting for censored data, Markov analysis including systems subject to repair; systems availability; prediction of repair times; part failure rate analysis; data sources, failure modes, effects and criticality analysis; influence of environment and operational modes, identification of areas for effort; load-strength relationships and application of simulation; case study; acceptance testing for reliability, confidence levels; environmental testing; methods and instrumentation, effects of heat, humidity, corrosion, mechanical hazards; packaging.

IE4417 Ergonomics
MOE 2-0-1
Ergonomics approach; muscular stress; energy liberation, circulatory system, physical work ability, muscle contractions;
work activity; measuring energy cost, Pimentel and Pandolf equations, manual materials handling, NIOSH guidelines; information exchange; information theory, information processing, controls and console design; postures; anthropometry, static work, posture description, posture improvement, cumulative trauma disorders; hand tools; design, problems, vibration white finger; systems environment; heat accumulation, Givoni and Goldman equations, lighting terms and requirements, noise effects and countermeasures; systems safety.

**IE4518 Engineering Psychology**  
MOE 2-0-1

Ability assessment; reliability and validity of tests, situational specificity, information theory, attention and perception; training; learning, educational and training, memory, designing a training programme and developing materials; testing a programme; training methods, assessing trainability, evaluating training programmes; decision making; information processing models of decision-making, feedback, hypothesis testing, diagnosis and forecasting, decision-making aids; human-machine interaction.

**IE4711/MF4711 Manufacturing Integration**  
MOE 2-0-2

Manufacturing Documentation; manufacturing process charts; spreadsheet procedures; for manufacturing calculations; manufacturing cost estimates.

**ME4111 Engineering Mechanics 1**  
MAE 2-0-2

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; centurions, centres of gravity, distributed forces, area and mass moments of inertia; friction.

**ME4113 Applied Mechanics**  
MAE 2-0-2

Kinematics of simple mechanics and linkage; analysis of four bar linkages, straight line mechanisms, use of velocity and acceleration diagrams; Coriolis analysis; cams; Kinematic analysis of follower motion, velocity and acceleration of cams; construction of cam profiles, computer aided design of cams; forces analysis of cams; gears; gear kinematics and dynamics, simple and compound trains; epicyclic gears, referred inertia, torque and power transmission; balancing; balancing of rotors, static and dynamic balance, balancing of reciprocation masses; Gyroscope; gyroscope analysis and gyroscopic effects.

**ME4117 Vibration Analysis**  
MAE 2-0-2

Single degree of freedom systems; free response; springs in series and in parallel; logarithmic decrement; forced response to harmonic excitation; excitation by an unbalanced rotor; response to periodic excitation; fourier series; impulse response; response to arbitrary excitation; free and forced response of two and multi-degree of freedom systems; use of the modal superposition method; use of the finite element method. Prerequisite ME4111

**ME4121 Engineering Science 1**  
MAE 2-2-0

Mass, force, weight; forces in equilibrium; frameworks; stress and strain; shear stress; shear force diagrams, bending moment diagrams; friction; velocity, acceleration, relative velocity; motion in a circle; simple harmonic motion; work, energy, power.

**ME4213 Mechanics of Solids 1**  
MAE 2-0-2

Uniaxial stress and biaxial strain fields; constitutive relations; shear force and bending moment diagrams; bending of beams; transverse shear stress in beams; composite beams; temperature stress; torsion of cylindrical sections; analysis of stress at a point in 2D; principal stress and Mohr’s stress circle; thin cylinders and thin spherical vessels. Prerequisite ME4112

**ME4216 Aircraft Structures 1**  
MAE 2-0-1

Aircraft structural design/analysis philosophies, construction principles: aircraft loads; theory of elasticity with applications to plane stress problems; airy stress function;
non-homogeneous, non-symmetric beams subjected to bending about two axes; torsion of open and closed sections, prandt stress function, membrane analogy, Bredt-Batho theory applied to single and multi-cell sections; shear of thin-walled beams; shear walled cross-sections; idealised stringer-web, multi-cell, thin-buckling; introduction to buckling of stiffened panels. Prerequisite ME4213

**ME4217 Mechanics of Solids 3**

Stress at a point in 3D, strain at a point (including finite strain) in 3D, theory of 3D strain rosettes and embedded moire grids; constitutive relations; equilibrium and compatibility; stress functions (various applications); holography and the measurement and separation of deformation u, v and w; case studies demonstrating a hybrid approach to metrology. Prerequisite ME4213

**ME4223 Fundamentals of Aerospace Engineering**

The syllabus will comprise of various topics selected from the following list on the basis of availability of guest industrial/academic experts: air accident investigation; aircraft aerodynamics; aircraft maintenance; aircraft performance; aircraft propulsion systems; aircraft stability and control; aircraft structural design and fabrication; computational engineering software; experimental techniques; astrodynamics; gas turbine overhaul; rotary wing aircraft; spacecraft design; spacecraft propulsion systems; technical report writing and presentation skills will always be covered.

**ME4227 Aircraft Structures**


**ME4238 Maintenance Technology**

Failure in service; influence of design, manufacturing and materials; non-destructive test procedures; analysis and characteristics of defects, validation of results; repair procedures for metallic and composite structures in aircraft; life of lubricants, hydraulic fluids and bearing materials; actuation systems, pneumatic and electric; test procedures for avionics systems.

**ME4417 Boundary Layer Theory**

The derivation of the three-dimensional viscous, steady compressible equations of the conservation of mass, momentum and energy; the distinction between differential and integral solutions; differential solutions for simple pipe flow with heat transfer and coquette flow; the Von-Karmen integral solution of flat plate flow with heat transfer; dimensional analysis for free and forced convection; shear stress drag and the Reynolds Colburn analogy; theories of turbulence; the effect of turbulence on drag and heat transfer. Prerequisite ME4312

**ME4418 Thermofluids Design**

Selection of CAD softwares, design analysis of industrial piping and pumping system design using analytical and cae approach, network analysis of fluid process system design, cfd codes including turbulence modelling, experimental analysis applied to simple fluid system modelling and applications. Prerequisite: ME 4562

**ME4427 Medical Device Design And Placement**

Overview of medical engineering materials and their functional properties. Practical aspects of stress analysis and biomechanic in medical appliances and devices. Stability of design elements. Aspects of component life,

ME4438: Computational Fluid Dynamics
MAE 2-0-2

The philosophy of CFD; fundamentals of vector fluid dynamics; fundamentals of viscous fluid deformations; the governing equations of fluid dynamics; basic discretisation and grid generation techniques; the finite volume method; application to convection-diffusion problems; pressure-velocity coupling; implementation of boundary conditions; fundamentals of turbulence modelling PREREQUISITE MODULE(S) ME4424 - Aerodynamics 1

ME4517 Energy Management
MAE 2-0-2

Fossil fuel reserves and rates of consumption; energy situation in Ireland, trends and issues, present and future; energy and the environment; energy tariffs and their significance in industry; economics of energy - payback period, present value, analysis, energy audit; energy management systems; combined heat and power; renewable energy sources; optimising thermal equipment; Lagrange multiplies; modelling thermal equipment; heat exchanger effectiveness and number of transfer units; availability, energy and minimisation of entropy production. Prerequisite ME4526

ME4523 Thermodynamics 1
MAE 2-2-2


ME4527 Thermodynamics 3
MAE 2-0-2

The second law re-visited: alternative approaches to entropy; the flow through gas turbine blade rows; the non-dimensionalised equations; compressible analysis; three dimensional flows; a design example; combustion; first law analysis of combustion. Prerequisite ME4414

ME4528 Propulsion Systems
MAE 2-0-2

The jet propulsion principle and the thrust equation; turbojets, turboprops and turbolans; ramjets and unducted fans; reviews of mechanics and thermodynamics of fluid flow; one-dimensional gas dynamics and boundary layer theory; thermodynamics of aircraft jet engines: efficiency and performance; two-dimensional blade row
velocity triangles for turbines and compressors; stresses in turbine discs. Prerequisite: ME4424

ME4611 Computing MAE 2-0-2

Introduction to computer organisation, programming languages, top-down design techniques; arithmetic operations including intrinsic functions; control structures; data files and input/output system; single and multidimensional array processing; implementing top-down design with functions and subroutines; character, complex, and double-precision data; internal, sequential and direct access files; numerical applications; and engineering applications. Operating System (DOS) and use of spreadsheets.

ME4662 Computing 2* MAE 2-0-2

Intrinsic functions; Array computations; Data analysis functions, Random numbers, Plotting: X-Y & polar plots, bar graphs, plotting options, Matrix computations: 3-D plots; Numerical Techniques; systems of linear equations, interpolation and curve fitting, polynomial analysis. Graphical User Interface(GUI). Process modelling; introduction to SIMULINK, and its application to process systems simulation. Prerequisite: ME4661

ME4717 Control Engineering 2 * MAE 2-0-2

Laplace transforms; dynamic behaviour; closed loop control system; controller design using frequency response criteria; stability of closed loop control systems; frequency response analysis; development of empirical dynamic models from step response data. Prerequisite ME4714

ME4727 Stability and Control* MAE 2-1-0

Equations of motion for a rigid body aircraft; physical basis for longitudinal and lateral stability derivatives; solution of the equations for free longitudinal motions, phugoid and short period modes, flight paths, variation of roots with C.O.G. position, flying qualities; free lateral motion; basic control theory, transfer functions, block diagrams, state space to transfer function representations for MIMO systems, the root locus technique; open loop control - response to controls; closed loop control, autopilots with displacement and velocity feedback, stability augmentation systems with velocity feedback and full state feedback. Prerequisite: ME4711

ME4817 Aircraft Systems Design*M 2-2-0

System engineering of aircraft design; preliminary sizing of critical parameters to specified performance requirements and airworthiness regulations; conceptual aircraft layout and scaling to requirements; weight and balance prediction and assessment; determination of aerodynamics and stability parameters for preliminary design; structural layout of critical elements. Prerequisite ME4826

ME4827 CAD 3-D MAE 2-0-2

The geometry of three-dimensional space; 3D wireframe, surface modelling and solid modelling; translation of models into other forms; e.g. FE meshes; rendering and presentation; mechanism modellers and visualisation modellers.

MF4111 Production Processes MOE 2-0-2

The aim of this module is to provide the student with a basic knowledge and experience of the methods employed in the processing and fabrication of common engineering materials and to emphasise the importance of safety in the engineering environment.
MF4712 Operations Integration*

By the end of this module students will be able to write programs to capture, manipulate and present manufacturing and operations engineering data through a high level language such as Visual Basic and to write programs to interface with manufacturing equipment. **Prerequisite: IE4711**

MF4713 Work Design and Measurement

The aim of this module is to provide expertise in the area of Work Design so that significant improvements in productivity can be achieved in manual and clerical work. To learn how to estimate the times required for jobs and to explain how to collect data on work times and methods.

MF4717 Modelling & Control of Dynamic Systems*

To develop skills in analysing and modelling dynamic systems. To develop the students' ability to build and analyse models at the systems level. To introduce the concept of controlling dynamic systems and to view operations and manufacturing in an integrated fashion. **Prerequisite: MF4766**

MF4723 Organisational Psychology

To introduce students to working in organisations prior to their co-operative placement. To acquaint students with sufficient knowledge to understand structures and cultures of organisations. To enable students to understand managerial practice in order to accept and practice management.

MF4724 Machine Design*

To develop in the students the ability to produce high quality engineering drawings on a CAD system. To apply correct design principles to engineering components and to develop a knowledge of Jig and Fixture design for Manufacturing Systems. **Prerequisite: MF4722.**

MF4727 Operations Management 3*

The aim of this module is to draw together material from the prerequisite modules and apply them to understand and optimise the operation of manufacturing systems. The module will address the following issues: scheduling; production planning and inventory control; variability in manufacturing operations; and layout design. **Prerequisite: MF4716**

MF4733 Manufacturing Information systems*

To give students an understanding of the role of information within a manufacturing organisation. To introduce students to tools available for information systems analysis and design and to allow students to acquire data management skills. **Prerequisite: MF4712**

MF4737 Automation Engineering 2 *

To introduce the student to the analytical concepts of movement and stability in equipment design. To introduce the student to the programming languages in Computer Aided Manufacturing. **Prerequisite: MF4766**

MF4747 Material Forming 1 *

To introduce the student to the analytical aspects and the different theories used in establishing the deformation forces in the shaping of engineering materials. **Prerequisite: MF4746**

MT4003/MT4013 Polymer Science

Molar mass averages; polymer chemistry, addition and condensation; chain growth and step growth mechanisms, kinetics and chain statistics; branching and cross linking; copolymerisation; polymerisation techniques; chain structure and property relationships; crystallinity; polymer solutions.
**MT4017 Biomaterials 1**


**MT4023 Materials 2**

Introduction to engineering materials and their properties, price and availability of materials, the elastic moduli (bonding between atoms, packing of atoms in solids, physical basis of young’s modulus, yield strength, tensile strength and ductility), fracture toughness, fatigue failure, creep and creep fracture, analysis of mechanical testing, failure analysis, design and materials selection.

**MT4101 Introduction to Materials**

Historical background to development of materials, materials science, classes of modern materials, metals, polymers, ceramics and glasses, composites, origin of these materials, properties, applications, related to properties.

**MT4105 Quality Systems**

To form an understanding of the concepts behind the ISO 9000 standards, product testing and certification. How quality standards operate in Irish manufacturing and service industries, How the standards relate to Total Quality Management (TQM), How to document and maintain a Quality System, To develop an understanding of the basic tools of statistical process control, To understand the role of Total Quality Management (TQM) in improving business performance. Prerequisite CH4701, MT4943

**MT4107 Composite Materials**

Fundamental concepts of composite materials, ceramic, metal and polymer matrix systems, stiffness and strength of composites, with particular reference to continuous fibre materials, macro mechanical and micro mechanical approaches, laminae and laminates, processing techniques, typical applications.

**MT4205 Failure Processes (including FM)**

Fracture; linear elastic fracture mechanics; fatigue - life prediction; stress corrosion cracking; corrosion mechanisms; protection processes; creep mechanisms.

**MT4207 Failure and Damage Analysis**

Analysis of failure and damage; modes of failure; procedures of failure analysis; implications of failure analysis; experimentally based mini-projects; case studies.

**MT4303 Materials Science 3**

Crystal chemistry of metallic and non-metallic structures, ionic and covalent crystals, structure, unit cells, indices; planes and directions; symmetry, crystal classes; stereographic projection, crystal defects, Frenkel and Schottky, non-stoichiometry in compounds, diffusion, atomic mechanisms, X-ray diffraction, Bragg and Laue equations, powder photographs, diffractometer, diffraction patterns, structure determination. Prerequisite MT4102

**MT4305 Advanced Analytical Techniques**

Diffraction techniques, electron diffraction analysis of simple reflection patterns, electron microscopy, scanning electron microscopy, EPMA, surface analysis atomic
force microscopy; spectroscopic techniques; IR visible and UV; nuclear magnetic resonance; thermal analysis techniques; case studies involving; specific materials problems. Prerequisite MT4913

MT4707 High Performance Materials  
MST 2-0-2
High temperature systems; materials for gas turbines; advanced processing; oxidation; corrosion resistance; coatings; high performance aluminium alloys; titanium alloys; processing - structure - property relationships.

MT4717 Aerospace Materials  
MST 2-0-2
Properties and processing of metallic and non-metallic, monolithic and composite, structural and high temperature materials for aerospace applications.

MT4804 Ceramics and Glass Science 1*  
MST 2-1-2
Classification of ceramics; structures of silicates and clay minerals; structure of glasses; green processing and fabrication; firing of traditional ceramics; vitrification and glass formation; binary and ternary systems; densification processes; sintering mechanisms; manufacture and properties of glasses. Prerequisite MT4303

MT4805 Ceramics & Glass Science 2*  
MST 2-1-2
Microstructure and texture in ceramics; structure/property relationships in ceramics; fracture in brittle materials; criteria for high strength; approaches to processing: (1) flaw-minimal fabrication [2] microstructural engineering; silicon nitride; zirconia; transformation toughening; plastic deformation in ceramics; creep strength of glass; devitrification of glasses; nucleation and crystal growth; glass-ceramic systems and properties; optical properties. Prerequisite MT4804

MT4905 Materials Technology 4  
MST 2-0-2
Principles of polymer processing; extrusion; injection; materials, techniques; compression, transfer and rotation, die filling, cycle, process control, effect on properties; blow moulding and vacuum forming moulding; cellular polymers.

MT4907 Polymer Chemistry  
MST 2-0-2
Ring opening polymerisations, their kinetics and reaction mechanisms; chemistry of selected natural polymers; cellulose and its derivatives, polysoprene and proteins; degradation reactions, thermal, chemical and radiation induced processes, their mechanism and kinetic descriptions.

MT4923 Materials Technology 2  
MST 2-0-2
Mechanical fundamentals of materials; metallurgical fundamentals of materials; irons and steels; heat treatment; copper, aluminium, nickel; mechanical testing and theory.

MT4943 Materials processing  
MST 2-0-2
Metals; casting; froming; extrusion, forging, rolling, sheet metal work; joining; mechanical, welding, adhesion, brazing; polymers; processing techniques.

PD4013 Aesthetics of form‡
Introduces the student to the concept of using 3D form to describe objects and to develop an appreciation and a language for aesthetics.

PD4023 Design research and specification‡
Introduces the student to the methodology of design practice from problem identification, design brief, research and analysis to design specification development.

PD4006 Product prototyping and development‡
Develops the students knowledge and ability to model and prototype design proposals in 3D using craft and maching skills in conjunction with modeling materials (paper, card, various foams, finishing products and preparation for painting).

PD4016 Aesthetics appearance and execution‡
Building on the knowledge and experience gained in PD4013 (2nd yr semester 1) the students learn to progress their design proposals through to design features detailing and execution. Prerequisite PD4013 Aesthetics of form.
PD4024 Design for environmental sustainability‡
Places the design of products in the context of environmental sustainability in product production choices related to materials and processes through the product manufacture and life-cycle

PD4036 Design realization‡
Develops the student’s ability to design products for manufacture employing professional best practices

‡ Please note that PD modules have 1 hour lecture, 3 studio lab hours and an additional 4 hours studio time aside from the 3 studio lab hours per week. ID modules have 1 hour lecture, 2 hours hands free drawing and 4 hours studio per week.

PE4118 Forming & Cutting of Engineering Materials 2* MOE 2-0-1
Fundamentals of elasticity and plasticity, plane strain and stress, idealised stress-strain curves and their empirical equations, yield criteria; of Von Mises and Tresca, work-hardening, instability, necking; plane strain tests, tension and compression and side-pressing tests, workability testing; analysis of metal-working processes, slab analysis in strip and wire drawing; bounding and limit analysis, the slip line field theory applied to plane strain forging between flat overhanging platens, computerised drawing of a s.l.f., the finite element method in metal forming, application of FEM to plasticity; mechanics of forming processes, rolling, drawing, extrusion, bending, punching and blanking; hot and cold working; friction and lubrication in metal-forming. Prerequisite PE4119

PE4216 Machine Tool Design & Control* MOE 1-0-1
Linear systems analysis; transient and steady state response of mechanical systems; applications of Laplace Transforms; open and closed loop systems; machine tools, lathes milling and reciprocating machines, presses and special purpose machines; machine tool kinematics, the function and design of shafts, slide-ways and power-screws in the generation of shape; the universal dividing head; variable speed drives, electrical, hydraulic and mechanical drive systems; power train design, gearboxes, flexible drives and clutches; speed and feed control; velocity and acceleration diagrams of sliding pairs and rotating elements; structured design of machine tools, machine component and machine body design for strength and functionality; machine tool vibration. Prerequisite PE4214

PE4228 Production Equipment Design 2 MOE 2-0-1
The general principles of presses and press tool design; piercing, blanking and bending process; tool design associated with piercing blanking and bending processes; optimising blank layout; the general principles of the die-casting process; die casting of metals and alloys, die design principles, material selection and component features used in the manufacture of dies; injection mould tool design; design of cavity layout, grating system and runner system in injection moulding; design of ejection system and sliding cores.

PE4317 Automation Technology 2* MOE 2-0-2
Classification of CNC machines, CNC machining; programming languages, manual and computer part programming; ISO programming codes, post-processor programmes, the ‘Smart-cam’ and CAD-key languages; DNC and interactive control of machines; the machine control unit, pulse generation and counting, table speed and position sensors, encoders and tachometers; table drives, amplifiers, D.C. motors, stepping and brushless servo drives; variable speed spindle drives; machine vision, object detection, bar-code readers; robot types, robot analysis and control, end effectors, programming languages, artificial intelligence; the flexible manufacturing cell, cell integration, data communications, transmission technology, local area

66
networking, distributed systems, network serves. Prerequisite PE4316

PE4318 Automation Technology 3*

MOE  3-0-1

Overview of CIM elements; description of role of CAD, CAPP, group technology, CAM; computer techniques - databases; conceptual schemes, logical storage schemes, application of database technology to manufacturing; knowledge-based systems to manufacturing; computer aided production and inventory control; production planning, master production scheduling, the manufacturing system database, materials requirement planning, capacity planning, role of JIT in production, production activity control; enterprise integration. Prerequisite PE4317.

PN4015 Design & Technology 2

MOE  1-0-4

Analysis of technology syllabuses and the structuring and planning of lessons to achieve quality outcomes. Quality of learning and the effective translation of knowledge and understanding of design and technology into practice. Strategies for development of design capabilities in 2nd level pupils to enable them to become confident in applying technological solutions to real problems. Promoting independent learning and facilitating the development of an enquiring mind.

PN4111 Introduction to Material Processing

MOE  1-0-4

Safety; manufacturing systems; historical perspectives on Manufacturing; production of materials; properties of materials which influence their selection; environmental implications of material processing; machine tools; basic manufacturing processes; expendable-mould casting; engineering measurement; standards of measurement; measuring instruments; introduction to metal cutting; chip formation; coolants; cutting speeds and feed rates; hand processing of materials.

PN4003 Process Technology 2*

MOE  2-0-4

Milling of components using the dividing head; milling with special form cutters; more advanced bench work and hand working processes; decorative metalwork involving repousse; rubber moulding techniques, resin casting, glass reinforced plastic lay-up.

PN4005 Engineering Design Graphics 1*

MOE  1-0-1

Intersection of surfaces [composite] - hinged planes; advanced problems on planes and their applications; skew line analysis - synthesis of geometries; conics - centres of curvature; special curves - their properties and applications; perspective projection; advanced transformation geometry; the geometry of sheet metalwork; gears and gear drives; conventional representations in engineering graphics; link mechanisms and their loci; construction of cam profiles to various specifications; schematic diagrams of electric and electronic systems. Prerequisite PN4216

PN4115 Process Technology 3

MOE  0-0-4

Problem identification in Engineering and Technology; evaluation of design; interpretation of design briefs; pedagogical considerations; design strategies and processes of designing relating to L.C. project briefs; manufacturing systems; design for manufacture; modelling and prototyping design solutions; properties of materials, selection of materials, shaping, joining and machining materials, finishing and presentation of artefacts; designing and making Leaving Certificate Engineering Technology and Technology design projects; evaluation and assessment criteria for design and make projects; management of the design and make environment.

PN4213 Technical Graphics *

MOE  1-0-4

Learning strategies in graphical problem-solving; orthographic projection; axonometric projection; planes and their traces and angles; freehand sketching in communication and in the modelling and development of ideas and designs; plane geometries; transformation geometry; two-dimensional and three-dimensional graphic design; surface developments and package design; presentation techniques; modelling solutions; surfaces in contact; auxiliary
projections; assessment modes and techniques. Prerequisite PT4111

PN4215 Technical Graphics & CAD*

MOE 1-0-4

Oblique and tangent planes - determination of traces, true shapes and angles; intersection and development of surfaces - plane and curved; conic sections - unique and common properties; pictorial solutions to assist visualisation; cognitive modelling strategies; geometric proofs in plane geometry; Axonometric planes; non-Euclidean geometries; hardware, software and operating systems; the Autocad drawing environment; basic drawing commands and editing fundamentals using blocks, attributes and symbols libraries; communicating building/ engineering and design details; dimensioning fundamentals; sections and hatching techniques; dictionaries and files; isometric drawing techniques; advanced drawing and program features. Prerequisite PN4213

PT4111 Manufacturing Technology 1

MOE 2-0-2

Safety; manufacturing systems; historical perspectives on Manufacturing; production of materials; properties of materials which influence their selection; environmental implications of material processing; machine tools; basic manufacturing processes; expendable-mould casting; engineering measurement; standards of measurement; measuring instruments; introduction to metal cutting; chip formation; coolants; cutting speeds and feed rates; hand processing of materials.

PT4113 Measurement & Inspection*

MOE 2-0-2

Historical background to measurement and interchange ability of parts limits and fits BS4500; measuring instruments; errors in measurement; measurement of components; straightness testing; machine tool alignment; flatness testing; measurement of surface texture; limit gauge design, in process measurement, automated measurement systems. Prerequisite PT4112

PT4115 Manufacturing Technology 4*

MOE 2-0-2

The stress strain diagram, the plastic region; metallurgical aspects of hot and cold working; work done in the deformation of metals; the mechanics of metal cutting; merchants analysis of metal cutting; lubrication and cutting fluids. Prerequisite PT4112

PT4117 Manufacturing Technology 5*

MOE 2-0-2

Mechanics of machine tools; forces on machine elements; machine tool alignment; machining of geometric forms; the machine-control unit for N.C. and CNC system; times for machining processes; cutting times; economic comparison of alternative processes, 'break-even' quantities; ISO standards for tools and tool holders. Prerequisite PT4115

PT4121 Communication Graphics

MOE 1-0-3

To prompt and nurture spatial-visualisation and spatial-reasoning abilities critical to the success of technology professionals. To present the standards and conventions of engineering drawing essential to the correct creation and interpretation of graphical representation used in engineering communication and documentation. To foster manual drawing skills, especially sketching, which are essential to design and communication success.

PT4315 Productivity Methods 3*

MOE 2-2-0

The objective of a manufacturing organisation; functions and types of manufacture; jobbing batch mass and flow production; costs and break-even charts; facilities layout; Gantt charts, network charts, critical path, uncertain times, time-cost tradeoffs; production planning; scheduling by SPT; Johnson's and Jackson's rules; index and graphical methods; use of priority rules. Prerequisite: PT4314

PT4317 Production Methods 4*

MOE 2-2-0

Forecasting by means of moving averages, exponential weighting, regression and smoothing techniques; linear programming; assembly line balancing problems; simple lines; evaluation of alternative methods; mixed-model and multi-model designs; manual flow systems. Prerequisite PT4315
PT4323 Productivity Methods 1A
MOE 2-0-2
Productivity, work design, workplace design, work measurement, time estimating, specialist techniques.

PT4423 2D CAD
MOE 2-0-2
Contemporary CAD software with particular reference to AutoCAD; hardware, software and operating systems; the AutoCAD drawing environment; absolute and relative coordinates, units and limits, CAD tools and drawing setup; the UCS; basic and advanced drawing and editing commands; introduction to layers; using blocks, attributes and symbol libraries; communicating engineering and design details; dimensioning and dimensioning styles; tolerance dimensioning; sectional views and hatching; text; introduction to Paper Space; basic customisation techniques; isometric drawing, CAD construction techniques, plotting; using Auto LISP routines from the Internet, DWF drawings; introduction to 3D functions.

PT4427/MF5051 Design for Manufacture
MOE 2-0-2

PT4515 Automation T1*
MOE 2-0-2
Programmable logic controllers; interfacing and programming; sensing devices; Analog - Digital; low cost automation; pneumatic control pneumatic circuit design; hydraulic circuit design; hoppers; feeders; orienting mechanisms; indexing mechanisms; transfer mechanisms; conveyors; the application of pneumatic, hydraulic, mechanical systems to manufacturing.

PT4517 Automation T 2*
MOE 2-0-2
Comparisons of hard programmable and manual status; costing of systems; systems specifications; design specifications; contracts; user manuals; safety etc.; robotics; production flow analysis; networks communication theory. Prerequisite: PT4515

PT4617 Reliability Technology
MOE 2-2-0
Considerations of implications on costs of purchase, operation and maintenance; reliability estimation; prediction of repair times; acceptance testing for reliability; replacement decision-making.

WT4003 Construction, Technology and Management 2*
MST 2-0-2
Site layout design and servicing, plant and equipment; substructure construction, ground water control, constructing deep foundations; specialist foundation techniques; demolition and temporary works; Portal frames, theory and erection procedures; Fire protection and means of escape; claddings to framed structures; formwork systems, concrete finishes; prestressed concrete, principles and applications; Industrial buildings, walls and roofs, wind pressures, roof structures; external works, roads, pavings and slabs. Prerequisite: Construction Technology and Management 1.

WT4005 Architectural Technology: Heritage and Design
MST 2-1-4

WT4007 Building Measurement & Documentation MST 1-1-1

Introduction to contract documents and their functions, conditions of contract, forms of tender, forms of agreement, bills of quantities, drawings, specifications; bill preparation process, contents bills of quantities, techniques used in preparing bills; general rules of abstracting and billing; preambles to the bill, using dayworks, specialist bills and addendums; recent developments in the bill preparation process, computer applications and electronic tendering; Application of standard methods of measurement to building works, general rules to using ARM, preliminaries, prime cost items, demolition, excavation and earthworks, piling and diaphragm walling, concrete work, brickwork and blockwork, underpinning, rubble walling, masonry, asphalt, roofing, woodwork, structural steelwork, metalwork, plumbing and mechanical engineering installation, electrical installations, floor wall and ceiling finishes, glazing, painting and decorating, drainage and fencing; Contract administration, letters of agreement, roles within the standard conditions of contract, site meetings, issuing instructions, dealing with variations, discrepancies in the documentation, certification, practical completion, defects liability, practical completion, agreement to final account, documentation and archives.

WT4103 Wood Technology and Design 1 MST 1-0-2


WT4105 Wood Science 3 MST 2-0-2

Mechanical properties of wood: specific gravity, density, concept of cellular solids; tensile strength; compressive strength; hardness and abrasion resistance; wood composites.

WT4107 Pulp,Fibre and Board Manufacture1 MST 2-0-2

Concepts in modifying wood: deconstruction, combination, chemical and physical changes; comminution; fibres, pulping, mechanical, chemical, physical, chips, particles, veneer, sections; fibre products; manufacture, types, properties, end uses.

WT4117 Structural Design MST 1-1-1

Introduction to structural design, basic structural concepts and material properties; design loads acting on structures, structural analysis beam design column design, design loads; concrete and structural steel design, limit state design principles, structural stability calculations, deflections; design of beams for shear force and bending moments, stresses in beams, steel, concrete and composite sections; Inelastic bending, plastic hinges, axially loaded members, eccentrically loaded columns, design of connections; trusses and bracing, design of roof trusses; timber frame designs, beams and columns; design of simple foundations.
WT4201 Wood Technology 1
MST 2-0-2

WT4203 Furniture Design
MST 1-0-3
A general appreciation of man's progressive development through the ages by reference to his design achievements; furniture design in a historical context as a precursor to contemporary design; seminars/projects: problem definition; solution options; design modelling and presentation.

WT4205 Architectural Technology: The Built Environment
MST 2-0-4

WT4301 Building & Construction Regulations 1
MST 3-0-0
Describe the role and content of the Safety Statement, Explain the duties of employers and managers in the context of health & safety legislation as it applies to the building of and construction industry, Identify different types of hazards and undertake risk assessments. Explain the role of Safety Representatives and Safety Officers in the building and construction industries and the role of consultation. Describe the main regulations and legislation as they apply to the construction and building industries. Explain how the Construction Regulations are applied.

WT4305 Machining Technology 3*
MST 2-0-3
Advanced machine processes; computer integrated manufacturing; analysis of tool design; material optimisation; analysis of factors governing the economics of manufacturing complex product design including effective modification of design and/or equipment; case studies. Prerequisite WT4304
WT4315 Harvesting and Sawmill Technology*
MST 2-0-2
Extraction, transportation and sorting logs, main equipment/machines selection relative to location and end use; analysis of material optimisation; sawmill layout; computer control systems; sawmill wastes; grading and drying; quality control; storage and yard organisation; structured visits to forests and sawmills. Prerequisite WT 4102

WT4401 Construction Technology and Management 1
MST 3-0-3
Residential construction - Introduction to site works, temporary works, sub-structure construction, foundations, retaining walls and basements, superstructure construction techniques, stonework, brickwork, blockwork, arches; Timber framed construction; Floors, walls, roofs; Thermal and sound insulation.

WT4405 Wood Technology 2*
MST 2-0-2
Analysis of factors governing the weathering of wood based materials - chemical, colour and physical changes; preservatives - analysis of factors governing their selection and application; surface finishing analysis of factors governing selection and application of the finishing agent. Prerequisite WT 4404

WT4503 Structural Mechanics
MST 2-0-2
Statics and dynamics; systems of units, forces, frameworks, stress and strain, friction, velocity, motion, work, energy, power; moments of area and section properties; qualitative analysis, truss analysis, shear force and bending moment calculations; beam theory; loading, factor of safety/load factor.

WT4505 Building Economics
MST 2-0-2
Basic elements of substructure (site works, setting out and foundations); superstructure elements (flooring, roofs, simple finishes, fittings and fixtures); basic services (water, gas, electricity, drainage); techniques for low-rise framed industrial and commercial building. Intro to site works, temporary works, sub-structure construction, foundations, retaining walls and basements, superstructure techniques, stonework, brickwork, arches; timber-framed construction; floors, walls, roofs, internal fixtures and fitting; thermal and sound insulation; framed buildings, structural steel, reinforced concrete, pre-cast concrete, cladding systems; intro do building services, domestic water supply, sanitary fittings, pipework, drainage.

WT4507 FORENSIC ENGINEERING & ETHICS
MST 1-1-1
Reasons for Building failures; Modes of failure; Risk: Failure case histories in concrete, steel, masonry, foundations and timber; Common pitfalls, Feld’s ten basic rules; Nonstructural failures; Learning from failures; Forensic engineering practice; Conducting a forensic engineering investigation; Writing a forensic engineering report; Ethics and Responsibilities, Standard of Care; Rules of evidence, Depositions, Arbitration.

WT4605 PROCUREMENT & CONTRACTING
MST 1-1-1
Contract building blocks, contract obligations, essential elements of a binding contract, offer acceptance and consideration, including types and forms of contract, standard forms of contract, use within the project lifecycle, traditional forms, partnering and new developments in standard forms, buyer-seller relationship. Invalidity factors and frustration, conditions and warranty, liquidated damages, performance bonds and terms of payments. The procurement process from the buyer and sellers perspective, tendering and bidding, tender evaluation and awarding of contracts, uncertainty and risks, allocation of risks, negotiations legislative restrictions, eProcurement, centralised purchasing within organisations, project requirements, Contract administration,
claims and disputes, legal procedures, conciliation & arbitration. Managing conflict and negotiating procedures. Contract closure, compliance, maintenance periods, commissioning, payment structures and final accounts.

**WT4707 CONSTRUCTION TECHNOLOGY AND MANAGEMENT 4**

**MST 1-1-1**

Management functions roles and responsibilities, procurement strategies, site management and site organisations, designing effective project organisations, project partnership and strategic alliancing, organising resources, organisation breakdown structures, project teamwork, communication, leadership and negotiation skills on construction projects; management information processes, procurement systems, construction processes, managing the supply chain, critical chain management; managing site problems and generating solutions, managing the budget, estimating and levels of accuracy; value engineering and cost management, using the WBS to control the budget, managing conformance, quality control and quality assurance, safety management systems, proactively managing uncertainty and risk on the project, project execution, contract administration, change control mechanisms, getting sign off, project closure, lessons learned, final accounts, conducting project audits; project support offices.

**INFOMATICS AND ELECTRONICS MODULES**

**CE4205 Microcomputer Systems**

Overview of the 8086 architecture including, memory and I/O mapping, memory segmentation, interrupt structure, the components of the standard PC base on the 8086 processor; the programmers model for the 8086, instruction set, addressing modes, 8086 assembly language programming tools; operating system introduction; definitions, components command shells, services overview; MS-DOS memory organisation, extended and expanded memory; interrupt handlers, BIOS and DOS functions; device drivers; concept, designing applications; disk storage organisation; disk structures, file and directory structures, performance considerations; introduction to micro soft windows 3.1; implementation as an extension of DOS, memory organisation, simple co-operative multi-tasking features.

**CE4517 Digital Systems 6**

Designing with DRAMS in microprocessor-based systems, Graphics and image displays using DRAM, VRAM. DMA hardware; error detection and correction hardware; CRC approach to error detection; Disk storage media consideration, data coding and system aspects. Xilinx programmable logic. Prerequisite EE4516

**CE4607 Computer Networks 1**

The course incorporates: communications within and between computer systems, switching and routing protocols, distributed network architectures incorporating application oriented protocols and standards.

**CE4701 Computer Software 1**

Outline structure of a digital computer; the role and use of the operating system; computer applications software; language hierarchy; Algorithms and problems solving; structuring complex problems, the program concept; Arrays; Input and Output; Disk files.

**CE4703 Computer Software 3**

Advanced C language programming; Structures; dynamic memory management; separate compilation; modules; header files; linkage; variables, access and scope; data abstraction in C; error handling; recursion; algorithm performance analysis; order notation; sorting arrays of objects; sorted
array searching; data structures and abstract data types (ADTs); hashing; data design and selection of data structures.
Prerequisite CE4702 and EE4512

CE4707 Software Engineering*
ECE 2-2-0
Object oriented analysis/design; object oriented programming; Smalltalk programming language; C++ programming language; C++ development environments; case study and project. Prerequisite: CE4706

CE4717 Language Processors*
ECE 2-1-2
An introduction to the theory of compiler design and its application in a simple compiler; the implementation of a compiler for a simple, Pascal-like language; compiler structure; grammars; parsing; syntactic error detection and recovery; semantic processing; code generation for a simple stack machine; scanning; table-driven parsing techniques; code generation for register architectures; introduction to code optimisation techniques. Prerequisite CE4703

CE4817 Digital Signal Processing 1
ECE 2-2-0
Discrete Time Systems; digital filters; digital filter design; FIR design by the window method; IIR design based on continuous-time systems; 2-D processes; the discrete Fourier transform.

CS4003 Information Society 1: Social Theories of New Media
CSI 2-1-0
The aim of the module is to gain an understanding of the social and cultural implications of new media. The impact new media have had on information sharing, processing and consumption and the changes on cultural attitudes and practices new media provoked. The course should also introduce students to the body of literature regarding social theory and new media and to the current research studying the impact of new communication technologies into our everyday lives. Cultural and social implications of new media and emerging technologies; analysis of social theories of media and research on new media in society; focus on the features of new emerging media (e.g. internet agents, distributed systems, intelligent environments) and the probable future social impact of these new communication technologies on culture.

CS4007 Information Society 2: The Information and Knowledge Society
CSI 2-1-0
This course offers a socio-economic, political and cultural exploration of the "Internet society". The course will provide a series of perspectives on the network society, examining its conceptual foundations, critiquing its more polemical exponents, and subjecting the claims of the electronic sublime to critical scrutiny. The course will help students understand some of the current debates in the media about the effects of information and communications technology on society. The course will examine the claims of those who argue for the emergence of a radically new Information Society, as against those who see the emerging society as being fundamentally a continuation of existing socio-economic forces; the differing perspectives of technological determinism and social determinism will be examined; the notion of "information ecologies" will be examined, as well as the current debate about the "knowledge society."

CS4013 Object Oriented Development
CSI 2-1-1
On successful completion of this module students will be able to identify, design, formulate and assemble classes using inheritance hierarchies, encapsulation and polymorphism to solve specified programming problems. Introduction to object orientation terminology; procedural approach versus object oriented approach to problem solving; discovering classes; class-responsibilities-collaborations (CRC) cards; CRC session; CRC cards for analysis; representing classes, objects and attributes; analysis-level diagram; defining classes, objects, methods, access modifiers, invocation; pre-defined object values; constructor method; overloading and overriding methods; exception handling; garbage collection; extending classes; nested classes and interfaces; interfaces and polymorphism; single inheritance of
implementation; collections; streams and buffers; declaring packages.

CS4023 Operating Systems

On successful completion of this module a student should have a clear understanding of the (1) logical structure of, and facilities provided by, a modern OS (2) concepts of processes, threads and mutithreading and how they are implemented in a modern OS (3) problems that arise when processes collaborate and compete and well as being able to demonstrate practical experience of mechanisms for handling these situations (4) different ways of implementing virtual memory (5) use of system calls. The need for the OS; different types of OSs: interfaces to an OS; processes and threads; process scheduling; mutithreading; context switching; concurrency, including interaction between threads; inter process communication; synchronization and mutual exclusion problems; software algorithms for IPC; 2 processes, n process; low and high level mechanisms for IPC and synchronization; signals; spinlocks; semaphores; message passing and monitors; deadlock; use of semaphores for synchronization, mutual exclusion, resource allocation; implementation of semaphores; use of eventcounts and sequencers for classical IPC problems; conditional critical regions; monitors and condition variables; physical and virtual memory; segmentation and paging etc.

CS4027 Information Retrieval & Knowledge Representation

To introduce students to the fields of information retrieval and knowledge representation as they pertain to information systems. The document collection; character encoding standards; automatic text processing; retrieval systems; retrieval based on sounds and images; measures of performance; modelling, classification and clustering; knowledge representation and visualisation; ontologies; content management systems; web-based knowledge representation; semantic web technologies; the business case for the semantic web.

CS4031 Introduction to Digital Media

On successful completion of this module students will have considered the influence of technology on human cognition and activity, considered a number of case studies focused on particular technologies and media. The influence of technology on cognition and activity; the relationship of technology to practice, form, content and remediation, case studies will consider the influences, consequences and interrelationship of: the written word, printing press, computer and digitisation, world wide web, music instrument form, mnemonics, notation, recording, digitisation, the reproduced image, printing press, camera, film, television, digitisation, narrative, orality, ritual and theatre/opera, illusion, interactive systems, sensors, virtual spaces, remediation.

CS4033 Information Flows in Business

To provide students with an overview of business organisation and operation. To provide students with an awareness of the information flows within and between business firms. To provide students with an appreciation of how information systems can support business objectives. Key functional areas of business; flows of information in an organisation; detailed examination of typical information flows in order processing, inventory, customer service, marketing and sales, payroll and personnel; accountability for the assets/liabilities of the business; financial reporting aspects of business operations; auditing requirements; legal obligations; summary budgets; classification of information systems; how an information system can support business objectives.

CS4035 Computer Graphics Tools and Technique

To provide students with expertise to develop a competence in the programming of interactive two and three dimensional graphics using a number of tools and techniques. This module involves practical graphics programming and students will build on the knowledge they have gained in the earlier Computer Graphics module. Topics include animation, interactions between objects, major components and
features of interactive graphics systems, interactivity (game programming) 2D and 3D, principles of image formation, illumination models, shading, morphing.

CS4111 Computer Science 1

Syntax and semantics; BNF and syntax diagrams; number and character representations; principles of program design; algorithms for summing, counting, exchanging, manipulating arrays; control structures; procedures, functions; parameter passing.

CS4113 Object Oriented Programming*

Background on the development of object-oriented programming; modularity information hiding, function abstraction, data abstraction and encapsulation; principles of object-oriented analysis, design and representation.

Prerequisite: CS4112

CS4115 Data Structures and Algorithms*

Binary trees, including threaded trees, multiway trees (excluding B, B+ and B* trees), linked lists and networks; recursion, and the elimination of recursion form algorithms; quick sort, heap sort, shell sort, merge sort and bin and radix sorting; tree searching; graph algorithms. Prerequisite: CS4113

CS4125 Systems Analysis and Design*

This module focuses on the requirements, analysis, and design phases of systems development life cycles using an object-oriented method and the unified modelling language (UML). Various software lifecycles are introduced to provide the student with a conceptual map of the different phases and approaches used in software development. Reuse of artefacts is discussed and emphasised using analysis and design patterns, architectural styles and frameworks; and through the production of model artefacts that facilitate reuse. Prerequisite: CE4513

CS4135 Software Architectures*

Graphical User Interfaces; Survey of the Major Object Orientated Libraries; Software Components; Computer Architectures; Overview of Software Architectures; Architectural Styles; Architectural Mismatches. Prerequisite: CS4113

CS4145 Operating Systems Overview

The need for and historical development of operating systems; interfaces; design of operating systems; processes and threads; multithreading; concurrency; deadlock; semaphores, message queues and monitors; memory management, including segmentation and paging; input and output, including devices and file systems; distributed operating systems; fault tolerance and security.

CS4257 Software Quality

To provide an understanding of the processes and techniques used to develop and maintain quality software. Brief 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.

CS4211 Computer Organisation 1

Introduction to computer architecture; the representation of data; principles of error detection and prevention; introduction to Boolean algebra; combinational and sequential logic circuitry; the central processing unit; principles of data communications.

CS4218 Telecom Networks Architectures*

The requirements to support speech traffic, digital switching principles, PCM trunks, the PDH, cross connects, provision of leased lines, signalling CC57; management in PDH systems; properties of transmission systems, echo cancelling, fibre, coax and microwave systems; packet switching X.25, ISDN
principles, LAPD protocol, frame relay, asynchronous transfer mode switching and multiplexing; virtual channels, virtual paths, the SDH architecture; user network interfaces for B-ISDN, MANS MAC DQDB, ATM over SDH; intelligent networking principles; management of telecom networks, operations centres, TNM architecture mobile communications, VLR, HLR, MSCs.

Prerequisite: CS4525

**CS4225 Computer Networks**  
CSI 2-1-2

Data communications; analog and digital; switched and broadcast networks; LANs and WANs, MACs; data link protocols; packet switching, circuit switching; frame relay, cell relay; transport protocols, ISO and internet; connectionless and connection oriented operation; internetworking. Prerequisite: CS4213

**CS4318 Software Engineering**  
CSI 2-2-0

Software quality assurance; approaches to testing; computer aided software testing; software maintenance; quality metrics; software process modelling. Prerequisite: CS4317

**CS4411 Imperative Programming**  
CSI 3-2-0

Programming process; syntax and semantics; declaring and defining variables/data; constant definitions; mixed data types arithmetic expressions and precedence; assignment statements; input and output; program design techniques and approaches; program standards and styles; modules, subroutines, procedures and functions; flow of control; library functions; user-defined functions; relational expressions, logical expressions and precedence; selection statements; data validation; error handling; systematic debugging approaches; looping constructs; one dimensional arrays and their manipulation; sorting and searching techniques; string manipulation; enumerated data types and an introduction to record structures.

**CS4417 Systems analysis**  
CSI 2-1-1

System life cycle; prototyping and fourth generation languages; system development methods; requirements analysis; computer aided software engineering; testing; project management. Prerequisite: CS4413

**CS4418 Advanced Database Systems**  
CSI 2-2-0

Database architectures; conventional data structures and languages; object-oriented knowledge bases and expert systems; managing graphical, statistical and other data types; data characteristics; conventional passive datastores; active databases and trigger technology; deductive databases, knowledge representation and acquisition; security and integrity; domain, relation and referential constraints; state and transition constraints; access control and administration; data distribution issues; data placement strategies; updating; concurrency and recovery problems; homogenous and heterogeneous environments; querying and performance appraisal; database computers; limitations of conventional computer configurations in database environments; hardware and software approaches for resolving limitation problems; database machine classification. Prerequisite: CS4416

**CS4456 Information Systems in Organisations**  
CSI 2-2-0

Development of IS applications since the introduction of electronic computing in the 1950's. The automate, informate and transformate phases. Case studies. Evaluating investment in information systems. The difficulty of attributing value to information systems. The information economics approach. IT - enabled business process re-engineering. Case studies. The business potential of the internet, intranets, extranets, Internet Services, E-mail, World Wide Web, E-commerce. Case studies. Prerequisite – CS4613 Information systems in context.

**CS4513 Introduction to Systems Analysis**  
CSI 2-1-2

The development of life cycle; specification and implementation; modelling facts in terms of Predicates, Sets, Relations; the Relational Model of Data; Relational Algebra
and Relational Calculus SQL. Simple Queries, Conditions and Expressions; Query nesting and Union; Views in SQL; Entity Relationship Diagrams; the Z Notation, Schemas, Predicates and Constraints; Database definition and manipulation using SQL; specifying and implementing database constraints.

CS4516 Programming Language Technology 2*  

Programming paradigms; grammars; regular expressions, context free grammars, parsing; compiler construction; compilers and interpreters, lexical analysis, syntax analysis, code generation, symbol tables, error handling, semantics, compiler generating tools. Prerequisite CS4515

CS4557 E-Commerce and Internet Applications  

To provide an understanding of the processes and techniques used to develop and maintain quality software. 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.

CS4567 Component Based Software Engineering  

To equip students with the knowledge and techniques required to plan and control the development of software architectures with reusable components. The objective of this module is to create an intellectual framework that supports the development and reuse of components in software engineering. This module advances the material covered in the core modules Software Architectures and Systems Analysis and Design. This module focuses on higher-level concepts such as the principles guiding component modelling using UML, component development, the evolution of component architecture as and instances of such architectures, with a brief overview of suggested economic and marketing trends. Prerequisite CS4515

CS4613 Information Systems in Context  

Introductory course concerning the nature of information systems. The focus will be on understanding the social, organisational, and historical context of information systems as they have developed over the years, and investigating possible futures for the field. The course will introduce students to basic concepts in the field of information systems, and importantly, to the practice of systems development and use.

CS4703 Language Programming II*  

Principles of data representation; the development of algorithms using simple data structures; introduction to the main components involved in language processing applications; practical exercises involving simple language processing programs.

CS4815 Computer Graphics*  

Interactive graphic systems; the role of the user; input and output devices; raster scan devices; video memory models; writing modes; block transfers; device, language, application independence; viewing functions; clipping functions; input and output primitives; control, transformation and segmentation functions; modelling; 3D transformations, rotations, reflective; projections; viewing in 3D; representation of surfaces via polygons; realism, hidden surface removal; surface generation via bicubic curves; rendering. Prerequisite CS4113

CS4826 Human Computer Interaction  

Early work on human factors and "man-machine communication"; from command languages to direct manipulation; cognitive ergonomics; usability engineering; future developments - artificial intelligence, multimedia, virtual reality; ubiquitous
computing; computer-supported collaborative work; human factors in the system design process.

CS4913 Business Information Systems

Growing importance of information systems management in business; components of a business information system; data management; role of the database; personal databases; shared databases; maintenance and security of databases; decision support systems; communication support systems; executive support systems; management of information systems; overview of systems development methodologies; data protection act, 1988. Prerequisite: CS4912

CS4828 Computer Integrated Manufacturing +

Concepts and terminology of materials and manufacturing; the manufacturing database; data reference models; CIM-OSA; mechanics of MRP; integrated manufacturing information systems; closed loop MRP; demand management; forecasting and master scheduling; the role of the master scheduler; the OPT approach and the OPT model; just-in-time systems; the KANBAN philosophy; CAD/CAM and FMS; automated storage and retrieval of materials; factory networks; OSI and manufacturing automation protocol.

CS4838 Advanced Topics in Software Engineering 2

This would be declared at the start of the year. Possible topics for a particular year might be Theory and applications of Neural Networks, Information Retrieval or Techniques of Software Localisation.

CS4848 Software Re-Engineering: Objectives and Methods.

Definitions of reverse engineering; re-engineering; kinds of reengineering activities; quality improvement of code; code restructuring; elimination of anomalies; improved presentation; remodularisation; improved code management; redocumentation; technical redocumentation; redocumentation and understanding; levels of redocumentation; tools for improved understanding; software localisation; dialect and language conversion; migration between hardware and software environments; migration between different data models; migration between different paradigms; downsizing; face-lifting.

CS4868 Machine Learning *

This module focuses on machine learning, with a bias towards some fields of natural computation, specifically artificial neural networks (ANNs) and evolutionary computation (EC). Various perspectives on machine intelligence are presented, based on symbolic, computational and behaviour-based models. The biological foundations that inspire ANNs are presented; followed by a selection of learning paradigms and architectures, with the same for EC. Examples of applications are continually presented with a focus on robotics, financial prediction and design. Prerequisite modules – ET4727 Artificial Intelligence and MA4403 Computer Maths 3.

CS4925 Business Information Technology 1

Introduction to fourth generation languages; structure of database management systems; systems development methodologies; systems analysis; feasibility study; gathering systems requirements; entity relationships diagrams; process descriptions; data type and structure; data flow diagrams; structure charts; detailed system design; data base design; user interface design testing; implementation; documentation; students will be expected to analyse, test and develop a database application system. Prerequisite module CS4913

CS4926 Business Information Technology 1B*

Information systems; decision making and problem solving; re-organisation of management structure; transaction processing systems; management information systems, decision support
systems; end-user computing; networking; communications; application of information systems in business functions; materials management; production; accounting and finance; personnel; marketing; role of modern technology in business; project management; project reviews; professional codes of conduct. Prerequisite module CS4923

**EE4001 Electrical Engineering**

Electrostatics; conduction; network analysis; magnetism.

**EE4003 The Engineer as a Professional**

This module introduces soft skills and professional issues to engineering students. Topics to be covered include communication, adapting to the workplace, the engineer as a professional and engineering ethics: (1) Communication, Presenting, Writing. (2) Adapting to the Workplace. Effective Meetings, Time Management, Creativity, Stress & Fun, Feedback, Planning, Teamwork, Leadership. (3) The Engineer as a Professional, Professions & The Engineering Profession, Professional Bodies. Life Long Learning & Continuous Professional Development (4) Engineering Ethics, Engineers in Society, Responsibility in Engineering, Common Morality & Codes of Ethics, Analysing the Problem, Utilitarian & Respect for Persons Philosophies, Creative Middle Ways.

**EE4101 Electrical Science 1**

Electrostatics; conduction; network analysis; magnetics.

**EE4113 Circuit Analysis 1**

Bode plots; Feedback; transients; Laplace transform; computer simulation; second order systems.

**EE4115 Systems Analysis**

Bode plots; poles and zeros; Laplace transform, application to circuit analysis, frequency response from pole-zero locations; computer simulations; second-order systems; Fourier series; filter design; Butterworth, Bessel, Chebyshev. Transmission line introduction; properties of selected lines.

**EE4207 Industrial Automation**

Motors used in motion control, drive electronics, controllers, sensors/transducers, computer based controllers, pneumatics, programmable logic controllers (PLCs) and industrial networks; the study of the design of automated work cells and the integration and control of automated processes/ workcells within the production environment.

**EE4313 Active Circuit Design 1**

Overview; diodes. Mosfets: JFETs: BJTs: IC components overview; BJTs Mosfets: biasing methods: small-signal models; amplifier types; differential; systems overview.

**EE4317 Active Circuits Design 4**

IC components and technologies; IC design methods; frequency response; amplifier loading effects; IC op-amps; switched capacitor filters; power amplifiers Prerequisite EE4314

**EE4407 ASICS 1**

Introduction to Design Methodologies; UNIX; VLSI structures; design entry and simulation; hardware description languages; design for text.

**EE4427 Semiconductor Technology 1**

Integrated circuit technology; lithography; device packaging; clean room; process integration; reliability; yield.

**EE4511 Digital Systems 1**

Number systems and arithmetic; Boolean Algebra; Karnaugh Mapping; Gate characteristics; Latches and flip-flops; laboratory work.
EE 4513 Digital Systems 3* ECE 2-0-2
Classical von Neumann model. The basic microprocessor; Addressing modes: data movement instructions; the assembler and assembler directives; arithmetic and logic instructions; program control; processing text; stacks; cross-linking. Prerequisite EE4512

EE4607 Telecommunication Systems 1 ECE 2-1-0
Introduction to Communication Systems; transmission, T1-digital Carrier, Switching, Signalling, Local Loop, Inter-exchange signalling; mobile Communications, GSM, DECT, DCS-1800 UMTS; satellite communications; DBS, LEO’s GPS; future of Telecommunications Systems

EE4817 Signals & Systems 2* ECE 2-2-0
Transforms; systems; signal windowing; non-recursive filters; recursive filters; filter transformation; noise. Prerequisite EE4816

ET4003 Electrotechnology ID ECE 2-0-2
Electrical charge; concept of a conductor; potential difference, resistance to current flow; power dissipation; simple DC circuit analysis; capacitor as a charge storage device, time taken and the current variation, to charge a capacitor; inductance; circuit behaviour, pictorial approach, when containing capacitors and inductors if an AC voltage is applied, particular emphasis on phase/time shift; magnetism and magnetic flux, statement of Lenz’s law and it’s interpretation hence possibility of generating an electrical supply; a simple alternator; hence why domestic and industrial supplies are sinusoidal in nature; the concept of the transformer; typical transformer sizes; overview of rectification circuits; the commutator and it’s action and the separately excited brush generator; the DC motor; typical applications; applications problems; induction motors; the torque behaviour of such machines; typical applications for the various types of induction motor.

ET4007 Product Development and ATE Systems * ECE 2-0-1
The relationship between reliability, maintainability and risk. Basic electronic system fault diagnosis. Fault diagnosis in circuits; analogue, digital. Component functional and parametric testing. VI curve testing for black box circuits. Test techniques for complex digital ICs e.g. boundary scan. Signature analysis, test vectors, pseudo-random test patterns etc. Role of diagnostic programmes for self test. Review of some key test instruments.

ET4008 Test Engineering 2: Digital Circuit and Systems Test* ECE 2-0-1
The aim of this module will be to introduce and investigate the test methods for analogue and mixed-signal electronic circuits and in particular, Integrated Circuits. It will identify problems associated with analogue and mixed-signal circuits and solutions for a range of devices, in particular demands placed on the testing of data converters. Based around the need to provide effective testing of analogue and mixed-signal circuits. Focus: data sampling, time and frequency domain analysis, need for limitations of exhaustive testing of electronic circuits, test procedures for common analogue and mixed-signal circuits, Design for Testability and Built-In Self-Test concepts and implementation, Tester Hardware (ATE) architectures cost issues and operation. Prerequisite: ET4007.

ET4023/ET4223 Embedded Software 1* ECE 2-0-1
This module will provide an introduction to embedded processor systems and applications. Will provide the student with an overview of the architecture of a simple microprocessor, to explain the operating principles and provide a functional understanding of assembly language. Introduce a simple microprocessor architecture. Detail application areas and examples of an embedded system. Instruction machine formats, instruction decoding. Program flow control instructions, sub routines and loops. Assembler directives
and program translation process. Simulation tools and debugging techniques. Control/communicate with I/O devices through polling and interrupts. Prerequisites ET4131, ET4152.

ET4033/ET4233 PC8 Design

The aim of this module is to provide students with a practical introduction to Printed Circuit Board design. Will be based around laboratory sessions. Introduce PCB technology, Use of software toolsets for PCB design. PCB layout techniques. PCB design standards. Technology trends for PCBs. Will design a medium size PCB, along with manufacture prototyping, build and test evaluation.

ET4043/ET4243 Web and Database Technology 2*

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 websites. Data models and database architectures. Database Management System. The relational database model introduction and additional concepts. Database design methodology. Introduction to Structured Query Language. Approaches for integrating databases into the web environment. Introduction to Microsoft Web Solution Platform. Web database programming case study. Prerequisite: ET4132.

ET4044/ET4244 Outcome Based Learning Laboratory 2*

Will further develop skills to study, experiment and report on a representative electronics based real world system. Study will be through problem-based approach. Modular design of real world systems. Sensor selection to meet resolution, accuracy, repeatability criteria and for compatibility with other sensors in the system. Data transmission point to point and through networks. Data logging using microcontrollers and PCs. Data manipulation and storage on a PC. Data display in user friendly format, graphic displays. Prerequisite: ET4112.

ET4063/ET4263 Java Programming 1*

Introduces students to the Java programming language and its software development environment. Introduce students to the Java language and compare it to C. Basic data types, control statements and methods. Impart a basic understanding of object oriented software development. Explore how Java is used in applet and program development. Introduce Java documentation. Investigate the role of the Java Virtual Machine. Introduce Java Class Libraries. UML, Java development environment. Complete simple programming assignments. Prerequisite: ET4702.

ET4003 Electrotechnology ID

Electrical charge; concept of a conductor; potential difference, resistance to current flow; power dissipation; simple DC circuit analysis; capacitor as a charge storage device, time taken and the current variation, to charge a capacitor; inductance; circuit behaviour, pictorial approach, when containing capacitors and inductors if an AC voltage is applied, particular emphasis on phase/time shift; magnetism and magnetic flux, statement of Lenz's law and its interpretation hence possibility of generating an electrical supply; a simple alternator; hence why domestic and industrial supplies are sinusoidal in nature; the concept of the transformer; typical transformer sizes; overview of rectification circuits; the commutator and it's action and the separately excited brush generator; the DC motor; typical applications; applications problems; induction motors; the torque behaviour of such machines; typical applications for the various types of induction motor.

ET4121 Laboratory Skills 1

The aim of this module is to provide the students with the necessary basic laboratory skills in which to effectively undertake the necessary laboratory work within the course. It will be based on an introduction to the electronic engineering laboratory and the development of laboratory skills required within the course. Emphasis is on building
practical electronic hardware skills. It will consist of an introduction to the electronic engineering laboratory, electronic circuit prototyping, build and test and PCB build and test, working in a project group environment.

ET4131 Introduction to Computer Programming


ET4141 Analog Electronics


ET4203 Analogue Electronics

The aim of this module is to introduce the structures and uses of semiconductor devices used in electronic circuits and systems. It will be based around the following key topics: semiconductor materials, basic semiconductor diode (structure and operation, zener diode, Light Emitting Diode, photodiode, uses of the diode, transistors, Bipolar Junction Transistor, Metal Oxide Semiconductor Field Effect Transistor, uses of the transistor, power semiconductor devices and data converters. Prerequisite: ET4121 & ET4122.

ET4213 Digital Electronics

The aim of this module is to introduce the building blocks for microprocessor based electronic systems and the design of digital electronics using Hardware Description Languages (HDLs). It will cover the following key topics: microprocessor concepts (history overview, application areas), architecture (block diagram model of the 8-bit microprocessor), internal operation of the microprocessor, input/output devices, memory maps and I/O maps, introduction to digital circuit and system design with HDLs and modelling digital circuits in VHDL. Prerequisites: ET4151 & ET4152.

ET4151 Digital Electronics

The basic digital circuit elements: number systems; truth tables and Boolean functions; simple digital circuits: the microprocessor; internal operation of the microprocessor; typical microcomputer structure.

ET4253 Computer Systems Architecture

Pentium class microprocessors and simple RISC/CISC concepts; Protected and Real Mode operation and relationship to Windows operating system; architecture of a modern PC.
bus structure and memories, use of caches; PCI and other PC buses; BIOS and its relationship to applications and the OS; use of device drivers; I/O standards; USB, IEEE 1394, serial and parallel ports; disk drives and standards; video standards; role of the Motherboard. Relevant project work.

**ET4315 Robotics 2* ECE**
This module aims to provide a broad understanding of the various sub-elements of robotics, modern robotics and automation systems and develop skills in designing, building, programming and maintaining robotic systems. Focus: Motion Control, open loop and servos/closed loop, Electro Pneumatics, valves, pneumatic devices, pneumatic control systems, PLCs, industrially hardened modular controller, programming. Friction, low friction designs, inertia matching, gear boxes, screws, worms, toothed belts, harmonic drives. Choice of motor system to match speed, accuracy, stiffness, efficiency requirements etc; Industrial robots. Prerequisite: ET4224.

**ET4325 Programmable Logic* ECE 2-0-2**
The aim of this module is to provide an introduction into the design methodologies and toolsets utilised in the design, fabrication and testing of modern ASIC (Application Specific Integrated Circuit) designs. Will cover the following key topics: evolution of the microelectronics industry, Moore’s Law, digital ASIC design (methodologies, toolsets), integration of design, fabrication and test, Hardware Description Language Vs schematic design, Verilog - HDL and VHDL, introduction to HDL synthesis, ASIC design team working and operation, product documentation development, writing and interpreting component datasheets, introduction to analogue and mixed-signal ASIC design. Prerequisite: ET4613.

**ET4335 Protocols Laboratory* ECE 1-0-3**
The aim of this module is to offer students a learn by doing approach in communications and computer networks for a better understanding of how networking technologies, mainly network protocols operate in practice. Introduction to layered architectures, basic concepts, open systems, layering, peer protocols, primitives and services. Reference models, telecommunications vs computing approaches, OSI and TCP/IP layer functions. Layer 2 LAN protocols. WAN protocols. TCP/IP protocol stack. Client/server software used by TCP/IP protocols. Network management. Network security. Prerequisites: ET4254, ET4274.

**ET4345 Operating Systems 2* ECE 2-0-2**
This module introduces a specific operating system, UNIX; covering the underlying design and implementation features of the operating system. The aim of the module is to learn about operating system internal features, following on from a previous module which deals with underlying operating system concepts. A set of laboratory exercises exposes the student to the internals of the UNIX operating system. Topics include: UNIX architecture, kernel, processes, memory, file systems and device I/O. Prerequisite ET4725.

**ET4355 Java Programming 3* ECE 2-0-2**
Basic dynamic data structures (e.g. queue, trees), Java Collections and their application to real problems. Introduce numerical methods and the growth of functions. Java Database Connectivity. Data structures - Self referencial classes, Dynamic Memory allocation, Linked lists, Stacks, Queues and Trees. Introduction to the Vector, Stack, Hashtable, Properties and BitSet classes. Java Collections - Arrays, Interface Collection and class Collections, Wrappers. Java support for Multimedia. Java Database Connectivity. Servlets. JavaServer Pages. Case Study of a moderate to large Java applications. Software engineering practices including design (UML) and testing techniques. Major development project.

**ET4365 Communications and Networking 2* ECE 2-1-1**
The aim of this module is to provide a firm grounding in the principles and practice of computer and communications networking. The module focuses on topics in LANs and internetworking. Review of communication networks definitions and concepts. OSI reference model, TCP/IP reference model.

ET4407 Electronics and the Environment ECE

To inform students of the necessity of environmental awareness in the electronics industry and to introduce the means by which these environmental issues can be addressed. Focus: environmental forces in the electronics industry, ECO Design, life cycle chain analysis, design for recycling, reverse manufacturing, reverse logistics, end of life solutions, green materials, sustainability, energy efficiency, alternative power supply, case studies in these environmental challenges and seminars given by local electronic industry representatives.

ET4417 Communications and Networks 3 ECE 2-2-1

Review of networking and internetworking concepts and principles; IPv6; Multicast; DiffServ, MPLS; Multimedia networking; VoIP; Network Management; Network Security MANs; WANs; Topics in ATM.

ET4427 Data Mining and Knowledge Discovery ECE 2-2-0

Advanced Database Concepts (SQL stored procedures & triggers); Data Pre-processing & Cleaning; Data Warehousing & OLAP; Design & Architecture; Data Generalization and Description; Classification & Prediction; Cluster Analysis; Frequent Patterns & Association Rules; Case Studies.

ET4437 Distributed Computing and Java ECE 2-0-2

Study of the distributed computing components of Java, including: Enterprise JavaBeans. Security in Java, Remote Method Invocation, Distributed Transactions, Jini and JavaSpaces. Prerequisite ET4355.

ET4513 Digital Systems 1* ECE 2-0-2

The programmer’s model of a simple microprocessor; the instruction cycle; addressing modes; control transfer; program development; programmable microprocessor interface devices; the ISA and EISA bus standards. Prerequisite ET4512.

ET4727 Artificial Intelligence & Expert Systems ECE 2-0-2

Expert system; expert systems with representative examples; knowledge acquisition and representation; inference mechanisms; programming environments for expert systems; the user interface; implementation strategies; expert system testing and validation; artificial intelligence; examination of representative applications such as in problem solving, symbolic mathematics, heuristic searching, vision, pattern recognition, motion control and robotics. As this course is an elective, it is only offered occasionally.

ET4807 Digital Signal Processing ECE 2-0-2


MA4001 Engineering Mathematics 1 M&S 3-2-0

Series functions; limits, continuity and differentiation from first principles; transcendental functions; vector algebra; complex numbers; differential calculus; properties; maxima and minima, curve sketching, roots of equations; undetermined forms; power series.
MA4003 Engineering Mathematics 3*
M&S 3-1-0

Vector Spaces; Inner Products, norms, orthogonality; Eigenvalues and eigenvectors. Diagonalisability; Numerical solution of systems of linear equations; iterative methods; non-linear systems using Newton’s method. Prerequisite MA4002

MA4005 Engineering Maths T1
M&S 3-0-3

The indefinite integral; numerical integration; ordinary differential equations; the Laplace Transform; Fourier series; matrix representation of and solution of systems of linear equations; vector spaces; numerical solution of systems of linear equations; Gauss elimination, LU-decomposition.

MA4007 Experimental Design*
M&S 2-1-0

Multiple regression: analysis of variance; robust techniques; statistical experimental design: full and fractional factorials, composite design, orthogonal arrays; evolutionary operations. Prerequisite MA4004

MA4103 Business Mathematics 2*
M&S 2-1-0


MA4125 Introduction to Computer Aided Data Analysis
M&S 2-1-2

Defining the research problem, formulating the research questions, quasi-experimental research designs, sources of data, data protection legislation, SQL, designing the data collection mechanisms, introduction to a suitable computing environment, data input, descriptive statistics and graphical methods, data analysis and interpretation including inference for a single proportion, a single mean, the difference between two proportions, and the difference between two means; the chi-squared test applied to contingency tables, simple linear regression and correlation, criticisms of data analysis with particular emphasis on the drawing of incorrect inferences due to poor design and/or poor analysis, report writing.

MA4402 Computer Maths 2
M&S 2-1-0

Real-value functions, simple numerical methods, matrices, graph theory.

MA4403 Computer Maths 3
M&S 2-1-0

Combinatorics; probability; introduction to information theory; normal, Poisson and binomial distributions; hypothesis testing, elementary queuing theory.

MA4505 Applied Statistics for Administration 1
M&S 2-1-0

Simple design and sampling methods; probability concepts; discrete probability distributions; continuous probability distributions; statistical inference and sampling; hypothesis testing; one-way ANOVA; linear regression; introduction to time series and index numbers.

MA4601 Science Mathematics 1
M&S 2-1-0

Vectors definition; addition; components, resultant, position vector; scalar product; dot product and angle between vectors; cross product; simple applications in mechanics. Complex Numbers: necessity and definition; algebra including multiplication, conjugate, division, modulus; Argand diagram representation; polar form, argument; exponential form; de Moivre’s theorem, powers and roots. Trigonometry: basic
definitions and relation to unit circle; basic formulae and identities; frequency, amplitude and phase; more formulae using complex exponential. Linear equations: solution of systems of linear equations by Gaussian elimination; examples with a unique solution, an infinite number or no solutions. Matrices: Addition and multiplication; matrix inversion; simple determinants. Functions: graphs and functions; polynomial and algebraic functions; curve-fitting; least-squares approximation formula only; exponential and logarithm; inverse function; limits and continuity. Derivative and applications basic concepts: slope as rate of change; differentiation of sum, product, quotient; chain rule; derivative of standard functions; tangent and normal; higher derivatives; maxima and minima; applications to optimisation in science.

MA4603 Science Mathematics 3*  M&S  2-1-0

Variables; representation of variables; reduction of variables; introduction to the fundamentals of probability; Baye's theorem; introduction to random variables; special distributions; binomial, Poisson, geometric, uniform, exponential, normal; statistical inference: non-parametric tests; correlation and regression. Prerequisite MA4601, MA4602

MA4605 Chemometrics*  M&S  2-1-0

Statistical process control; capability studies; correlation and regression; multiple regression; importance of plotting data; design of experiments of variance; factorial designs; Plackett-Burman design. Prerequisite MA4603

MA4607 Introduction to Applied Mathematical Modelling in Continuum  M&S  2-1-0

Continuum theory, balance of momenta, constitutive laws, elementary viscous flow, waves, aerfoil theory, vortex motion, Navier Stokes equations, very viscous flow, thin film flow, boundary layer theory, instability and turbulence, introduction to linear elasticity and rheology, illustrative real examples from the sciences.

MA4701 Technological Mathematics 1  M&S  2-1-0

Functions; trigonometry; the derivative and it's applications; experimental laws; linear equations; vectors; complex numbers

MA4707 Quality Management  M&S  2-1-0

History of quality; Quality organisation; Quality Planning; Standards and Vendors; Modern Quality development; Continuous improvement strategy, Economics of Quality

MA4713 Technological Mathematics 3A*  M&S  3-1-0

Further Integrations; ordinary differential equations; Laplace Transforms. Prerequisite MA4701, MA4702

MA4715 Technological Mathematics 5A*  M&S  3-1-0

Fourier Series; Linear Algebra; Linear Programming; Discrete mathematics. Prerequisite MA4701, MA4702, MA4713

MA4802 Business Mathematics 1  M&S  2-1-0

Review of algebra: linear equations and inequalities, real numbers, functions and their graphs; exponential and logs, polynomials; laws of indices, matrices and linear systems, linear programming, mathematics of finance, present value, sinking funds; deferred and complex annuities, data reduction and representation, measure of location and dispersion for grouped data, coefficient of variation, probability concepts, discrete and continuous probability distributions especially binomial, poison, geometric, normal, exponential and uniform; concepts of sampling and sampling techniques; relationship between sample data and population.

MB4001 Algebra 1  M&S  2-1-0

Number: basic number concepts; number systems; elementary number theory; solution
by graphical and numerical methods; matrices; applications.

**MB4005 Analysis**

Functions of a real variable; differentiability; set theory; Bolzano-Weirstrass theorem; sequences and series; general topology; integration; Riemann integral, basic integration theorems, improper integrals; functions of a complex variable; differentiability; complex integration; residues; complex power series; applications. **Prerequisite:** MA4701

**MS4002 Calculus 2**

Indefinite integral; definite integral; line, surface and volume integrals; ordinary differential equations. **Prerequisite:** MS4001

**MS4007 Mathematical Methods 1**

Functions of a complex variable including the Cauchy-Riemann equations, Cauchy's theorem, singular points, complex integration, residue theorem, Application of residue theorem to the inversion of Laplace transforms. Conformal mapping and its application to solving Laplace's equation in two dimensions. The Fourier transform and its relationship to the Laplace transform. Solution of linear partial differential equations by integral transform methods such as the Fourier and Laplace transform. Solution by separation of variables of some linear partial differential equations such as Laplace's equation, the heat equation and the wave equation. **Prerequisites:** MS4001 and MS4002

**MS4008 Maths Methods 2**

Finite difference methods; elliptic problems; parabolic problems; hyperbolic; finite element method. **Prerequisite:** MS4007

**MS4013 Linear Analysis**

Orthogonal sets of functions; inner products of vectors, orthogonality, orthonormal sets of vectors; functions as vectors and orthogonality, generalised Fourier series, approximation in the mean, closed and complete systems, orthogonal functions generated by differential equations; Fourier series; definition, periodicity, even and odd functions, sine and cosine series, half range series, piecewise continuous functions, Fourier theorem, orthonormal trigonometric functions, differentiation and integration of Fourier series, uniform convergence, applications e.g. inhomogeneous ODEs, Fourier integral, outline of the Sturm-Liouville theory, linear transforms, Laplace transform and properties, application to simple ODEs, Laplace transform and properties, applications in signal analysis, introduction to Green's functions and distributions, fast Fourier transform, discrete Fourier transform; introduction to wavelets; basic concepts, compact support, localised approximation.

**MS4015 Linear Algebra 2**

The aim of this module is to introduce some more advanced concepts in Linear Algebra and Numerical Linear Algebra. **Prerequisites:** MS4131 and MS4013.
Instantaneous and block codes; rings of polynomials; vector spaces over finite fields; hamming distance, error detection, error correction and nearest neighbour decoding; linear codes; dual codes; perfect codes; cyclic codes; decoding algorithms. Prerequisite MS4102

Graphs, directed graphs and their computer representation. Graph algorithms. Graph colouring with applications. Network flows and matchings. Planar graphs and Hamiltonian graphs. Prerequisite MS4132

Systems of linear equations and their solution by an elimination method. Matrices, matrix algebra, determinants, inverses, methods for "small" matrices, extensions to larger matrices. Vectors in 2 and 3 dimensions, geometric interpretation of vectors, vector arithmetic, norm, scalar product, angle, orthogonality, projections, cross product and its uses, lines and planes in 3 space. Extension to vectors in n dimensions, vector algebra, scalar product, orthogonality, projections, bases in R^2, R^3, and R^n. Matrices acting on vectors, eigenvalues and eigenvectors esp. in 2 and 3 dimensions. Applications to (some of, and eg) input-output models, least squares fit, simple Markov chains, geometric transformations, diagonalisation of matrices. Prerequisite: MS4111

Elementary probability, sample space, events, compound events, the laws of probability, conditional probability, independence; random variables, probability distribution, probability density, moments, expectation, variance; binomial, Poisson, Geometric, uniform, normal, exponential, gamma, chi-squared joint probability distributions, conditional distribution, covariance; functions of a random variable, distribution of sum, difference, product, and quotient of two random variables; introduction to Markov chains.

This course introduces students to the formalities of statistical inference with special emphasis on problems of estimation, confidence intervals and hypothesis testing. Prerequisites MS4212, MS4213


Conditional probability and conditional expectations; Markov chains, Chapman-Kolmogorov equations, classification of states, limiting distributions, random walks, branching processes, time reversible Markov chains; Renewal Theory, counting processes, the Poisson process, semi-Markov processes; Queuing theory, the M/G/1 and G/M/1 systems, multiserver queues; continuous-time Markov chains, birth and death processes; Brownian motion with application in option pricing. Prerequisite MS4213

The concept of state; the state equation and it’s solution. State transformations. Controllability, Observability, Stability and Lyapunov’s approach. Feedback control (Pole placement, Observers, Decoupling). System identification, parameter estimation, regression methods. Optimal control: Linear systems with quadratic criteria, Pontryagin’s
This module introduces further Operating Research technique for decisionmaking; Monte Carlo methods; simulation; integer programming; deterministic dynamic programming; probabilistic dynamic programming and Network problems. Prerequisite MS4303

**MS4403 Ordinary Differential Equations**


**MS4407 Perturbation techniques and asymptotics**

- Non-dimensionalisation, scaling, ordering, definition of asymptotic series, algebraic equations, integrals. Laplace’s method, method of steepest descent, regular and singular perturbations, multiple scales, strained coordinates, boundary layer techniques. Prerequisites: MS4403, MS4404

**MS4517 Theory of Mathematical Finance**


**MS4613 Vector Analysis**

- Vectorial mechanics: rotation of axes, index notation, review of vector and scalar algebra (scalar vector and triple scalar products); vector functions of a real variable, functions of time; differentiation of vectors, derivative of dot and cross products, tangent to a curve, arclength, smoothness, curvature applications in mechanics. Fields: scalar and vector fields; functions of several variables, maxima/minima, contourmaps, directional derivative and gradient vector field; applications in electromagnetism and fluid mechanics; vector identities; cylindrical and spherical coordinates. Line, surface and volume integrals and work; conservation of energy and potential function; applications to planetary dynamics, area, surface and volume integrals; gauge’s green’s and stokes’s theorems. Multiple integrals in radial, cylindrical and spherical coordinates, scalar and vector potentials, helmholtz’s theorem, tensor algebra and calculus; review of matrix algebra introducing suffix notation; definition of determinant; evaluation of determinants by row and column expansion.

**MS4627 Topics in Fluid Dynamics**

- Topics from: slow flow, waves and viscous flow, boundary layer theory, flow instabilities, geophysical fluid dynamics, computational fluid dynamics, classical aerfoil theory. Prerequisites: MA4607, MS4404

**TA4001 Introduction to Science & Technology 1**

- For Business/Humanities students. Development of our understanding of the universe; the nature of scientific laws; gravitation; energy, conservation and thermodynamics laws; energy conversion and its applications; application of laws of mechanics to transportation; modern
concepts of electricity and magnetism; electrical power generation and electronics; analogue and digital electronics; information technology; signal coding, transmission, networks, the internet.

TA4003 Introduction to Science & Technology 3*
ECE 2-1-0

For Business/Humanities students. Darwinism; genetics and molecular biology, genetic engineering; disease and modern treatment methods, vaccination, drugs and surgery; food production and processing techniques; pollution problems; economics of pollution prevention; science and social structure; critique of modern attitudes to science. Prerequisite TA4002
SPRING
SEMESTER
MODULES
EH4116 Contemporary Irish Writing in English
LCS 2-1-0
This course relates contemporary Irish writing to the literary scene of the early part of the century and looks at the major literary, political and social forces that have helped to shape it since then. Selections from contemporary poetry, drama and fiction are examined.

EH4126 Imagined Spaces: Irish Cultural Texts
LCS 2-1-0
This module will provide a critical and a theoretical examination of Irish culture (both literary and media), ranging from early twentieth century efforts to create an 'Irish national culture' to contemporary ways of imagining contemporary Irish identities within culture. The module provides a thorough grounding in theory and method that will enable the student to analyse a complex range of cultural texts as well as incorporating practice-based elements such as script writing.

EH4135 W.B. Yeats, Heaney and the Politics of Irish Identity
LCS 2-1-0
The application of the theories of Derrida and Lacan to the writings of Yeats and Heaney. A post-structuralist and post-colonial analysis of the intersection of the works of Yeats and Heaney with the political forces of republicanism and nationalism. The writings are seen as pluralising the politics and poetics of Irish identity.

GA4105 Irish Folklore
LCS 2-1-0
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; traditional custom and belief including calendar customs. A case study in folklore collection based on field recordings made in county Limerick in 1980.

GA4116 Irish Language 2
LCS 2-3-0
A continuation course in communicative Irish based on texts and other materials in use in Irish postprimary schools; research in Irish place and family names; current position of Irish. [See GA4115 (Autumn Semester) for the Irish language content for students taking Spring Semester only].

GY4018 Historical Cultural Geography of Modern Ireland
SOC 2-1-0
Decoding the landscape; names of places; signatures and people; the interpretation of cultural markers; signs and symbols; landscape as clue to culture; seeing things; history matters; writing landscapes into existence.

HI4018 Ireland: Revolution and Independence
HIS 2-1-0
Origins of the modern physical force tradition; resistance to change; Sinn Féin and the Irish Volunteers, 1916 Rising and its aftermath; 1918 Election and the first Dáil; War of Independence, Partition and Civil War, Free State and Stormont; economic unrest; Ireland and the Second World War; Fianna Fáil and the constitution; the Republic, IRA and the Border Campaign; civil rights in Ireland.

MU4136/MD4022 Irish Traditional Music 2
IAWM 2-1-0
Regional styles in instrumental and vocal tradition; Irish song tradition - repertoire and style; tradition and change in the music of the Irish harp; traditional music and society in contemporary Ireland. Practical instruction in traditional music, dance, and / or song performance.

PO4013 Government and Politics of Ireland/Local Government
PPA 2-1-0
Historical introduction to the economic, cultural and social background of Irish politics; economic, social and political change; Irish political culture; constitutional development; development of political parties and evolution of the party system; electoral behaviour; social bases of party support; overview of the principal political institutions, including the Presidency, Oireachtas, Government, Taoiseach and the Civil Service.

SO4016/4096 Issues in Contemporary Irish Society*
SOC 2-1-0
Power, control and legitimacy in Irish Society; social differentiation, exclusion and marginalisation; social control and social conflict; ideology-dominant and submerged discourses; the nature and reality of consent and resistance.
The Irish World Academy of Music and Dance

The Irish World Academy of Music and Dance is a centre of academic and performance excellence housed at the University of Limerick, Ireland. It offers a suite of taught MA courses and a BA and Grad.Dip in music and dance related subject areas. Its research is at the forefront of these fields of enquiry worldwide. Community outreach, artists in residence and a series of concerts, seminars and a summer school showcase this unique focus to local and international spheres.

Modules with prerequisites/auditions

The practicum modules are designed primarily to develop the performance skills of students and to do this they will work with visiting and resident tutors who represent the cream of performance in Ireland and beyond. The main bulk of performance work will be solo but there will also be a significant amount of ensemble work. Students will also be encouraged to develop second performance skills making them more versatile as performers.

1. All practicum modules require an audition on arrival
   * A prerequisite level of knowledge is required for students taking courses with the * symbol. Students will need to check with the course leader on arrival to see if they can take these courses.

ASSESSMENTS:
Assessment practices vary between modules. In general, practicum modules have a continuous assessment and performance component while lecture-based modules are based on a mixture of submissions and examinations. These are detailed in the course documentation each academic semester and are subject to change.
MD4002 practicum 2a Main Performance Interest & Performance Skills
Development of the student’s primary performance interest, whether instrumental, vocal or dance, with on-site tutors. Students will be encouraged to engage in a dynamic self-critical process conducive to development and related to the principle of ‘reflective practice’.

MD4012 practicum 2b Secondary Performance Interest & Performance skills
Development of the student’s secondary performance interest, whether instrumental, vocal or dance, with on-site tutors. Students will be encouraged to engage in a dynamic self-critical process conducive to development and related to the principle of ‘reflective practice’.

MU4136/MD4022 Irish Traditional Music, Song and Dance
Regional styles in instrumental and vocal tradition; Irish song tradition - repertoire and style; tradition and change in the music of the Irish harp; traditional music and society in contemporary Ireland. Practical instruction in traditional music, dance, and/or song performance. This module will be taught as a beginner’s module for students attending in Spring semester only.

MD 4026 IRISH Music and Dance Studies
In this module, a cluster of key theoretical ideas or ‘themes’ (such as globalization, cognition and language, identity, etc) will be examined and applied to Irish Music and Dance Studies.

MD4032 Western Art Music and Dance
This course introduces students to the worlds of Western Art Music and Dance – their texts, contexts, structures, forms, values, ideologies, functions, aesthetics, meanings and creators/practitioners.

MD4034 Introduction to Community Music and Dance Education
To give students a general overview of the principles of Music & Dance Education and of Community Music & Dance, to introduce them the methodologies used in Music & Dance Education and to give practical experience in Community Music & Dance together with some of the tools needed to practise as a community musician/dancer.

MD4036 Introduction to Ethnomusicology/Ethnochoreology and Digital Media
The Ethnomusicology/Ethnochoreology section comprises an introduction to the historical, theoretical and practical aspects of Ethnomusicology/Ethnochoreology with an emphasis on the performance of fieldwork and the representation of experiences/findings. The Digital Media Section develops basic skills in recording and sound production.
Faculty of Arts, Humanities and Social Sciences

For students whose talents and interests lie in subjects such as languages, history, sociology, cultural studies, music, politics and law this Faculty is an excellent choice. The Faculty of Arts, Humanities and Social Sciences is a vibrant centre of critical thought and a generator of national and international scholarship. It prides itself on the quality of its teaching and its commitment to research within a context where debate and discussion are an integral part of developing those analytical skills which are much sought after in the workplace. The research objective of the Faculty is to create a vibrant centre of critical thinking and to be a generator of national and international scholarship. It strives to facilitate postgraduate and post doctoral students to undertake research, and encourages them to be actively involved in the dissemination of their work.
CU4112 Cultural Studies 2: Language & Culture  
LCS 2-0-0
To examine some of the key elements of the interaction between language, culture and society. Language as a structured system: semantics and society; language, thought and worldview; language and identity; issues of language, power and conflict.

CU4116 Cultural Studies 4: Cultural Theory  
LCS 2-1-0
To give students the opportunity to study in depth, the writings of key cultural theorists of the 20th century. Up to three authors will be covered taken from a list which could include Adorno, Barthes, Baudrillard, Benjamin, Bourdieu, Cixous, Deleuze, Eco, Foucault, Habermas, Lacan, Marcuse, McLuhan, Warner, and Williams. The lectures will cover the selected authors and also contextualise them into the intellectual movements that they generated e.g. neo-modernism, structuralism and post-modernism.

CU4118 European Cinema  
LCS 2-1-0
Students will study films from different countries for the ways in which they inform the European tradition. Lectures will cover different periods of European Cinema: Weimer cinema, Italian neo-realism, French New Wave and New German cinema. The tutorials will study individual films from the weekly screenings and apply theoretical approaches such as genre, auteur and image analysis.

EF4022 English as a Foreign Language 2  
LCS 0-3-1
The module is intended to bring the students to a higher advanced level of proficiency in the four language skills, to advance their knowledge of English grammar, to introduce elements of socio-political and economic issues into the material for language study and to use the acculturation process as the basis for language work. It includes grammar work at intermediate to advanced level, development of listening, reading, writing and speaking skills, debates and discussion of topical issues, exploitation of English language media and essay writing.

EH4103 Renaissance English Literature  
LCS 2-2-0
Humanist writing in England. Classical influences. The Reformation, capitalism, colonial voyages. The work of Spencer, Sidney, Shakespeare, Donne; the epic rise of nationalism; lyric, metaphysical poetry, the Civil War, Milton.

EH4104 Augustan Literature  
LCS 2-1-0
English literature 1660-1750; political and cultural contexts of the novel, essay and pamphlet literature; classical models in the Augustan age; the form of the couplet, verse-essay and pastoral; the concepts of stability, decorum, morality and manners.

EH4105 Nineteenth Century Studies  
LCS 2-2-0
This course begins by taking an overview of the Victorian era, and the degree to which it was influenced by Romanticism; it examines the major prose writings and poetries and looks at their influence on twentieth-century literature.

EH4108 Twentieth Century English Literature  
LCS 2-2-0
The aim of this module is to introduce students to twentieth century English literature. The novel, poetry and prose will be considered in the context of the modernist movement in the twentieth century European culture.

EH4116 Contemporary Irish Writing in English  
LCS 2-1-0
This course relates contemporary Irish writing to the literary scene of the early part of the century and looks at the major literary, political and social forces that have helped
to shape it since then. Selections from contemporary poetry, drama and fiction are examined.

**EH4125 Feminist Literary Theory and Criticism**
LCS 2-1-0

Modern feminist literary theory; literary, psychoanalytic, philosophical and political perspectives; the way in which interconnections between these disciplines have been given primacy in feminist literary theory.

**EH4126 Imagined Spaces: Irish Cultural Texts**
LCS 2-1-0

This module will provide a critical and a theoretical examination of Irish culture (both literary and media), ranging from early twentieth century efforts to create an 'Irish national culture' to contemporary ways of imagining contemporary Irish identities within culture. The module provides a thorough grounding in theory and method that will enable the student to analyse a complex range of cultural texts as well as incorporating practice-based elements such as script writing.

**EH4135 W.B. Yeats, Heaney and the Politics of Irish Identity**
LCS 2-1-0

The application of the theories of Derrida and Lacan to the writings of Yeats and Heaney. A post-structuralist and post-colonial analysis of the intersection of the works of Yeats and Heaney with the political forces of republicanism and nationalism. The writings are seen as pluralising the politics and poetics of Irish identity.

**FR4142 French Language and Society 2: Introduction to French Studies 2**
LCS 2-2-1

The module builds on French Language and Society 1 through continuation of oral and written exercises on topics relating to contemporary France and the Francophone community. Continued revision of grammatical structures and introduction of more complex structures. Development of autonomous language-learning skills. Prerequisite FR4121

**FR4146 French Language & Society 4: Contemporary France**
LCS 2-2-0

Introduction to key moments in the history of post war France through the study of a variety of texts from the chosen period: this will provide the basis for language activities including reading and linguistic analysis of authentic texts, development of written skills, discussion and debate, oral presentations and translation of authentic texts: students will also study a work of literature related to the themes of the module. Prerequisite FR4143

**FR4148 French Language & Society 6 : Media/Current Issues**
LCS 1-3-0

The nature of communication and the media industries in France; general language classes will concentrate on text analysis, oral presentation and debate in French; translation classes will focus on the study of different registers and discourses: students will study a modern film television broadcast or work of literature: Prerequisite FR4147

**FR4242 French Language, Culture & Society 2**
LCS 2-2-0

The module builds on French A1 through continuation of oral and written exercises on topics relating to contemporary France. Continued revision of grammatical structures and introduction of more complex structures; development of autonomous language-learning skills. Prerequisite FR4241

**FR4246 French Language Culture & Society 4**
LCS 1-3-0

Development of active and receptive language skills, key moments in the history of post-war France, revolutionary ideals in eighteenth-century France: Prerequisite FR4243

**FR4248 French Language Culture & Society 6**
LCS 1-3-0

Communication and the media in France, the written press cinema television and new
technologies translation and the audio-visual media principles and practice in conference and bi-lateral interpreting theory and practice of literary translation: Prerequisite FR4247

FR4422 French for Engineering/Science 2*

LCS 2-2-0

Continuation of communicative ability though a variety of activities both oral and written; cross-cultural awareness; introduction to examples of scientific communication and discourse for the general public through audio-visual and textual aids; continuation of essential grammatical structures and basic vocabulary throughout Call programmes. Prerequisite FR4421

FR4622 Literature & Culture 2: Twentieth Century Literature*

LCS 1-2-0

A study of four literary texts: works by authors such as the following will be included: camus, sarte, de beauvoir ,duras, ionesco,anouilh, pervert, cesare:

FR4626 French Literature and Culture 4: Nineteenth Century Art*

LCS 1-2-0

The module will concentrate on the mid century to the first world war and will deal with topics selected from the following revolutions, realism, naturalism, industrialisation, positivism, impressionism, symbolism, modernism: the module will focus on the representations of Paris during and following the second empire fin-de-siecle France and the period leading up to the first world war; students will study novels poetry and painting of this period: authors could include Flaubert, Zola, Baudelaire, Mallarme, Proust: painters could include Courbet, Manet, Monet, Renoir, Cezanne:

FR4922 French for Business 2 (advanced)*

LCS 2-2-0

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; focusing on organisational structures of firms, advertising, personnel management. Prerequisite FR4921

FR4924 French for Business 4 (advanced)*

LCS 2-2-0

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; focus is in the following areas: Import and Export, The Stock Exchange, Government Taxes. Prerequisite FR4923

FR4928 French for Business 8 (advanced)*

LCS 2-2-0

This module entitled “La politique et la societe” looks at present day French politics. It examines French political institutions, the recent presidential elections and the attitudes of the French citizens to politics. Students are asked to take part in simulated debates on current socio-political issues and to write a profile of a political party. The in-depth study of the press and the television provides an ideal base for analysing the treatment of topical issues in the media from a language point of view: in this final module an external oral examination takes place to evaluate fluency and competence developed throughout all the modules. Prerequisite FR4927

GA4105 Irish Folklore 1

LCS 2-2-0

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; traditional custom and belief including calendar customs. A case study in folklore collection based on field recordings made in county Limerick in 1980.

GA4116 Irish Language 2

LCS 2-3-0

A continuation course in communicative Irish based on texts and other materials in use in Irish postprimary schools; research in Irish place and family names; current position of Irish. [See GA4115 (Autumn Semester) for the
Irish language content for students taking Spring Semester only.

GA4134 Litríocht & Saíocht 2*  LCS 2-1-0
Grinnléitheoreacht ar nuadhrámaí roghnaithe, agus ar théacsanna idir fhilíocht agus prós. Saothrú na litríochta sa Ghaeilge ó aimsir an Dara Cogadh i leith; téacs agus comhfhilíocht; anailís théamúil ar ghnéithe de nualitríocht na Gaeilge; léirmheastóireacht agus critic.

GA4142 Teanga, Sochaí agus Saíocht 2*  LCS 2-3-0
Ranganna teagaisc: Feabhas a chur ar an gcumas bainite amach faoi GA4121; gramadach agus comhréir na Gaeilge; grinnléitheoireacht ghradamadá ar théacsanna roghnaithe, Léachtai: Cúrsa breise sa litríocht ina ndéanfar iníonadh as shaothar tháil na linne seo agus as úrscéalta agus as ghearrscéalta comhaimseartha; logainmneacha, sloinntí agus ainmneacha básaithe Gaeilcha.

GA4146 Teanga, Sochaí agus Saíocht 4*  LCS 2-2-0
Ranganna teagaisc: Feabhas a chur ar an gcumas bainite amach sa dara bliain; fágail ar thalúth na mac léinn i ndiaidh dóibh cursa Gaeilcha agus tréimhsí in eagrais nó i gcomhrac le Gaeilge a chur i gcrích; staidéar ar chúrsaí agus ar rialacha an Chaighdeáin Oifigiúil; caighdeáin ar théacsanna sa seanchló agus sna canúintí éagsúla; an t-aistriúchán, go praiticiúil agus mar dhisciúlín. Léachtai: Bunchúrsa sochtanéagdaíochta; teanga agus sochaí, teanga agus polaitiúchta an Ghaeilge in Éirinn, agus miontaoastachacha na hEorpa; prós agus filíocht na linne seo, le bhéim ar údair chomhaimseartha.

GE4142 German Language and Society 2: Introduction to German Studies II*  LCS 1-1-2
Lecture: Social, cultural and economic trends and institutions in the German-speaking countries in the post-war period; the German regions and regionalism; regional and social variation in the German language.Tutorials: a) analysis of literary texts to provide further access to the period while at the same time introducing reading techniques, principles of textual analysis and text discussion in oral and written form; *b) Contrastive grammar work continued.
Language laboratory: exercises in pronunciation, listening comprehension and grammar utilizing CALL facilities Prerequisite GE4141

GE4146 German Language and Society 4: Germany past and present*  LCS 1-3-0
Lecture: German revolutions, democracy, fascism; cultural institutions, cultural life (book trade, theatres, music, cinema, fine art, media etc.), the cultural and literary heritage. Tutorials: a) reading and discussion of literary texts supporting the lecture; b) conversation class or drama workshop; c) advanced grammar work. Prerequisite GE4143
GE4148 German Language and Society 4: Issues & Debates in German speaking countries today*

LCS 1-3-0

Lecture: political issues in unified Germany, Austria and Switzerland; dealing with the past; nationalism and national identity; economic, cultural and social debates (equality, environmentalism, cultural politics, social reforms, women's movement in Germany); political apathy and extremism. Tutorials: a) discussions of literary texts, newspaper, magazine articles and TV programmes on topical issues focussing on the characteristics of different text types and language registers; b) issues in Austria and Switzerland incl. presentations in the foreign language; c) translation class English/German with a particular focus on the problem of registers. Prerequisite GE4147

GE4212 German for beginners 2 LCS 1-4-1

Trends in post-war German society, culture and economy; institutions in the German speaking countries; the German regions and regionalism; regional and social variation in the German language; German drama and short story; further grammatical structures, functions and vocabulary; transfer of known structures to a variety of communicative contexts; consolidation of grammar and development of self-study skills to reinforce material covered during the course. Prerequisite GE4211

GE4242 German Language, Culture and Society 2* LCS 1-1-0

Postwar German-speaking countries; society and institutions; regional/social variations and developments in the German language; political geography; trends in post-war German culture and economy. Tutorial work: one hour text work develops skills relating to textual analysis, grammar in use and writing, two short 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; one hour German linguistics relates general linguistic course to the German situation, focusing on past and current developments in the German language. Prerequisite GE4241

GE4246 German language, culture & society 4* LCS 1-3-0

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 (presentations, talks, interviews). This hour will be alternated with an introduction to interpreting; Text analysis & production: literary texts. Literature reading course: Students will read two pieces of literature related to the theme of the lecture. This will form the basis of 2 weeks oral discussion work and one essay in German. Prerequisite GE4243

GE4248 German language, culture & society 6* LCS 1-3-0

Lecture: cultural-political issues in unified Germany, Austria and Switzerland; dealing with the past; nationalism and national identity; economic, cultural and social debates such as equality, environmentalism, cultural politics, social reforms, political apathy and extremism. Tutorial work: Oral presentation & discussion class: drawing on text and audio-visual materials to develop formal oral skills (presentations, talks, interviews). This hour will be alternated with a class providing an introduction to interpreting; Text analysis & production: literary texts. Literature reading course: Students will read two pieces of literature related to the theme of the lecture. This will form the basis of 2 weeks oral discussion work and one essay in German. Prerequisite GE4247

GE4322 German for Business 2* LCS 1-3-0

Further development of oral and communicative skills and enhancement of reading course: Students will read two pieces of literature related to the theme of the lecture. This will form the basis of 2 weeks oral discussion work and one essay in German. Prerequisite GE4247
vocabulary base through the use of authentic situations, actions and dialogues; greater emphasis on development of written proficiency and the transfer of acquired language skills to different communicative situations in a business context; broadening the students knowledge of German culture through selected themes in the course material. Prerequisite GE4321

GE4324 German for Business 4*  
LCS 1-3-0
Examination of the internal structure of a cross-section of German firms, their administrative organisation and functions of their various departments; preparation and oral presentation of a short case-study based on a local or German firm; introduction to the elements of commercial correspondence and office procedure, tendering, ordering, processing invoices. Prerequisite: GE4323

GE4412/GE4512 German for Engineering/Science 2 (Beginners)*  
LCS 1-4-1
Introduction of further grammatical structures and vocabulary. Development of all four-language skills through individual, pair and group work. Transfer of known structures to a variety of communicative contexts. One hour a week is self-access and students are encouraged to use such facilities in their own time to consolidate the learning process. Prerequisite: GE4411

GE4422 German for Engineering/Science 2 (Advanced)*  
LCS 2-2-0
The module provides students with further opportunities to revise and consolidate their prior language knowledge. Video and text material will be exploited to develop students' ability to operate within a work environment in Germany and to revise in more depth both the grammatical structures and vocabulary necessary to cope with everyday situations. As in GE4421, students will be required to spend at least one hour per week in addition to their three contact hours working on a self-access basis. Students will be introduced to the use of the Internet and CD-ROMs for language-learning purposes. Prerequisite GE4421

GE4424 German for Engineering/Science 4 (advanced)*  
LCS 2-1-0
Students work with a variety of text types (general, popular scientific, semi-technical) to increase their awareness of different registers and approaches to presenting technical information. Texts will also be exploited as a basis for basic report, summary and translation work. Students will be encouraged to expand their knowledge of basic subject specialism terminology. Students will be expected to read and discuss longer texts on issues relating to their potential work environment and to undertake projects and presentations on the background and industrial context of the companies for which they will be working on placement. Students will be expected to make full use of Internet facilities and will also be encouraged to enter into email contact with students of Mechanical Engineering in Germany as a basis for projects of common interest. Prerequisite GE4423

GE4426 German for Engineering/Science 5 (advanced)*  
LCS 1-3-0
Two hours per week will be spent on text work, developing skills in relation to the reading and writing of reports summaries and project proposals. Emphasis will be placed on the effective use of technical dictionaries and the consolidation of basic subject specialism terminology; one hour will concentrate on simulated situations such as project meetings, formal presentations, etc

GE4622 German Literature & Culture 2: Text, writer and reader*  
LCS 1-1-0
Lecture: what is a text? The process of reading; intertextuality; reception of literature; literature and politics, relationship between work and biography of the writer; literature on stage: theatre; literature and politics. Tutorials: a) continuation of the introductory course to German literature; b) a study of the biography of two writers, their work and their time, drama and poetry as examples Prerequisite GE4621
GE4626 German Literature & Culture 4: 19th Century German Literature*

LCS 2-1-0

To examine some 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. 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. Prerequisite GE4623

GE4922 German for Business 2(advanced)*

LCS 2-2-0

Using authentic materials simulating a business environment, students are asked to deal competently with tasks in specific communicative situations; introduction to the organisational structures of firms in Germany; emphasis on developing telephone techniques and other work-related interactive skills. Students will also continue to learn more about the cultural side of German life and work on improving their language skills with an emphasis on writing and speaking. Prerequisite GE4921

GE4924 German for Business 4 (advanced)*

LCS 2-2-0

Dealing with commercial correspondence from processing an initial enquiry through to coping with non-payment of invoices; filling in official forms/documentation; introducing the following business areas: advertising, import and export. Preparation of CVs and letters of application. Regular discussion of current affairs to improve awareness of changes in the German economy and society. Prerequisite GE4923

GE4928 German for Business 7(advanced)*

LCS 2-2-0

Consolidation of language skills acquired in the course of the previous semesters; examination of the institutions and policies of the EU with particular reference to Germany's role within the EU, Irish-German trade and the implications of the Single Market; presentation of economic and social issues by the German media; revision of the following: business material in general, the skills of translation, and summarisation of texts. In this final module, an oral examination with the External Examiner evaluates fluency and competence developed throughout the German stream; students must pass this examination in order to complete this module successfully. Prerequisite GE4927

GY4016 Economic Geography

SOC 2-1-0

The economy and economic geography; manufacturing activity and least cost location theory; Weberian location theory; transportation cost as a factor of location; production costs and location; scale and agglomeration; spatial behaviour of large organisations; deindustrialisation and tertiarisation; nature of service activity; market area analysis; central place theory; quaternary activities and office location; location and public policy.

GY4018 Historical Cultural Geography of Modern Ireland

SOC 2-1-0

An exploration of Irishness in the landscape, past and present; names of places; signatures and people; signs and symbols; landscape as clue to culture; seeing things; history matters.

GY4021 Regional Geography

SOC 2-1-0

The EU; general review of issues and problems, institutions, policies and funding; regional disparity; frontier regions; the core-periphery model; North America; Canadian regionalism in life and letters; ethnic and religious cleavages in the US; wealth, poverty, crime.
GY4023 Geography of Development
SOC 2-1-0
Conceptions of development; unity and diversity with respect to the major physical, social, economic and political characteristics of developing societies; the historical roots of underdevelopment; the bases of contemporary political and economic domination of the developing world by the developed world with particular attention to the role of trade, multi-national corporations, aid and debt and the necessity for balanced interdependence; the position of elites; the role of demography; urban development.

HI4032 Capitalism and Industrial Society, 1450-1900
HIS 2-1-0
Agriculture, power and printing; a European mentalité? feudalism, craft and capitalist production; navigation, a world economy, mercantilism and the agricultural revolution; invention and innovation in metal, mining, textiles, power, transport; social change; Marx and technological determinism; location and timing of industrialisation; the invention of invention; the built environment; communications and transport; public health and modern medical innovation; the mechanization of food supply. Note numbers will be restricted on this module for 2008/9

HI4018 Ireland: Revolution and Independence
HIS 2-1-0
Origins of the modern physical force tradition; resistance to change; Sinn Féin and the Irish Volunteers, 1916 Rising and its aftermath; 1918 Election and the first Dáil; War of Independence, Partition and Civil War, Free State and Stormont; economic unrest; Ireland and the Second World War; Fianna Fáil and the constitution; the Republic, Fianna Fáil and the Border Campaign; civil rights in Ireland.

HI4072 Europe: Imperialism and Deconolonisation
HIS 2-1-0
The following themes will be examined; the historiography of colonialism and imperialism; understanding the concepts; the economics of colonialism; the framework - emigration, religion, education, culture, sport, economy; Ireland and the wider world 1850-1921; the conduct of empire - France, Britain; women - agents of empire; the retreat from empire; Ireland and the wider world after 1922.

HU4013: Computers and the Social Sciences
HIS 2-0-2
Examination of the implications of the computer revolution for learning and research in the social sciences; electronic communication and the interrogation of bibliographic and other databases.

JA4212 Japanese Language, Culture and Society 2
LCS 3-3-0
Listening exercises dealing with street directions descriptions of places, abilities and family; speaking practice emphasising talk about one’s own and others’ families, descriptions of places; reading descriptions of towns in Ireland and Japan; and passages about Japanese sport, and pastimes; writing more complicated
passages about family and place, also pastimes; study of at least a further 80 kanji; discussion of further aspects of Japanese society.

Prerequisite JA4211

JA4216 Japanese Language, Culture and Society 4

LCS 3-3-0

Listening practice, particularly authentic broadcast news; speaking at various levels of formality and with correct nuances of regret etc; reading authentic essays and news stories or near authentic material relating to contemporary Japanese life; writing descriptions, summaries, memos, faxes and emails; use of a further 250 kanji to bring the total up to 500 characters.

Prerequisite JA4213

JA4218 Japanese Language, Culture and Society 6

LCS 3-3-0

Listening practice using a variety of authentic texts; further practice in the use of polite language; presentations, summaries of material heard and read practice for interviews; vocabulary consolidation; reading of authentic news stories, and literature. Translation of a variety of authentic passages; practice in writing summaries, descriptions, letters, and passages expressing opinions; study of a further 100 kanji, to bring the total up to 750 characters.

Prerequisite JA4217

JA4512 Japanese for Engineering & Science 2 *

LCS 2-3-1

Vocabulary expansion through role-playing and language laboratory exercises; basic grammatical structures; consolidation of kanji reading and writing; introduction of a further 75 kanji; basic conversation skills; communication over the telephone; basic descriptive writing.

JA4912 Japanese for Business 2 *

LCS 2-3-1

Vocabulary expansion through role-playing and language laboratory exercises; simple telephone conversation skills; invitations, appointments, messages; introduction of a further 100 kanji; basic descriptive writing, such as describing a city; basic grammatical structures including verbal plain forms.

JA4914 Japanese for Business 4 *

LCS 2-3-1

Expansion of verb-following phrases through functional exercises; written exercises focusing on explanations of native customs and society; comprehension of the Japanese cultural context through audio-visual materials; further basic grammatical structures; introduction of a further 100 kanji (total 350)

JA4917 Japanese for Business 7 *

LCS 2-3-1

Business project in Japanese: advertisements in both written and oral forms; further business communication; discussing price and quantity; introduction of intermediate grammatical structures; introduction of a further 70 kanji (total 430)

JA4918 Japanese for Business 8 *

LCS 2-3-1

Preparation for applying for a job in Japan, e.g., interview exercise through role playing; business correspondence and communication, e.g., CV and letter of application; introduction of intermediate grammatical structures including basic polite language, i.e., judging when to be used and how to be adjusted according to whom is being addressed; introduction of a further 100 kanji.

JM4002 Professional Skills for Journalism 2

LCS 1-0-2

In Professional Skills for Journalists 2 Students will generate their own stories and develop them in news and features conferences. They will develop their skills in design for print and websites and editing and handling pictures. They will design pages in a wide variety of styles for magazines and newspapers, using their own material from Journalistic Writing 2, and using their own photographs and other illustrations. They will develop their knowledge of writing for broadcast.
JM4012 Journalistic Writing 2  LCS  0-1-2
The course covers a variety of journalistic forms including short features, profiles of each other and visiting speakers, vox pops, and reviews of music, clubs or bars. Students will reflect on and analyze each other's work and professional output through their own blogs and a course web forum. Regular news writing workshops will continue, including one on a breaking news exercise and a wrap story exercise.

JM4442 Shorthand 2  LCS  0-0-4
Building on Shorthand 1, this module explores the different contexts within which professional journalists regularly use shorthand (such as courts, council meetings, Dáil) and the value of shorthand notes as legally acceptable evidence. Through further regular practice, students: develop listening skills further, deepen knowledge of a recognised form of shorthand, learn to read and transcribe their notes fluently and accurately. Students rectify any final challenges in relation to language skills and practise shorthand skills regularly through independent work. Prerequisite JM4441

LA4002 Jurisprudence  LAW
Students will acquire a variety of theoretical perspectives on law through an examination of its nature and operation and an analysis of key concepts and issues. Schools of jurisprudence, positivism, classical and modern, Kelsen's pure theory of law, Natural law theories, Historical and anthropological theories. Sociological jurisprudence, Legal realism, Marxist theories of law, Critical legal studies. Economic analyses. The operation of the law: precedent; statutory and constitutional interpretation. Theories of adjudication; Dworkin's rights thesis. Key legal concepts including theories of justice and Hohfeld's analysis. Key issues such as morality and the law and the duty to obey the law.

LA4012 Comparative Legal Systems*  LAW  2-1-0
The idea of law: legal concepts; historical development of common law; early Irish law; Roman law; civil law; some fundamental concepts: German/French/Spanish / Scottish legal systems - an introduction; how a civil lawyer finds the law; American legal system: other conceptions of law and the social order. Prerequisite LA 4001 Legal System and Method

LA4022 Commercial Law  LAW  2-1-0
Review of US anti trust legislation, enforcement mechanisms, the relationship between intellectual property rights and competition abuses; remedies at law and equity; alternative mechanisms for dispute resolution, arbitration, private courts, negotiation; bankruptcy, personal versus corporate, historical evolution, philosophical basis, bankruptcy Act 1988, comparative views for the US.

LA4035 Labour Law  LAW  2-1-0
Nature of labour law; legal classification of the provision of labour; the role of statute in labour law; protective legislation and conditions of employment, redundancy, minimum notice and unfair dismissal; Trade Unions, legal regulation thereof, worker participation, EU developments; courts and tribunals in labour law.

LA4122 Contract Law 2  LAW  2-1-0
Vitiating factors; mistake; misrepresentation; fraud; duress; undue influence; discharge of obligations; by performance; by agreement; by breach; by frustration; remedies for breach of contract: specific performance; damages; rectification; recession; assignment of contract obligations; agency; quasi-contracts.

LA4126 Civil Liberties  LAW  2-1-0
Fundamental concepts of human rights and civil liberties, police powers, freedom of assembly and public order, emergency powers, immigration and asylum rights, due process and access to justice, freedom of expression, freedom of information and government secrecy, protection of privacy, freedom from gender and racial

LA4222 Criminal Law 2*
LAW 2-1-0
Murder and manslaughter; non-fatal offences against the person: assault and battery; aggravated assaults; false imprisonment; kidnapping; sexual offences; rape; unlawful carnal knowledge of minors and others; indecent assault; offences against property; arson; criminal damage; burglary; larceny; aggravated larcenies; robbery; false pretences; embezzlement; fraudulent confession; handling stolen property; offences against the administration of justice; perjury; contempt of court; offences against the public peace; riot and affray; criminal libel; offences against the State; treason; sentencing; elements of criminal procedure: bail; extradition; police powers.

LA4226 Court Practice and Procedure
LAW 2-1-0
Court Rules; Terms of Law; Pre-trial Actions and Pleadings; Discovery in Civil and Criminal Matters; Motions; Injunctions; Witnesses; Expert, lay and Garda, Jury and Non Jury Trials; Rules of Evidence, Proof, Testimony, Hearsay and exceptions; Actual Trial, Order of Appearance, Opening, Examination in Chief, Cross, Re-examination, Objections, Summations; Verdicts and Judgements; Enforcement of Judgements.

LA4320 Law of Torts 2*
LAW 2-1-0
Specific torts: trespass (to the person, land or goods); nuisance; Rylands v Fletcher liability; damage by fire; defamation; economic torts (deceit; passing off; injurious falsehood; inducement to breach of contract; conspiracy); remedies: general and special; judicial and extra judicial assessment of damages; limitation of actions.

LA4410 Public Law 1
LAW 2-1-0
The historical background to the 1937 Constitution; the legal nature of the Constitution; the legal personality of the State; sovereignty; the juridical nature of the claim to territory in Articles 2 and 3. Separation of powers; office of the President; the Oireachtas; the Dáil; the Seanad; the executive. The law of local government. International relations and membership of the EC; judicial power; constitutional litigation; constitutional interpretation.

LA4420 Public Law 2*
LAW 2-1-0
The trial of offences; due process of law; the guarantee of equality; personal rights; the family; education; religion; probate property; judicial review of administrative action remedies for breach of constitutionally protected rights; international regimes for the protection of rights.

LA4520 Law of Business Association 2*
LAW 2-1-0
Capital of a company; shares and membership rights; borrowing by the company; types of security and relative priorities; administration of a company; directors; fraudulent and reckless trading; insider dealing; investigations; winding up.

LA4620 Land Law 2
LAW 2-1-0
The concept of public control on the use, transfer and development of real property, methods of real property transfer of ownership, public restrictions on the use of real property; landlord and tenant law, nature and creation of the relationship, determination of the relationship, statutory control of tenancies, public welfare codes; the laws relating to succession, statutory control of the right to devolve property upon death, wills and intestacies.

LA4720 Substantive Law of the EC
LAW 2-1-0
The law of the economy - concept and scope, the law of the economy under the EC Treaty; the concept of the common market/internal market; the Customs Union, Common Customs Tariff, Common Commercial Policy; four Freedoms - goods, persons, services, capital and payments;
policies of the EC including - Agriculture, Competition, Transport, Social Labour law; consumer and environment; approximation of laws.

LA4722/LA4942 EU Law (B) LAW 2-1-0
The Treaties of the European Communities; merger, accession, amendment; the nature of the Communities; personality, liability, immunities, external relations; the Institutions; the Council of Justice; the Court of First Instance; the Court of Auditors; Ireland and the EU; constitutional referenda; method of incorporation; the European Communities Acts, 1972-1993; statutory instruments; the Oireachtas Joint Committee on the Secondary legislation of the European Communities; the relationship between Community and National Law. Prerequisite LA4001

LA4828 Equity and Trusts 2* LAW 2-1-0
The trust, classifications 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.

LA4918 Company Law LAW 2-1-0
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, director’s 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.

LA4922 Sport and the Law LAW 2-1-0
Elements of a valid contract: offer, acceptance, consideration, formalities, legality; terms and conditions; standard form sports contracts; enforcement mechanisms and remedies for breach of contract; doctrine of restraints to trade; EU competition law and policy as applied to sport; criminal law and sport; manslaughter, assaults and batteries; public order offences; fraud related offences; sports governance: discipline; tribunals and natural justice; judicial review of sports association action.

LI4212 Linguistics 2* LAW 2-1-0
Language and world-view; cognitive aspects of language categorisation; linguistic universals - typology; contact phenomena - bilingualism; pidgins, Creoles, second-language learning; ideological issues - language planning, purism, language and power, feminist critiques. Prerequisite LI4211 Linguistics 1

MU4136/MD4022 Irish Traditional Music 2 IAWM 2-1-0
Repertoire and style in instrumental and voice tradition; the Irish Harp; traditional music and society in contemporary Ireland.

PA4011 The Civil and Public Service PPA 3-0-0
Constitutional and legal position of the public service; growth of the public service; the structure of the public service; the civil service; ‘ministerial responsibility’; government departments; the civil service and the policy process; co-ordination and control; the profession of government; recruitment and promotion; staff development; rights and duties of civil servants; ethical dilemmas in the civil service; the civil service in comparative perspective.

PA4013 Local Government PPA 2-1-0
The nature and purpose of local government; historical development of Irish
local government; local government in the politico-administrative system; local government areas and structures; elections and politics; the management system in theory and practice; local government finance and audit; issues in Irish local government.

PA4018 Public Policy Process

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 organizationally based decision processes within public administrations. What is public policy?; stages approach to the policy process; power approaches – elitism, pluralism, Marxism, corporatism, professionalism, technocracy; agenda setting; models of decision making – Simon, Lindblom, Allison, Etzioni, Dror; institutional approaches; rational choice theory; policy transfer; policy implementation; policy fiascos; accountability and transparency.

PA4038 Public Administration in Democratic States

Overview of the main themes in comparative public administration. Discussion on the role of the state in society. Analysis of models of politico-administrative relations in European countries. Discussion of internal organisation of the administration in different European countries. Review of processes of change and innovation in public management in selected countries.

PO4013 Partnership and Governance

Exercises the concepts of governance and partnership. Models and applications of partnership, plus the administrative, social, economic and 'sustainability' implications of partnership approaches.

PO4015 Government and Politics of the EU

Examines the development of the European Union as a political system from the aftermath of the second World War onwards; the institutional system of the EU including decision-making procedures; the policies of the EU and their effects on member states; the ongoing debate on institutional reform and the question of a European Constitution.

PO4016 Issues of European Integration

The main problems and obstacles encountered since the end of the first transitional period of the EC Treaty, in realising the principles and objectives of the European Community; the political-institutional problems that the Community faces and the major initiatives aimed at constitutional reform; Draft Treaty on European Union, the Single European Act and the Maastricht Treaty; the economic and political problems: the completion of the internal market, reform of the common agricultural policy, proposals for economic and social cohesion, the community budget and own resources, foreign and security policy; and enlargement.

PL4013 Community Development

Theories and concepts of community development; economic and social perspectives on development; state and community in modern Irish society; history of community development in Ireland; the cooperative movement; community development in rural and urban areas; EU initiatives and national policy in respect of local and community development; the partnership concept; the impact of community development.

PO4013 Government and Politics of Ireland

Historical introduction to the economic, cultural and social background of Irish politics; economic, social and political change; Irish political culture; constitutional development; development of political parties and evolution of the party system; electoral behaviour; social bases of party support; overview of the principal political institutions, including the Presidency, Oireachtas, Government, Taoiseach and the Civil Service.
PO4022 Modern European Political Thought

110
The origins of the State, including the political thought of Machiavelli and Hobbes; the Enlightenment project and the rise of nationalism in European thought; The place of Utopian thought in the formation and development of European political ideas; the form of the liberal state and it’s place in liberal political economy; Marxist analyses of the liberal state; liberal, socialist and anarchist alternatives to the liberal state; environmental politics and the Green challenge to the current liberal political order; the different forms of feminist thought; the post modern condition and the role of the state at the end of the modern era.

PO 4058: Politics of the Third World

The module aims to introduce the student to the problems of, and prospects for, economic and political development in the Third World. At the outset, the concept of a “Third World” is explored and some of the theoretical and ideological precepts underlying relative underdevelopment are analysed. Political instability, revolutionary change and faltering progress towards democratisation are set in the context of a globalisation that appears to perpetuate Third World vulnerabilities. The module will be comparative and analytical in its approach but will focus, in particular, on Africa, Latin America and India.

SO4032 Introduction to Sociology 2

SO4032, ‘Introduction to Sociology 2’ 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 student’s awareness and understanding of key sociological theories, concepts and issues, this module is orientated to developing students’ ability to use sociology as an analytical tool. Topics include sociological approaches to deviance, crime and control; migration, recent trends in Irish migration and issues faced by contemporary migrants; concepts of ethnicity and ‘race’; contemporary issues in the representation of ethnic minorities in the media; religiosity and secularisation; civil and invisible religion; social class and contemporary debates regarding the continuing relevance of the concept of class.

SO4016/4096 Issues in Contemporary Irish Society*

Power, control and legitimacy in Irish Society; social differentiation, exclusion and marginalisation; social control and social conflict; ideology-dominant and submerged discourses; the nature and reality of consent and resistance.

SO4023 Sociological Theory

The analysis of power and stratification, functionalist, Marxist and feminist theories; ideology, meaning and social action, Weberian, Marxist, rational choice and symbolic interactionist perspectives; macro and micro theories of social change; bridging the chasm between structure and process, Parsons, Habermas and Giddens; fragmentation or fusion; the post modernist debate; the limits of sociology, space and time in sociological theory.

SO4025 Quantitative Research Methods

The role of quantitative empirical reasoning in sociology Collecting, coding and analysing survey data, using SPSS and spreadsheets Samples, surveys and probability Univariate and bivariate summaries of data Introduction to statistical inference, hypothesis testing and inference Introduction to linear regression and correlation

SO4035 Sociology of Organisation

The growth and proliferation of organisations since the 19th century; organisations as a sociological research object; the relationship between sociological theory and organisational management; the potential transitions from modern to post-modern organisations; new developments in organisational theory and research, such as
networking, information technology, teleworking and organisational culture as well as enduring inequalities in organisations.

SO4038 Technology, Social Innovation and Gender

SOC  3-0-0

This module explores the different conceptual frameworks surrounding the debate on the role(s) of technology in society and the impact of society on technological development from a gender perspective. It explores the extent to which technology 'liberates' or 'imprisons' women; the ways in which technology can be defined, whether technology is neutral or value free. Specific topics will include health care and reproduction technologies, women’s participation and exclusion from technology, technology and the home, and women’s marginalized position in the technological sphere. There will be a strong focus on information technologies as one of the major technologies affecting everyday life and work today.

SO4078 Inequality and Social Exclusion

SOC  2-1-0

Defining inequality, social exclusion; an examination of different approaches to measuring inequality and social exclusion and the implications of the diversity; locating the issues of inequality and social exclusion within discourses such as citizenship and equality, an analysis of class, gender and racial divisions exploring their continued significance as bases for both social exclusion and inequality.

SP4132 Spanish for Beginners 2 *

LCS  2-1-0

A brief revision and transfer of known structures to new communicative contexts; development of all four language skills and basic translation strategies in the classroom and laboratories; selective reading of short stories. (General lecture: 1 hour) comprising an introduction to Latin America in the twentieth century with lectures on recent history, film, popular culture and literature.

SP4142 Spanish Language & Society 2: Introduction to Spanish Studies *

LCS  2-1-0

General lecture of one hour a week comprising an introduction to Latin America in the twentieth century with lectures on recent history, film, popular culture and literature. A contemporary novel by a Hispanic writer will be read and discussed in class. The course incorporates a brief revision and transfer of known structures to new communicative contexts; development of all four language skills and basic translation strategies in the classroom and laboratories; selective reading of short stories.

SP4146 Spanish Language & Society 4: Modern and Contemporary Spain*

LCS  2-1-0

Language work on more complex structures; text analysis and exposure to a variety of writing styles; oral discussion and presentations on texts relevant to the topics of the general lecture; post-civil war Spain political societal and economic developments; transition to democracy; the cultural and literary heritage.

SP4148 Spanish Language & Society 6: Media and Current Issues in the Spanish Speaking World*

LCS  2-1-0

Multi-media based extensive use of press and journal articles video material and films cd ROMs and Internet for language and information purposes; seminars on political economic and social issues in Spain and other Spanish speaking countries; national identity nationalisms welfare state terrorism racism and discrimination religion and today’s society.

SP4232 Spanish Language, Culture & Society 2 * (Beginners)

LCS  2-1-0

The language of persuasion; expressing opinions; making comparisons, showing agreement and disagreement; improvement of communicative ability in giving information concerning themselves, other people, and about places, timetables,
events. (General lecture: 1 hour) Comprising an introduction to Latin America in the twentieth century with lectures on recent history, film, popular culture and literature. Prerequisite SP4231 Spanish 1 Beginners

**SP4242 Spanish Language, Culture & Society 2* (Advanced)**  
LCS 2-1-0

Developments and reinforcement vocabulary pertaining to specific contexts by the use of monolingual and thesaurus dictionaries; emphasis on text structure and analysis of text styles. A contemporary novel by a Spanish writer will be read and discussed. (General lecture: 1 hour) Comprising an introduction to Latin America in the twentieth century with lectures on recent history, film, popular culture and literature. Prerequisite SP4221

**SP4246 Spanish Language, Culture & Society 4***  
LCS 1-2-1

The theory and practice of translation concentrates on political and legal texts and summary writing is practised, the cultural and literary heritage of Post-Civil War Spain is examined, as are political, societal and economic developments of this period, including Spain’s transition from dictatorship to democracy.

**SP4248 Spanish Language, Culture and Society 6***  
LCS 1-2-1

Advanced Spanish grammar is practiced and text analysis and production continued, further deepening their knowledge of translation theory and practice. Students tackle legal translation. Further developments and challenges in contemporary cultural and economic issues will be explored. (General lecture: 1 hour) Comprising an introduction to Latin America in the twentieth century with lectures on recent history, film, popular culture and literature. Prerequisite SP4221

**SP4322 Spanish for Business 2***  
LCS 2-2-0

Language needed in various business transactions; telephone conversations, messages, letters, publicity and agreements; extensive use of video to expose students to industry and the business world in Spain and Latin America. Use of CALL for autonomous learning. (General lecture: 1 hour) Comprising an introduction to Latin America in the twentieth century with lectures on recent history, film, popular culture and literature. Prerequisite SP4221

**SP4324 Spanish for Business 4***  
LCS 2-2-0

Report skills; research reading on a variety of relevant issues within the areas of tourism, marketing, advertising and insurance; translating from Spanish into English.

**SP4002 Introduction to Latin American Culture/s**  
LCS 1-2-0

This module offers an introduction to the most important events and movements in Latin American culture. It focuses mainly on the cultural impact of the Spanish colonisation, the New Republics, and the development and revision of women’s place in Latin American culture. Through the use of literature, music, film and other forms of culture, the module will serve as a platform for the exploration of up-to-date socio-political issues in Latin America and their effect on cultural production.

**SP4622 Indigenismo and Negrismo in Latin American Literature**  
LCS 1-2-0

This module approaches literary Americanism in Latin America through black and indigenous Hispanic texts that are representative of literary trends in general. 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.
SP4625 From Romanticism To Realism in Hispanic Literature

This module focuses on literary and artistic works in Spain and Latin America within the movements of Romanticism and Realism. One weekly lecture will focus on the socio-historical context of the six century. Two tutorials will be devoted to study and analyse literary texts in detail.

TW4116 Technical Writing 2*

Forms of technical communication. Writing online documentation. Hypertext and hypermedia. Interviewing skills for technical authors; ethical issues in technical communication; consumer protection law; health and safety legislation; intellectual property laws. Prerequisite TW4115 Technical Writing 1

TW4118 Technical Writing 4*

Economics of text production (estimating, cost control, planning quality control); information design; desktop publishing; image and text processing; conventional print. Prerequisite TW 4116 Technical Writing 2

WS4011 Feminist Perspectives: An Introduction

The nature of women's studies; an introduction to the main theoretical frameworks (viz Liberal; Radical; Psychoanalysis; Marxist and socialist; Existentialist and post-modern); exploration of topics (paid work; motherhood; violence etc.) in the context of these frameworks; a critical evaluation of multifactorial frameworks and their relevance in understanding the position of women in Irish society.

WS4028 Theories of Multiculturalism

This module examines theoretical approaches to multiculturalism and how different multicultural approaches construct cultural difference in gendered ways; it offers a comparative approach by considering different gendered cultural practices and different national approaches to multiculturalism; it offers a framework for understanding how gender relations affect and are affected by multicultural strategies for negotiating difference.
The Faculty of Education and Health Sciences (EHS) is an exciting development at the University of Limerick. The Faculty was newly created in January 2008 as part of a substantive academic restructuring at the University. This has resulted in bringing together in a new Faculty a number of related disciplines in the Department of Education and Professional Studies, Department of Physical Education and Sports Sciences, Department of Physiotherapy, Department of Psychology, Department of Nursing and Midwifery, Department of Occupational Therapy, Department of Speech and Language Therapy and the School of Medicine (Graduate Entry).

Those interested in post primary teaching as well as those interested in working in the health sector will find some of the most progressive programmes in these applied fields of study in the country. There are opportunities for clinical and educational placements as well as dedicated supervision from faculty members committed to the highest standards of teaching and quality research.
EN4002 Introduction to Principles and Practice of Primary Education  
*ED 1-2-2*
Content, rationale and learning experiences of the primary school curriculum; transition from primary to second level education; social, emotional and cognitive aspects of child development; the integrated curriculum through discussion and practical work-shop activities; planning and development of lessons/projects appropriate to relevant teaching subjects; principles and techniques of classroom observation, self-appraisal, classroom management and the pastoral care of pupils in preparation for primary school experience.

EN4004 Introduction to Reflective Practice  
*ED 2-3-0*
Planning a scheme of work: context, aims, subject matter, organisation of learning experiences; evaluation; devising lesson plans, becoming self-critical; teaching practice: evaluating teaching practice; analysing problems encountered; teaching practice as a learning experience for the student teacher.

EN4008 Teachers as Professionals*  
*ED 2-1-0*
Equity in schooling; gender; social class; special needs; education of minorities; values in education; the European dimension in education; school based assessment; the school as a social agency; substance abuse; sex-education; bullying and harassment; AIDS education; assessment. Prerequisite EN4007

EN4014 Technology and Society  
*ED 1-2-1*
Technology and culture in developing and in technologically advanced cultures; technology for sustainable economic growth and development; appropriate technology and technology transfer to developing countries; ethics and technology; biotechnology; reproductive technology; educational technology; communication technology and international relations; technology and the environment: acid deposition, greenhouse warming, forest decline, ozone depletion. An examination of the dominant issues confronting the classroom teacher today; the role and professional status of the teacher in contemporary society; the psychology of motivation; school effectiveness; educational evaluation and assessment; psychometric, dialectical and information processing models; intelligence and creativity.

PS4032 Psychology and Social Issues  
*ED 2-1-0*
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 engage in debating and evaluating the place of psychology in society as well as the theory and methods of the discipline. Through a psychological analysis of the causes and consequences of social issues students will gain insight into how these issues might be resolved. Issues covered will include: riots and disasters; altruism; prejudice, abnormal psychology; gender and mental health; human machine interaction; stress.

Numbers are limited on PS4032. The module is subject to availability on arrival at the University of Limerick.

PY4011 Physical Education Curriculum and Assessment  
*PESS 2-1-1*
This module will examine physical education in contemporary Irish society, focussing on Junior Cycle, Senior Cycle and Leaving Certificate. Discussion of teaching styles, curriculum models and instructional models in physical education will be encouraged as will the rationale for assessment in physical
education and examinable forms of the physical education subject in Scotland, Ireland, England and Wales, Australia. Numbers are limited on PY4011. The module is subject to availability on arrival at the University of Limerick.

PY4022 Physiology and Anatomy

Physiology: An introduction to the physiology of movement: the concept of homeostasis; the role of physiological systems in sports performance; basic cellular physiology; membranes, energy metabolism and cellular control; Systems Physiology: the nervous system and the brain; the endocrine system; the musculoskeletal system; the circulatory system; the respiratory system; the digestive system and nutrition; energy transfer at rest and exercise. Anatomy: terms and definitions; functions and structure of skeletal and particular systems. Origin and insertion of prime movers and available range of motion. Biomechanics: Fundamental biomechanics. Health Related Activity: Introduction to components of health related fitness (HRF); introduction to and personal experience of field tests for HRF; warm up and cool down procedures; health appraisals and screening. Components of physical fitness (PF). Principles of training specific to HRF and PF. Field tests for physical fitness. Numbers are limited on PY4022. The module is subject to availability on arrival at the University of Limerick.

PY4026 Youth Sport and Policy (Spring) PESS

Students will be introduced to the current youth sport provision in Ireland available through the existing pillars of physical education, extra-curricular sport and sport outside school and possible motivations for involvement in youth sport (sampling/specialising/investing). Students will identify the elements of quality coaching and engage with the extent to which communication, methodologies and the management of the training / learning environment are evident in coaching and teaching contexts.

PY4032 Applied Studies in Games/Gym PESS

Games: students will experience and analyse invasion/ court games. Common principles of games, structures, rules, skill development and basic tactics; introducing activities and progressions; safety aspects; consideration of physical fitness demands of games.

Gym: Students will be introduced to themes including locomotion, transference of weight, flight, body shape, levels and directions and partner work. Students will be encouraged to use apparatus and focus on their own ability to complete gymnastic moves, themes and sequences.

PY4038 Qualitative Biomechanics PESS


Numbers are limited on PY4038. The module is subject to availability on arrival at the University of Limerick.

PY4048 Pedagogy, Exercise and Children’s Health

Theoretical: Definitions relating to physical activity, health and health promotion. Recommended amounts of physical activity, latest guidelines. Assessment and levels of Physical Activity. Inactivity related disorders; obesity/overweight, coronary heart disease, chronic obstructive pulmonary diseases, neuromuscular disorders, osteoporosis, diabetes. Examination of the role of the physical education teacher and curriculum in activity and health promotion. Structure and content of health related physical activity programmes for schools and community. Practical: APA programmes, organisations and resources. Activity
adaptation. Adapted physical activity programme prescription and implementation for different disabilities. A work experience in schools/centres, which cater for individuals with disabilities.

Numbers are limited on PY4048. The module is subject to availability on arrival at the University of Limerick.

**PY4058 Applied Studies in Athletics/Outdoor Adventure Education**

*Students to opt for either Athletics or Outdoor Adventure Education. Athletics: An in-depth look at the ‘fundamental skills’ approach to athletics through to ‘advanced techniques’ using biomechanical qualitative analysis. This course will explore a number of themes, all related to the efficient yet creative ways in which athletics can be taught in schools. Adventure: Develop and improve existing basic skills in selected activity. Acquire additional advanced personal skills. Advanced rescue skills. Planning, equipment selection, survival skills, and leadership skills. Teaching and leading small groups with a qualified leader. An analysis of the factors, which affect performance in the chosen activity. Adventure education and outward-bound philosophy worldwide. Risk taking in adventure activities and its impact on the individual. Opportunities will be provided to attain the minimum teaching or leading or instructing award of the selected NGB.

Numbers are limited on PY4058. The module is subject to availability on arrival at the University of Limerick.

**PY4064 Teaching and Learning for Individuals in Physical Education (Spring)**

The module will acquaint students with how learning by individual pupils can be facilitated by provision of appropriate environmental factors (e.g., safety, facilities, equipment, teacher information) and the setting of tasks that are appropriate to individual learners. Students will be involved in considering how material can be selected for teaching. Students will be encouraged to address such environmental factors when constructing schemes of work for activities. The context of selected activities will allow students to focus on pupils’ learning that is not only considered as what is visible but also what is not observable or measurable.

Numbers are limited on PY4064. The module is subject to availability on arrival at the University of Limerick.

**SS4102 Foundations of Sport and Exercise Psychology**

Psychology as a discipline and mode of enquiry; major branches of psychology; evolution of sport and exercise psychology; sociological aspects, sport in Ireland - structures and processes, groups in sport, participation levels; introduction to key concepts in the psychology of sport - attention, personality, motivation, stress; the individual performer; key mental skills; rationale and pathway for the socio-psychological study of the course, the life cycle approach.

Numbers are limited on SS4102. The module is subject to availability on arrival at the University of Limerick.

**SS4103 Psychology of Movement Development from Infancy to Adolescence**

Motor skills development as a part of human development (a) as a process (b) as a field of study; descriptions of the phases of motor development from infancy to adolescence (reflexive rudimentary, fundamental skills, sport specific skills), noting the changing characteristics, direction of development, genetic V environmental (nature V nurture) debate, historical overview of methods of investigation; influences of the individual (biology/genetic), the environment and task demands; dynamic systems perspectives; readiness to learn, critical/sensitive periods; perception and perceptual development; (vision and kinaesthesia); balance and its development; evaluation and perceptual motor training programs. Conceptual approaches to the Study of Motor Development; introduction to sociology of sport; socialisation into sport; significant others; stages of play; gender differences; psycho social models of development; children in sport and exercise; coach and
media influences; talent identification; burnout dropout and child abuse in sport; Adolescent motivation and participation in exercise and sport; personality, body image, self image and self concept; group dynamics and leadership; at risk groups; gender issues and sport; eating disorders, substance abuse; disability and sport; bridging the participation gap. Numbers are limited on SS4103. The module is subject to availability on arrival at the University of Limerick

SS4128 Applied Sports Psychology

The emphasis in this course is on the application of psychological concepts, skills and strategies to applied settings in sport for performance enhancement. Specifically, students will explore the social and psychological factors related to sport participation and peak sport performance. Content relating to performance enhancement includes psychological characteristics of peak performance, characteristics of elite athletes and their development, increasing of awareness; selected mental skills and strategies (e.g. muscle relaxation, autogenic training, meditation, self talk, plans & routines, simulation training); guidelines and procedures for implementing intervention strategies; conducting mental skills training programmes. Attention will also be given to the environment in which sport occurs focusing on aspects of group dynamics.

SS4204 Physiology 2: The Physiology of Exercise

Physiological changes during acute and chronic exercise, especially involving cardiovascular, respiratory and muscular systems and thermoregulation in children, adults and the elderly; limiting factors to performance including fatigue; influence of altitude on training and performances; respiration underwater using SCUBA apparatus; use and abuse of argument, evidence, reason proof, analysis and interpretation; academic standards of accuracy and record. Prerequisite SS4203. Numbers are limited on SS4107. The module is subject to availability on arrival at the University of Limerick

SS4206 Physiology and Kinesiology in Biomedicine

The nervous system and the brain; nerve structure and function, nerve transmission; the action potential, the neuro-muscular junction, neurotransmitters; the central nervous system; the peripheral nervous system, autonomic and somatic nervous systems; muscle fibres; organisation into motor units; circulatory system; structure and function of the heart; blood vessel structure and function; the respiratory system; structure and function of the upper respiratory tract; The kidneys and renal function; Identification an functions of the musculo-skeletal system; introduction to injury prevention and analysis.

SS4208 Physiology 5: Physical Activity, Health and the Common Diseases

Types, causes and incidence on relevant diseases including morbidity and mortality statistics of adults and children; heart disease, obesity, diabetes, respiratory conditions, muscular-skeletal problems, cancer, and other common forms of disease; the place of exercise in health related fitness; exercise and pregnancy; exercise and the immune system; interaction with other professionals working in the health field; sports injuries their pathogenesis treatment principles and possible prevention. Numbers are limited on SS4208. The module is subject to availability on arrival at the University of Limerick

SS4304 Biomechanics 3: Introductory and Applied Sports Biomechanics

Application to movement of axes and planes of movement and muscle forces; fluid statics and hydromatics; air flow effect; water flow effect; locomotion including walking and running; sports skills; basic biomechanical analysis; visual and instrumental methods of analysis; point, rigid body, quasi-rigid body and linked segment models; gait analysis; optimal movement patterns; mathematical modelling.
Prerequisite SS4302. Numbers are limited on SS4304. The module is subject to availability on arrival at the University of Limerick

SS4318 Novel methods in Biomechanics

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. 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; new and developing methods for data analysis of human movement: applications Power spectrum analysis, notational analysis, wavelet analysis in biomechanics of Kinematic Kinetic and EMG Data.

Numbers are limited on SS4318. The module is subject to availability on arrival at the University of Limerick

SS4402 Sports & Exercise Applications 2


Organising of a major sports event: planning budgeting, promoting, sponsorship, safety and legal aspects, running the event, media, evaluation. Legal and ethical responsibilities. Work experience in relevant areas of Sports administration on campus. Planning, delivery and evaluation of phases of a single session, and of a number of sessions. Coaching experience gained by placement of students to work with coaches or exercise leaders in an ongoing practical setting. Maintenance of a coaching log. Numbers are limited on SS4404. The module is subject to availability on arrival at the University of Limerick

SS4405 Sport & Exercise Applications 5

Classification of injury; incidence and causes of injury by sport; first handling of injury; procedures for referral to medical/ other agencies; aqua fitness; weight training; theory of treatment of the 'acute' phase of the injury; management of the injured athlete while undergoing treatment; i.e. maintenance of CV fitness (use of pool); pathophysiology of soft tissue injury and repair, i.e. inflammation degeneration regeneration; Functional adaptations of musculo-skeletal system to accommodate the injury. Physiological/Biomechanical/ Motor/ Psychological issues of the injured athlete. Prerequisite SS4303. Numbers are limited on SS4405. The module is subject to availability on arrival at the University of Limerick
SS4408 Sports & Exercise Applications

The emphasis in these modules is placed on applying scientific methods to sport and exercise through a series of selected mini-projects carried out in groups. The projects themselves determine the syllabus content and the emphasis is placed on students developing important practical skills in sport and exercise science. The projects will involve the students in for example: testing the theory of projectiles in track and field athletics; investigation of the physiological rationale for warm up and cool down; evaluation of the merits of stretching and flexibility to increase performance; testing the theory of the relationship between anxiety and performance in sport and/or exercise; assessing methods of intervention for overcoming problems related to anxiety, motivation or concentration; examining the physiological, psychological and biomechanical demands of a selected sport or exercise activity. Numbers are limited on

SS4408. The module is subject to availability on arrival at the University of Limerick.

Note: △ Students who want to join any module with the symbol △ should note that resource and scheduling constraints limit places, therefore, we cannot guarantee enrolment. Modules with SS or PY code followed by a △ symbol: Available places are allocated to Sports Science majors first and are subject to interview and/or skills assessment.
These are exciting times for the Kemmy Business School (KBS), which is home to 2,900 students and 100 faculty and staff. Founded in 1972 and renamed the KBS in 2003 the School will consolidate its locational future in a new state-of-the-art building due for full occupation in September 2008 at the Limerick City end of the main UL campus. The new building will incorporate a Wall St. style trading room, specialist HRM and Marketing laboratories, executive education teaching rooms, breakout rooms and a self-contained conference centre. We offer a wide range of business and management education opportunities at undergraduate and postgraduate levels that are of particular interest to international students. As a Study Abroad student at the Kemmy Business School you will join a welcoming, vibrant and exciting community of students and faculty. You will enjoy world class facilities during your stay with us and an academic environment that is second to none.
The module introduces students to the nature, basic techniques, language and principles of modern cost and management accounting. The role of the management accountant in the management process is considered in the context of a dynamic business environment. In particular, the use of accounting information in the internal decision making process of an organisation as well as recent developments in management accounting.

AC4002 Managerial Accounting  
A&F 2-1-1
Stakeholder theory; impact of governance developments on accounting and auditing; boards and non-executive directors; Corporate Social Reporting; Accounting for business combinations, merger and acquisition accounting, equity accounting; Goodwill and fair values; Public sector accounting; Frauds and forensic accounting; Current issues; Ethics and ethical issues in accounting. 
Prerequisite AC4305: Financial Information Analysis.

AC4004 Accounting & Auditing Frameworks  
A&F 2-1-0
This module develops students understanding of the various historical, governance, regulatory and political contexts within which accounting operates. It is intended to give them an understanding of the broader considerations that impinge upon accounting and auditing policy and practice. It also extends students understanding of the broader frameworks within which accounting operates. Finally it addresses similar issues relating to auditing. 
Prerequisite AC4001.

AC4008 Management Accounting 2 *  
(offered only in AY2009/10) A&F 2-1-0
Political nature of accounting and governance; Corporate Governance; history, development and future; international and political contexts; approaches to governance; Cadbury, Greenbury, Hampel; Turnbury, Higgs etc.; the ways in which funds for a business are raised and invested. The topics covered include the relationship between financial and management accounting, costing, budgeting, short-term decision making, strategic management accounting, sources of finance, investment appraisal and management of working capital. This module is designed to be a prerequisite for the module AC4417 Management Accounting 1.

AC4014 Intermediate Accounting 1  
A&F 2-1-0
Specific topics to be covered include: Inventories (IAS 2); Construction Contracts (IAS 11); Income measurement and asset valuation; Accounting for changing price levels; Property, Plant & Equipment (IAS 16); Impairment of Assets (IAS 36); Accounting for Investment Properties (SSAP 19); Intangible Assets (IAS 38); Accounting for Research & Development; Subsistance over form. 
(Prerequisite: AC4001 Principles of Accounting).

AC4214 Accounting for Financial Decision Making  
A&F 2-1-0
This module introduces the non-business student to the fundamental concepts and practices of management accounting and finance. Management accounting provides information for product/service costing and profit determination in addition to information for planning, control and decision-making. Finance is concerned with...
analysis; opportunity cost and capacity considerations; decision model versus performance evaluation model; pricing decisions and profitability analysis; target costing; life-cycle product budgeting and costing; cost management; decision-making under conditions of risk and uncertainty; information for planning, control and performance measurement; master budget and responsibility accounting; kaizen budgeting; activity-based budgeting; flexible budgets and management control; standard costing and variance analysis; management control systems; contingency theory; organisational and social aspects of management accounting; segment reporting and decentralisation; performance measures, compensation and multinational considerations; transfer pricing and multinational considerations; the balanced scorecard; strategic management accounting; past, current and future developments in management accounting.  

**EC4004 Economics for Business**  
**ECON 2-1-0**  
Short-run and long-run cost curve analysis; The Economics of market power; Monopolistic competition; Oligopoly; Game theory; Labour demand and the investment decision; Labour supply; Firms’ objectives and behaviour; The role of government and the firm; The expectations-augmented Phillips curve, purchasing power parity, interest rate parity, the Fisher effect; open economy monetary model and the factors underlying the “Celtic Tiger” period.

**EC4006 Intermediate Macroeconomics**  
**ECON 2-1-0**  
The labour market and the extended Keynesian, Classical model; The Phillips curve and the inflation-unemployment trade-off; Purchasing power parity; Covered and uncovered interest rate parity theory; Open economy monetary model; Economic adjustment given the constraints imposed by EMU membership; The Design of the European Central Bank (ECB); The ECB’s Monetary Policy; Controlling the Money Supply; Interest Rate Determination and Policy; The Growth and Stability Pact; Exchange Rate Determination and Policy; Open Economy; Monetary Model; Economic Adjustment in a Monetary Union; The Economic Performance of the ECB.

**EC4014 International Economics**  
**ECON 2-1-0**  
The world economy: recent trends in trade and capital flows traditional trade theories, The Mercantilists, Smith, Ricardo, Heckscher-Ohlin; Monopolistic Competition and Imperfect Competition Trade policy; theory of Tariffs, Non-tariff barriers Trade policy; practice, The political economy of trade policy, Strategic trade policy International production factors; labour and capital mobility, the welfare effects of labour and capital mobility, Foreign Direct Investment and the Multinational Corporation, Theories explaining NCS and FDI. Prerequisites EC4101, EC4102 and EC4004.

**EC4018 Monetary Economics**  
**(offered only in AY2009/10) ECON 2-1-0**  
The main topics included in the syllabus are: The Design of the European Central Bank; The ECB’s Monetary Policy; Controlling the Money Supply; Interest Rate Determination and Policy; The Growth and Stability Pact; Exchange Rate Determination and Policy; Open Economy; Monetary Model; Economic Adjustment in a Monetary Union; The Economic Performance of the ECB.

**EC4024 Financial Economics**  
**ECON 2-1-0**  
This module is concerned with issues in global financial management. Among the topics examined are: the international monetary system, the foreign exchange market,
measuring and managing foreign exchange exposure, financing the global firm, managing multinational operations and foreign investment decisions. Prerequisites EC4101, EC4102 and EC4004.

EC4102 Macroeconomics ECON 2-1-0
Introduction (national income; business cycle; inflation; unemployment; balance of payments); the theory of income determination: basic model; fiscal policy: the Irish experience, 1973 - 93; money and banking: monetary policy; monetary versus fiscal policy, crowding-out, quantity theory of money, IS/LM model in closed economy; the balance of payments and exchange rate theory: fixed and floating exchange rates; fixed exchange rate systems; road to EMU, enlarged community, EFTA, eastern Europe and the EU.

EC4108 Contemporary Issues in the Global Economy (offered only in AY2009/10) ECON 2-1-0
Economic versus Human Development; Economic Performance of Less Developed Countries, Population and Economic Development; Income Distribution and Poverty; Migration patterns and their effects; Globalisation and International Trade; The effects of trade on wages and labour standards; International financial movements; The role of outsourcing and offshoring; The role of the US Dollar and US Current Account Deficits in the world economy.

EC4112 Macroeconomics for Non-business ECON 2-1-0

EC4408 Public Finance ECON 2-1-0
Market possibilities and prescriptions; evaluating public finance policy; collective decision making: market failures and government intervention; searching for the public good; evaluation of public production and bureaucracy and public expenditure; tax theory - basic concepts; income (re) distribution; fiscal aspects of macroeconomic theories; international issues in public finance; public failure and public expenditure growth; 'normative' optimal taxation; 'positive' optimal taxation; the 'traditional’ versus the public choice approach - public finance analysis and the policy-makers.

EC4418 Monetary Economics and International Finance (offered only in AY2008/9) ECON 2-1-0
IS-LM model and the balance of payments, Mundell-Fleming model, exchange rate policy; open economy model; foreign exchange market, the forward market, forward market efficiency; interest rate parity theory, exchange rate expectations, international fisher theory; futures and options markets, currency options - Garman Kolhagen model; international portfolio diversification; application for futures and options in portfolio management.

EC4711 EU Economic Environment ECON 2-2-0
This module will 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 topics covered are: Competition Policy; Trade Policy; Monetary Integration and EMU: The Common Agricultural Policy; The EU and
Central and Eastern Europe (Enlargement); The EU and the LDCs.

EP4408 Small Business Consulting
M&M 2-0-1
This module provides students with the principles and process of business consulting; typical assignments include preparing a feasibility study; designing marketing plans and market research reports; students have the opportunity to apply experiential knowledge and concepts learned in the classroom to real-life business situations whilst working in teams; module content includes: the steps, skills and roles in the consultancy process, market research methodology, conducting an industry and competitive analysis, the marketing plan, report writing, communication and presentation skills.

FI4008 Empirical Finance*
(offered only in AY2009/10) A&F 2-0-1

FI4408 Advanced Topics in Finance*
(offer only in AY2008/9) A&F 2-1-0
The course material tracks recent developments in finance and is updated annually. Topics covered include but are not restricted to: An introduction to agency theory; the capital structure decision, bankruptcy costs; dividend policy and signalling; models of stock price behaviour, stochastic processes; option pricing models, the importance of the volatility parameter in option pricing models; real options theory and applications; analysing investor sentiment using options data, trading models based on investor sentiment metrics; asset pricing models, the importance of skewness and kurtosis. Prerequisite FI4305.

IN4004 Insurance Law and Claims
A&F 2-1-0
This module provides the student with insights into the law of insurance and the assessment of all classes of losses. It deals with the investigation of losses and incidents for the purpose of preparing cases for court, confirming cover under the contract and ascertaining how losses can be prevented. Prerequisite IN4003.

IN4008 Reinsurance/ART
(offer only in AY2009/10) A&F 2-1-0
Principles and functions of 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. Statistical analysis of pure risk exposures, including computer based simulations of possible loss scenarios; selection of relevant risk transfer measures; underwriting techniques - exposure analysis; use of market indices; exercises in reinsurance/alternative risk transfer programming.

IN4014 Life Insurance
A&F 2-1-0
The module includes: the history and importance of life insurance, analysis of term insurance, whole of life insurance and endowment insurance, health insurance, the Irish social insurance system, retirement and pensions, demographics and life insurance, the life insurance contract, life insurance underwriting, underwriting of diseases that affect the human anatomy, theory of mortality and morbidity risk, the use and formulation of mortality tables, premium models for term, whole of life, endowment and annuity. Prerequisite IN4003.

IN4408 Insurance Law and Claims
(offer only in AY2008/9) A&F 2-1-0
The principles of claims management, claims as an economic cost; the insurance
contract, the law of contract, the law of insurance, insurable interest, utmost good faith, indemnity, subrogation, contribution, proximate cause, law of agency, interpretation of the insurance contract; codes of practice; principles of valuing losses, property, loss of profits, civil damages, legal fees; human relations in handling claims, investigation of claims, fraudulent claims.

**IN4418 Risk Control and Underwriting**  
A&F 2-1-0

The theory of risk construction and separation, the principles of risk improvement and loss control, fire, theft and liability protection and prevention; actuarial methods and the theory of rating and underwriting; the management of an underwriting portfolio, accumulation; the principles of acceptance and retention; the principles of reinsurance, setting of net retentions, structuring of a reinsurance programme, handling claims, conflict resolution; principles of loss investigation, theory of fraud detection.

**IN4428 Life Insurance**  
(offered only in AY2008/9)  
A&F 2-1-0

The theory of financial planning, protection, savings and investment, pensions; the effect of taxation on the financial plan; the theory of insurance in fulfilling the financial plan, life, health and personal accident insurance; pensions; the mathematical theory of life contingencies; force of mortality; the importance of interest; premiums and reserves for annuities and insurance based on a single life; the formulation of mortality tables; underwriting the life insurance policy; principles of assessing degrees of extra risk; the concept of forfeiture, surrender values, paid up policies; principles of social insurance.

**IN4718 Reinsurance**  
A&F 2-1-0

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 insurance programs.

(a) Principles and functions of 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 - exposure analysis; use of market indices; exercises in reinsurance/alternative risk transfer programming.  
Prerequisite: IN4716.

**IN4728 Insurance Information Systems**  
A&F 2-1-0

The need for information to assess risk, the obtaining of information, environmental pressures to use information technology, the use of information technology in risk financing, networks in insurance, the strategic use of networks, expert systems, usage of expert systems in risk financing, management of information, evaluating technological investment, protecting the investment, security of information, the need to link business and IT strategies.  
Prerequisite: IN4716.

**IN4738 International Insurance**  
A&F 2-1-0

The function of insurances in an international market, marine insurance, aviation insurance, transit insurance; the development of a single European market in insurance and the consequent directives, harmonisation of legal provisions related to the insurance industry; WTO and the globalisation of the insurance industry, the marketing of insurance across borders; a review and comparison of international insurance and reinsurance markets.
IN4748 Life Insurance and Financial Planning  
A&F  2-1-1

The theory of financial planning, savings and investments, pensions; the effect of taxation on the financial plan; the theory of insurance in fulfilling the financial plan, life, health and personal accident insurance; pensions; underwriting the life and health insurance policy; principles of assessing degrees of extra risk; the concept of forfeiture, surrender values, paid up policies; principles of estate planning, trusts; principles of ownership of a policy; principles of social insurance.

MG4038 Sustainable Development  
M&M 2-1-0

Theories and policies of sustainability. The status of the global natural resource base. The EU approach to Sustainability; the Lisbon objectives their realisation and impact on creating a sustainable economy; social dialogue and civil society in differing regions of Europe; progress in implementing social dialogue objectives. Globalisation and the EU Social Dialogue process: the US model; the impact of EU policies on third world countries. Corporate responsibility Corporate environmental management, sustainable consumption, Business ethics and corporate social responsibility, sustainable, enterprise, green marketing, cause-related marketing, sustainability reporting, socially responsible investment, fair trade, child and low cost labour, sustainable communication.

MG4048 Contemporary Management  
Practice (offered only in AY2009/10)  M&M 2-1-0

Note – this module is contingent and will vary in content from year to year depending on the major issues in the world of management at time of delivery. Current examples would be: Restoration of Stakeholder Trust; Managing lean organisations; Structuring business for unstable markets and Communication strategies in crisis and turnaround management.

MG4408 Strategic Management  
(offerers only in AY2008/9) M&M 2-1-0

The nature and importance of strategic management; strategic management as a dynamic, interactive process; models of the strategic management process; the nature of competition and the meaning of competitive advantage; the role and influence of stakeholders on the strategic management process; establishing corporate missions and setting objectives; environmental analysis; developing environmental threat and opportunity profiles; internal strategic audits, including value-chain analysis, and developing strategic advantage profiles; corporate grand strategies and strategic business unit generic strategies; strategy choice and decision-making, including portfolio analysis and decision-support systems; strategy implementation and control processes and systems.

MG4604 Air Transportation  
M&M 2-2-0

History of air transport, national and international regulations for civil aviation and the deregulation of the environment; overview of world-wide aviation industry; air transport, airports, aerospace manufacturing, maintenance, financial and other aviation services; airline planning, scheduling, pricing, fares, passenger demand, costs, aircraft and route selection; current issues and future prospects of the air transport industry.

MI4002 Business Information Management  
M&M 2-1-2

This course will provide an economic and social framework for understanding the nature and interaction of information, technology, people, and organizational components; the role of the Internet and networking technology in modern organization; the evolution of e-business and the transformation of organizations and markets; business systems as both constraining and enabling organizations; the relationship between business systems and an organizations social structure; information and knowledge as a strategic resource in organizations; systems use for semi-structured decision-making management of international business systems.
Mi4408 Knowledge Management and Strategy

This module introduces the business student to a strategic perspective on the role of knowledge, information and technology in organisations. It studies the role of technology and infrastructure in organisational transformation. It presents frameworks for the planning and implementation of information as a competitive resource. It provides an appreciation of the need to manage knowledge as an organisational resource and the infrastructural requirements to facilitate this. The above concepts will be reinforced and developed through the use of various software packages including web, intranet and knowledge portal software systems.

MK4002 Marketing

Nature of Marketing; Histories of Marketing; Marketing Concept; Marketing Mix; Marketing as Organisational Culture, Market Orientation; Barriers to Market Orientation; Marketing in different contexts. The Consumer; Consumer Sovereignty; Consumer Rights; The Consumer Movement; Marketing, Ethics and Social Responsibility; How Marketing Adds Value; Marketing’s Contribution.

MK4004 Consumption & Consumer Culture

The Circle of Consumption; The Meaning & Nature of Culture; Consumption Meanings; Consumption & Marketing Strategies; Identity & Consumption; Embodiment & Consumption; Motivation & Involvement; Experience, Learning & Knowledge; Approaches to Consumption; Purchase Behaviour; Gift Giving; Organisational Consumption; Family & Household Consumption; Interpersonal Influence; Innovation; Compulsive Consumption; Disposition.

MK4008 applied Marketing 2

Through applied project work students will be exposed to project planning and management, the effective use of communication channel(s), and sales and negotiation processes. The module also addresses stakeholder communications and culminates in the delivery of presentation skills, both written and oral.

MK4014 Branding

The syllabus presents, in the first instance, a review of the history and origins of branding. This provides context for the subsequent discussion of the role and importance of branding. Next, students are introduced to the processes of segmentation, targeting and positioning. Brand building activities are reviewed with consideration given to strategic brand management, comparative analyses of brand image and brand concept, and an exploration of brands as assets. Finally, branding in discussed in terms of how it relates to different marketing contexts: service brands; industrial brands; retailer brands; international brands and corporate brands. Prerequisite MK4002.

MK4018 Interaction, Relationships and Networks


MK4408 Marketing Management

Marketing and the marketing management process, the strategic role of marketing, market opportunity analysis, industry and competitor analysis, developing strategic and operational marketing programmes, the marketing plan, implementation and control: structuring for marketing effectiveness; comparative analysis of functional, product, market and geographic organisational structures; introduction of the model building approach in marketing.
MK4438 Electronic and International Marketing*  
(offered only in AY2008/9) M&M 2-1-0
Electronic marketing, introduction to marketing on the internet, product and pricing on the internet, the internet as a distribution channel, marketing communications on the internet, interactive advertising, relationship marketing through online strategies, developing and website and designing a web presence, online marketing strategies; introduction to international marketing, the international marketing environment, market entry strategies, developing products for international markets, pricing in international markets, managing international channels, international promotion strategies, planning and organising for international marketing. Prerequisites MK4305, MK4315.

MK4448 Marketing Communications *  
(offered only in AY2008/9) M&M 2-1-0
Role of communications in marketing strategy, communications theory, how advertising works, the management of marketing communications, the advertising industry, creative aspects of advertising, media aspects of advertising, advertising research and testing, ethics and advertising standards, sponsorship, public relations, direct marketing, consumer sales promotions, trade shows and exhibitions, use of the internet as a marketing communications tool, internal marketing communications, integrated marketing communications, the effects and effectiveness of marketing communications. Prerequisites MK4305, MK4315.

MK4606 Marketing in Equine Industry  
M&M 3-1-0
Marketing research application in equine industry. Evaluation of market research methodologies. Critical analysis of the role of channels and of “key players” in the distribution/buyer-seller system. Marketing interaction with the other functional areas, management of market operations. Pricing policies of particular application to the equine industry. Marketing communications, including promotion options. Corporate image and positioning. Customer competition and company analysis models. Features of marketing in international markets vs. home market. Searching and evaluating new product ideas. The relevance of quality control. Development of strategies applicable to the equine sector. Prerequisites MK4305, MK4315.

PM4002 Organisational Behaviour  
P&M 2-1-0
Organisational Behaviour in perspective: Personality; Perceptions of Cognition; Learning & the Individual; Emotion, Stress & Psychological Well being; Communication and the Individual; Groups & Team Roles; Organisational Power and Politics; Organisational Development.

PM4004 Employment Relations  
P&M 2-1-0
Approaches to studying and managing the employment relationship; trade unions and employer organisations in a societal and organisational context; the role and operation of state institutions; voluntarism and legalism in Irish employment relations; discipline, grievance, bullying, dignity and respect at work procedures; dismissals and equality legislation; collective bargaining and alternatives; management approaches to employment relations, public sector employment relations; national and workplace partnership; recent legislation on trade disputes and trade unions; the 1937 Irish Constitution; contemporary developments in employment relations.

PM4008 Employment Relations Practice  
(offered only in AY2009/10) P&M 2-0-2
Theoretical content: An introduction to the theory and practice of negotiation. The role of procedural regulation in discipline and grievance administration in the workplace. The management of employment relations legislation. Third party interventions in employment relations.

Practical skill comprising the following: Effective interaction with in employees in the area of bullying and dignity and respect. Skills development in the following areas: Interviewing skills, case presentation, active listening, team preparation and organisation.
The preparation and submission of cases to third parties.

PM4014 Human Resource Development
P&M 2-1-0
The organisational process of developing people at work; rationale for HRD; individual and organisational learning; identifying learning needs; designing learning events; delivering effective learning events; evaluating outcomes; careers and career management; management development; life-long and continuous learning.

PM4024 Organisational Behaviour 2
P&M 2-1-0
The syllabus covers core issues relating to organisational behaviour in the workplace focusing on the individual and the group within the organisation. It explores the following areas: the development of the individual; personality and individual difference, Myers Briggs Type Inventory (MBTI), perception, attitudes and motivation. Group development and dynamics are examined including the dynamics of groups and teams, communication, inter and intragroup conflict, organisational learning and organisational leadership.

PM4028 Psychometrics and Psychological Testing
(offered only in AY2009/10) P&M 2-1-0
Key psychometrics concepts, measurement testing, norming, reliability and validity, statistical processes and methods relevant to psychometrics. Different types of tests: aptitude, ability, attainment, personality and career inventories, selecting tests for selection, development and career purposes, evaluating the contents of a test manual, test administration, test scoring and evaluation, evaluating different types of test. Concepts of personality, personality inventories and measurement, career inventories, the status of testing in selection, development and careers; Ethical issues in testing, integration of testing in broader assessment and bias and its avoidance.

PM4038 Human Resource Management 2
(offered only in AY2009/10) P&M 2-1-0
The syllabus covers the origins of HRM and the factors that have enhanced the strategic importance of people in organisations. The recent emphasis and various theoretical perspectives on HRM as a critical factor in organisational performance are examined. The concept of HRM strategy is examined with regard to a number of workplace issues including the management of employment relations, new employment relations, flexible work practices and work-life balance and employee participation and involvement. HRM and its ability to deliver organisational justice for employees is considered and the contribution of the HR department to ethics and corporate social responsibility. Finally, the problems of measuring the HR contribution to organisational effectiveness and efficiency are considered.

PM4038 Personnel Management 2
(offered only in AY2008/9) P&M 2-2-0
Nature and role of personnel management; determinants and outcomes of personnel policy choice; business strategy and personnel management; role models of the personnel function; development and nature of human resource management (HRM); corporate culture and personnel management; strategic aspects in relation to the management of human resource flows; reward systems, work systems and employee relations; comparative issues in personnel management; trends and developments in personnel management.

PM4418 Industrial Relations Practice*
(offered only in AY2008/9) P&M 2-2-0
Negotiation theory and research comprising the following: the nature of negotiation; strategy and tactics of distributive bargaining; strategy and tactics of integrative negotiation; negotiation planning and strategy; negotiation breakdown causes and cures; the communication and persuasion processes in negotiation; power in negotiation. The theory and practice of principled negotiation. Third party interventions. Contemporary pay bargaining in Ireland. Practical skills comprising the following: team preparation and organisation for negotiation; planning and preparation for negotiation. The negotiation process: the use of negotiation and presentational skills; the conventions of bargaining; the phases of negotiation and
the use of appropriate techniques at each stage; active listening and effective communication and persuasion; effective trading techniques and other tactics of conflict resolution; concluding the agreement; providing for breakdown; the preparation and submission of cases to third parties. Prerequisite PM4417.

* Numbers are restricted on PM4418 but if places are available then applications from Study Abroad students will be considered on their merits. Students will be required to have fluency in English as assessment is by way of role play.

PM4428 Organisation Behaviour* P&M 2-2-0

The nature of organisations and organisation theory; metaphors of organisation; organisation as systems; organisation as psychic prison; the organisation in its environment; organisation and institutionalism; internal organisational processes: culture, sensemaking and adjustment in organisations: understanding and managing diversity; gender and communication; gender and careers: emotion in organisations; justice, trust and ethical considerations in organisational behaviour. Prerequisite PM4325.

PM4902 Women Management and Organisation P&M 2-1-0


TX4407 Corporate Taxation* A&F 2-1-0

Corporate Tax; tax implications of incorporation; computation of the corporation tax liability; manufacturing relief, meaning of manufacture, extended definitions of goods; debt and equity, tax implications; dividend policy and advance corporation tax, company distributions; loss relief for companies including excess payments of ACT and excess charges; group relief for losses, charges and ACT; close companies, definition and consequences; tax planning for companies including restructuring of companies to maximise tax reliefs; capital gains tax: computation of capital gains and allowable expenses for companies and individuals; reliefs and exemptions; losses and company group reliefs; valued added tax: general principles and administration, registration and deregistration, exemptions and zero rating; inter EU sales and purchases. Prerequisite TX4305.
The Faculty of Science and Engineering offers exciting opportunities for career and personal development in an environment that supports a high quality undergraduate and post graduate experience. The faculty prides itself on the quality of its teaching and learning personnel and programmes having three world-class research institutes in the areas of Materials and Surface Sciences, Software Engineering and Mathematics which are underpinned by well established links with industry. Cooperative Education (work placement in industry or teaching practice as appropriate) is an integral part of all our undergraduate programmes and we continually keep all programmes under review to ensure they meet the requirements of employers as well as national and international bodies. Emphasis is placed on easing the transition from second level to third level by providing special guidance and care for first year students entering our programmes. The Mathematics Learning Centre and the Science Learning Centre offer one-to-one support, additional tutorials and a supervised study area. Access to personal tuition and additional learning resources is open to all students. We value the participation and contribution that students from different backgrounds and cultures make to campus life in particular through their involvement with the many University sport and recreational clubs and societies that are on Campus.
S C I E N C E M O D U L E S

BC4002 Introductory Biochemistry* CES 2-0-2

BC4608 Bioprocess Technology 2* CES 2-0-0

BC4718 Industrial Biochemistry 2* CES 2-2-0

BC4904 Biochemistry 2* (Proteins and Nucleic Acids) CES 2-2-3
The 3D structure of proteins; strategies of protein purification; enzyme kinetics and catalysis; protein sequencing; the lac and trp operons. Prerequisite BC4903.

BC4908 Biochemistry 8 (Structural biochemistry of proteins) CES 2-1-2

BY4002 Biology 2* CES 2-0-2
Cellular reproduction; plant structure and function; 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; regulation of gene activity; recombinant DNA and biotechnology; evolutionary theories; introduction to taxonomy; principles and scope of sociology. Prerequisite BY4001

BY4008 Genetic and Molecular Biology* CES 2-0-2
Extensions of Mendelian genetics; linkage; multiple alleles, multiple genes and epistasis; chromosome structure, meiosis / mitosis, the biochemistry of protein synthesis; mutation causes and effects at the gene chromosome and organism levels; basic principles of plant and animal breeding; human genetics; introduction to population genetics; microbial genetics; genetic exchange mechanisms, plasmids; immune system function; allergy; immune surveillance immune deficiency; AIDS; monoclonal antibodies. Prerequisite: BY4002

BY4018 Plant & Animal Physiology CES 2-0-2
Macro and micro nutrients in plant nutrition. Water relations in plants. Photosynthesis and carbon metabolism. Secondary plant metabolism. Control of plant growth and development; mammalian reproduction; structures, functions and control lactation; artificial control of reproduction and lactation in farm mammals; ruminant nutrition and growth; food evaluation and feeding standards for reproduction and lactation.

BY4104 Ecology 1* CES 2-0-2
Woodland ecosystems; vegetation sampling; freshwater ecosystems; marine ecosystems; rocky shores; brief consideration of sandy, muddy and estuarine ecosystems. Prerequisite BY4002

BY4208 Agriculture 2 CES 2-0-2
Principles of beef production; conventional versus intensive production; calf rearing, diseases of cattle; production of milk; markets for dairy products; management of dairy herds; sheep production, principles of production, housing and management.

BY4505 Pollution Biology* CES 2-0-2
Categories of freshwater pollution; indicators - biological and chemical monitoring; use of biotic indices; toxic pollutants in air, water, soil and food; introduction to toxicological principles; ecotoxicology; air pollution; major air pollutants, sources and impacts. Prerequisite BY4104

CH4002 Physical Chemistry 1* (Thermo- dynamics and Kinetics) CES 2-0-2
Introduction to chemical thermodynamics; heat; work; reversible and irreversible systems; state functions; first law of thermodynamics; internal energy; enthalpy; standard enthalpies; second and third laws of thermodynamics; entropy,

CH4104 Organic Chemistry 3* CES 2-0-3
Amino Acids: structure, stereochemistry, acid ionisation, methods of synthesis Gabriel and Strecker synthesis and modification malonic ester and gabriel synthesis. Peptides: strategy for synthesis, use of protecting groups and activating agents, solid phase synthesis using Merrifield resin. Proteins: primary, secondary and tertiary structures, enzymes as catalytic proteins, DNA, transcription and translation. Carbohydrates: structure and stereochemistry of monosaccharides, mutarotation, oxidation and reduction reactions, synthetic transformations of; disaccharides and polysaccharides, structure and function, chemical and enzyme degradation products, chemically modified polysaccharides-cellulose acetate, nitrate and xanthate cycloexodextrins. Prerequisite CH4102, CH4103

CH4108 Organic Pharmaceutical Chemistry* (Advanced Organic Chemistry) CES 2-2-0
Selectivity of action of reagents and catalysts: regiochemical control-addition of HB by ionic and radical mechanisms, alcohol formation by acid catalysed hydration and via hydroboration; chemoselectivity- Reformatsky reaction, hydride reducing reagents. Licandis catalyst and dissolving metal reduction; stereochemical control, as exemplified by Lindlar catalyst and dissolving metal reduction, general principles of asymmetric induction-Cram’s Rule, chiral reagents (hydride reducing agents-Alpine hydrides) for enantioselectivity and chiral catalysts (Monsanto catalyst for L-dopa production). Enzymes as chiral catalysts. Structure activity relationships and acid base catalysis: Development and use of the Hammett equation, Taft equation; definition of general and specific acid and base catalysis, use of buffers and kinetic data to distinguish between general and specific catalysis, relevance of general acid/base catalysis to enzyme catalysis. Molecular basis of drug design-cimetidine case study; definition of agonists and antagonists, histamine as a locally acting hormone, H1 and H2 receptor sites and function, development of cimetidine-structure/activity aspects. (In addition variety (approx15) of named organic reactions (such as the Mannich reaction, Robinson annelation, Sharpless epoxidation) are also covered by way of student presentations throughout the module) Prerequisite CH4102, CH4103

CH4152 Introductory Organic Chemistry 1* CES 2-0-2

CH4202 Inorganic Chemistry 1* CES 2-0-2
Covalent bonding; valence bonds treatment, molecular orbital treatment; resonance and electron delocalisation. Comparison of valence bond and molecular orbital approaches. Polarity in bonds. Molecular Crystals. Ionic crystals estimation of ionic radii, radius ratio and its importance, Madelung constants and estimation of lattice energies, the Born-Haber Cycle. Structure of metals. Band theory as applied to...
conductor, semiconductors and insulators. Bonding in transition metal complexes, crystal field theory, molecular orbital approach, bonding ligands. Cluster compounds, multiple metal to metal bonds. The influence of bonding on the physical properties of materials is emphasised throughout the module. Prerequisite CH4701

CH4252 Inorganic Chemistry 1B* CES 2-1-2
Covalent bonding; comparison of valence bond and molecular orbital approaches; ionic crystals; lattice energies; structure of metals; band theory; bonding in transition metal complexes, crystal field theory; cluster compounds Prerequisite CH4701

CH4304 Analytical Chemistry 2* CES 2-1-3
The structure of crystalline solids; crystal lattice, lattice points, crystal structure; application of X-ray methods including diffraction, fluorescence and electron microprobe analysis; structure determination by X-ray methods; solid state reactions including corrosion and cement chemistry; relationship between chemical and mechanical properties; application of group theory, including point and space groups. Prerequisite CH4003, CH4303

CH4308 Discrete Analytical Methods* CES 2-1-0
Sample pre-treatment and separation; emission spectroscopy based upon plasma, arc and spark atomisation; Raman spectroscopy; radiochemical methods; automated methods of analysis; HPLC. Prerequisite: CH4303

CH4354 Analytical Chemistry for the Environment * CES 2-1-3
Survey of analytical methods; electrometric methods; chromatographic methods; spectroscopic methods; mass spectrometry; thermal analysis; water analysis; gas analysis.

CH4404 Process Technology 1 CES 2-1-3
Health and safety at work: types of factory environment and their physiological and psychological risks. Current legislation in the area of employer and employee liability. Codes of practice. The role of management and unions in safety. 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.

CH4408 Industrial Process Chemistry 2* CES 2-0-0
Chemical and process aspects of petrochemistry and the production of bulk organic chemicals: Hydrotreating, reforming, cracking, production of vinyl chloride monomer, Acrylonitrile, maleic anhydride. Selective oxidation and ammoxidation: fundamentals (kinetic isotope effects in determining reaction mechanism) and applied (study of flammability limits) aspects. Chemical and Engineering aspects of energy conversion: fuels, their analysis and ranking; production of thermal energy-combustion etc. combustion methods and systems, steam Generators; environmental impact of power flat operation: water treatment-coagulation, aeration, ion-exchange and chemical precipitation softening, adsorption, membrane processes. Prerequisite CH4415, CH4407, CH4103, CH4203

CH4554 Environmental Chemistry* CES 2-1-3
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, and photochemical smog. The biosphere: composition, major and minor elements; sources, utilization and disposal; toxicology of heavy metals and organics, bioaccumulation. Biochemical cycles for Prerequisite CH4701

CH4608 Plant Process Management 2 CES

ER4304 Geoscience CES 2-1-0
Terrestrial and coastal geomorphologic history at global and Irish scales; methods of gaining and analysing remotely sensed data.
ER4404 Managing the Environment
CES 2-1-1
Environmental management systems; environmental monitoring, environmental auditing.

ER4408 Environmental Management 2
CES 2-1-1
Global, EU and Irish law policy and structures concerning environmental management; Environmental Protection Agency: structure and functions; the reasons why industry is increasingly embracing environmental management, and ways in which this is achieved within corporate organisations; case studies of environmental management as a planning tool within economic development.

ER4508 Pollution Control (Waste Management)
CES 2-1-1
Waste minimisation; hazardous waste management; waste to energy systems: incineration, landfill; composting; leakage control and gas capture; waste recycling techniques and economics; reuse of waste materials; component recovery; biogas; algae, weed and fish production.

ER4608 Clean Technology 2
CES 2-1-1
Identification of the main sources of waste emissions in energy generation or chemical processes; monitoring industrial processes; methods of reducing gaseous or aqueous emissions using: catalytic processes, scrubbing, electrochemical treatments; control of fugitive emissions; recycling and reuse of waste: solvent recovery; energy efficiency.

EQ2002 Horsemanship 2
LCS 2-0-3
Principles of training with reference to exercise physiology and it’s application to the horse. Riding techniques and specific training methods.

EQ2102 Horsemanship 2A
LCS 2-0-3
Principles of training with reference to exercise physiology and it’s application to the horse. Riding techniques and specific training methods. Teaching the beginning and novice riders; pupil/teacher interactions. Safety considerations.

EQ3006 Problem Identification & Practical Solutions
LCS x-x-x
This module develops the material included in the module advanced riding techniques and problem analysis through practical and exploitation of the principles and practices promoted there; emphasis will be placed on the importance of identifying root causes of incorrect performance, resistance and evasion; methods of teaching advanced riding techniques.

EQ4002 Equine Exercise Science 1
LCS 2-0-3
Principles of training with particular reference to exercise physiology and it’s application to the equine athlete. Riding techniques and specific training methods. Analysis and evaluation of the physical parameters associated with the different types of sport horse competition. Riding theories.

EQ4004 Equine Management
LCS 2-0-3

EQ4008 Equine Teaching Principles 2
LCS 2-0-3
Knowledge of the requirements and rules of various types of ‘competition’ disciplines. Methods of improving the skills of horse and rider. Methods of producing the mental and physical preparedness needed for competition by horse and rider. Sports Psychology. The communication triangle - coach, pupil, horse. Prerequisite: EQ4015

EQ4018 Equine Competition 2
LCS 2-0-3
Study of the different international schools of dressage training and trainers. Evaluation of different international events. Trainers and their methods. Analysis of different types and levels of show jumping competition and the specialist training needed. The theory and practice of course building and fence structure.

EV4004 Equine Reproduction & Mgmt Mares & Stallions
LCS 2-0-2
Factors affecting selection of equine breeding stock; breeding practices; management of equine breeding stock; parturition and care of the neonate and dam; lactation in the mare; the oestrus cycle with reference to veterinary examination; artificial insemination and pregnancy diagnosis; infertility (infectious and non-infectious) pregnancy failures.

EV4008 Equine Genetics*
LCS 2-0-2
Review of basic genetics; genetics of evolution and speciation; genetics and anima; disease; genetics and breed improvement. Prerequisite BY4001
The anatomy of the horse to be discussed with reference to musculoskeletal structure and function; the main systems of the horse digestive respiratory circulatory (including lymphatics) reproductive (including embryology, and physiology of reproduction) urinary nervous and immune; consideration of the theoretical background to the use and operation of modern diagnostic/treatment equipment such as x-ray, ecg, ultrasound, laser, and fibre optic based devices.

Principal horse feed stuffs composition analysis and energy values; feeding principles; nutrient requirements of barren pregnant and lactating mares; nutrient requirement of horses ponies in training convalescent etc; nutrient requirements of the orphan foals. Nutritional disorders; problems of feeding excess/deficiency. Prerequisite Equine Anatomy, Equine Reproduction and Management of Mares & Stallions.


The anatomy of the horse; the main systems of the horse; digestive, respiratory, circulatory, including lymphatics; reproductive including embryology and physiology of reproduction; urinary; nervous and immune; consideration of the theoretical background to the use and operation of modern diagnostic/treatment equipment.

Evil utilisation of plant and animal raw materials by agri-industries; biochemistry of raw materials - amounts and types of proteins, lipids, carbohydrates and secondary metabolites of economic importance; Anatomical and structural aspects of raw materials; food analysis; relationship between raw material composition and biochemical and physical properties.

Soils and plant nutrition; fertiliser use; production of conventional and novel crops including crops for biomass use; grassland and grazing; grazing systems; grass conservation; milk and meat production; rearing and management of cattle, sheep and pigs; production systems; effects of production methods on post-harvest and processing quality.

Detailed treatment of the biochemistry of lipids, carbohydrates and proteins in food systems; analytical techniques; relationships between structure and function; industrial modification of lipids; oxidative rancidity and it’s control; emulsification; non-enzymatic browning and caramelisation reactions; natural and chemically modified polysaccharides; roles of proteins in gelation, dough formation, foaming, texture formation, etc.; effects of processing and storage.

Roles of major families of micro organisms in food preservation/spoilage, food fermentation and public health; isolation and characterisation; microbial testing and control in food products; HACCP and quality systems; foodborne pathogens of current concern including listeria monocyogenes, psychrophilic C. botulinum, aeromonas, yersinia, bacillus cereus, salmonella.

Implications of technologies used in agriculture and by the food industry for consumer health; potential hazards associated with residues of agricultural chemicals/veterinary products; toxicological and nutritional implications of food processing; control systems needed to ensure consumer health and to ensure consumer confidence.

Physiological and environmental plant growth factors; micro propagation; vegetative propagation; seed propagation; seed dormancy; pruning; insect, disease and weed identification/control; organic growing; marketing.

Heat; laws of thermodynamics; heat capacities; Carnot cycles entropy; heat transfer; Stefan-Boltzmann law; wave motion; Doppler effect; sound; light; electromagnetic spectrum; source of light, UV, visible and IR; geometrical optics; physical optics; optical systems. Prerequisite: PH4011.

This module will introduce the student to general wave motion, optics and acoustics and give a general introduction to special relativity and to atomic and nuclear physics. Oscillations and simple harmonic motion, waves, sound waves. Light, EM spectrum, sources of light, geometrical optics, physical optics, optical systems. Special relativity, Einstein's Postulates, the Lorentz Transformation, the atom, the Bohr atom, photoelectric effect, quantized energy. The nucleus, radiation, the law of radioactive decay, fission and fusion. Prerequisite: PH4131.

PH4104 Physics 8 (Thermal Physics)

Prerequisite: PH4131.

This module will introduce the student to general wave motion, optics and acoustics and give a general introduction to special relativity and to atomic and nuclear physics. Oscillations and simple harmonic motion, waves, sound waves. Light, EM spectrum, sources of light, geometrical optics, physical optics, optical systems. Special relativity, Einstein's Postulates, the Lorentz Transformation, the atom, the Bohr atom, photoelectric effect, quantized energy. The nucleus, radiation, the law of radioactive decay, fission and fusion. Prerequisite: PH4131.

PH4104 Physics 8 (Thermal Physics)

Prerequisite: PH4131.

This module will introduce the student to general wave motion, optics and acoustics and give a general introduction to special relativity and to atomic and nuclear physics. Oscillations and simple harmonic motion, waves, sound waves. Light, EM spectrum, sources of light, geometrical optics, physical optics, optical systems. Special relativity, Einstein's Postulates, the Lorentz Transformation, the atom, the Bohr atom, photoelectric effect, quantized energy. The nucleus, radiation, the law of radioactive decay, fission and fusion. Prerequisite: PH4131.

PH4104 Physics 8 (Thermal Physics)

Prerequisite: PH4131.

This module will introduce the student to general wave motion, optics and acoustics and give a general introduction to special relativity and to atomic and nuclear physics. Oscillations and simple harmonic motion, waves, sound waves. Light, EM spectrum, sources of light, geometrical optics, physical optics, optical systems. Special relativity, Einstein's Postulates, the Lorentz Transformation, the atom, the Bohr atom, photoelectric effect, quantized energy. The nucleus, radiation, the law of radioactive decay, fission and fusion. Prerequisite: PH4131.
problems: Poisson’s and Laplace’s equation; magnetostatics: magnetic fields and induction, magnetizable media, magnetic force and torque, calculation of B vector, Biot-Savart Law, Ampere’s Law; cut of magnetic field, magnetic dipole, scalar and vector magnetic potentials, magnetisation and equivalent current densities; magnetism in matter; ferromagnetism and hysteresis; time varying fields: Faraday’s and Lenz’s law of electromagnetic induction, moving conductor in a static magnetic field, moving circuit in a time varying magnetic field; conduction and displacement current; equation of continuity; AC circuits; Prerequisite PH4301

PH4404 Physics 10 (Space and Time)*

PHY 3-0-2


PH4608 Solid State Physics 2*

PHY 2-1-0

Properties of semiconductors; carrier densities and Fermi level position; transport properties; mobility; diffusion constant and lifetime; law of mass action; Einstein equation; continuity equation; solid state devices: junction diodes; bipolar transistor; transistor parameters; MOS capacitor; MOSFET; characteristic equations; microwave devices; TEDs; IMPATT diodes; photonic devices, Prerequisite PH4607

PH4704 Instrumentation 1*

PHY 2-1-2

General principles; units and standards. Static characteristics of measurement systems: range; span; linearity; hysteresis; resolution; error bands. Bridges: the potential divider; bridge design; transformer bridge; active bridges. General purpose measurement system elements: resistive; semiconducting; capacitive; inductive; thermoelectric; elastic; and piezoelectric. Operational amplifiers: the ideal operational amplifier; operational feedback: the two basic operational feedback circuits; closed loop gain, ideal op-amp circuits; current to voltage converter/voltage to current converter; voltage/current adder; subtractor; buffer; integrator. Real op-amps: performance parameters; negative feedback; frequency response characteristics; offsets; bias current; drift. Differential amplifiers; differential input configurations. Current sources and sinks. Non-linear circuits: log amplifier; Schmitt trigger circuits; oscillators. Signal conditioning and signal processing elements; data presentation/display. Prerequisite PH4702

Note: Students who want to join any module with this symbol should note that resource and scheduling constraints limit places, therefore, we cannot guarantee enrolment. EQ modules with Δ: Available places are allocated to Equine Science majors first and are subject to interview and/or skills assessment. It is unlikely that any student will be able to enrol for more than one of these modules.

IE4368 Plant And Process Management

Reliability engineering: fundamentals, implications on costs, operation and maintenance; maintenance planning; determination of repair times, plant availability calculations, replacement decisions; plant location: factors, comparison techniques; plant layout systematic layout planning; plant scheduling; project planning and control; critical path methods; loss prevention.

IE4712 Operations Integration

Data capture from metrology equipment and bar code readers; tooling management using database techniques; control of stepping motors and programmable logic controllers; integration with other software applications; on-line capture of timing, inventory, posture or heart rate data.

ME4116 Aircraft Vibrations

Oscillatory motion; free vibration of single degree of freedom systems; harmonically excited vibration; transient vibration; systems with two or more degrees of freedom; vibration of continuous systems: sources of aircraft vibrations; flutter and aeroelasticity; control of aircraft vibrations.

ME4168 Engineering Science (Ed)*

Velocity of mechanisms, balancing of static and dynamic systems; gyroscopic effects; friction drives and braking systems; vibration; constant volume and constant pressure processes; isothermal, adiabatic; heat engine cycles; reciprocating IC engines; engine and vehicle performance criteria; steam plant - the enthalpy/entropy chart, boiler and associated plant; applications of fluid dynamics; operation and performance of pumps and turbines.

ME4218 Mechanics of Solids 4 *

Creep, recovery and stress relaxation of viscoelastic materials, fatigue and impact behaviour of plastics, design methods for plastics; elastic properties of composite materials; unidirectional laminae, laminate theory, short fibre composites, thermal stresses, strength of composites. Prerequisites: ME4213, ME4226, ME4217.

ME4226 Mechanics of Solids 2 *

Infinitesimal strain at a point in two dimensional stress field and Mohr's strain circle; selection of strain gauges for measurements on metals, thin circular plates, criteria of failure for isotropic homo; materials (rankline, tresca and von-mises), deflection of beams, buckling of struts and plates, thick cylinders, linear elastic fracture mechanics, fatigue. Prerequisite: ME4213.

ME4312 Thermofluids 1

First law of thermodynamics with applications to non-flow processes and to steady flow processes; general thermodynamic relationships and properties; statements of the second law of thermodynamics including Carnot efficiency; characteristics and properties of fluids; fluid statics and manometry; principles of continuity, momentum and energy conservation applied to fluid dynamics; introduction to dimensional analysis - fundamental and derived units; introduction to conduction, convection and radiation.
Aircraft maintenance: philosophy of maintenance, inspection schedules, regulatory requirements (JAR, FAR), condition monitoring, durability and reliability of materials and components, traceability of materials and components and ageing aircraft programmes. Introduction to the failure effects and reliability of aircraft systems. Aircraft repair and inspection; causes and mechanisms of corrosion, non destructive testing (NDT) techniques and procedures, analysis and design of repair procedures for both metallic and composite structures.

Compressible flow, normal and oblique shock waves; introduction to experimental techniques. Prerequisite ME4313

Axial and radial flow turbines and compressors; reciprocating expanders and compressors; vapour power cycles; gas turbine cycles; introduction to combustion theory; performance of internal combustion engines. Prerequisite ME4313

Fourier's law of heat conduction; the convection equation; thermal resistances 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 correlations and their application; free convection; standard heat transfer correlations and their applications; thermal radiation; an introduction to heat exchange design equations: the log mean temperature difference. Prerequisite ME4312

Introduction: general concepts; truss analysis; two-dimensional field problems; plane stress and plane strain; implementation of the finite element method; mesh design; pre-processing and automatic mesh generation; pre-solution checks; solution methods; ill-conditioning; post-processing and computer graphics; validation of the finite element software; interpolation functions and the convergence of the solution.

Sensors, transducers and transmitters; instrument specification; standard instrumentation signal levels; signal transmission; dynamic errors; open and closed loop control systems; control systems components; block diagrams and transfer functions standard process inputs; dynamic response of first order systems.

Introduction to control systems and automation; programmable controller's hardware and software; control program development; sequential control; interfacing external devices; PLC communications; PLC applications; selection, installation and commissioning of PLC systems; supervisory computer control; sampling and filtering of continuous measurements. Prerequisite ME4714

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. Prerequisite: ME4714

Atmospheric models, standard atmosphere, thrust and drag characteristics; aircraft performance: steady flight, climbing, turning, range and endurance, takeoff and land; energy methods, specific excess power; longitudinal static stability; stick fixed and stick stability margins; longitudinal control, hinge moments, manoeuvre margin; lateral and directional static stability and control; dynamic stability: equations of motion, stability derivatives, stability modes, flying qualities; in-flight assessment of aircraft performance and stability characteristics in an instrumented aircraft. Prerequisite ME4424
ME4804 Introduction to CAD
MAE 2-0-1
Overview of hardware and software fundamentals; introduction to 2D and CAD; introduction to isometric and 3D wireframe drawings; menu and command editing, macro writing in autoLISP / ADS.

ME4818 Mechanical Design +
MAE 2-0-1
Integration of machine elements into design; overview of common engineering materials and their functional properties; review of steels and heat treatment processes relevant to transmission design; practical aspects of stress analysis; review of the history of gear design showing the relationship to fatigue theory; advantages of helical and spiral bevel gears in relation to noise, wear and strength; clutches and brakes - selection considerations; electric motors - types and control options; starters and protection devices; design for fatigue life, use of fatigue data, load and environment factors in design and selection; pressure vessel design use of standards.

ME4826 Aircraft Design*
MAE 2-2-0
Aircraft design process, phases of design projects. Design aspects of the airworthiness regulations (JAR, FAR), aircraft certification. Aircraft loads limit and ultimate loads, flight envelope, construction of V-n diagram. Structural design and analysis philosophies, material design allowables, reserve factors, construction principles, fail-safe, safe-life philosophies. Wing lift distribution, shear force, bending moment and torsional load distribution. Design of structural components for ultimate failure and fatigue. Fasteners and structural joints. Aircraft design practise, drawings, lofting, standard hardware. Aircraft component manufacture and assembly. Prerequisite: ME4424

MF4712 Operations Integration*
MOE 1-0-2
By the end of this module students will be able to write programs to capture, manipulate and present manufacturing and operations engineering data through a high level language such as Visual Basic and to write programs to interface with manufacturing equipment. Prerequisite IE4711

MF4714 Operations Management 1
MOE 1-2-0
To introduce the subject of operations management, differentiating between operations and processes. To introduce performance optimisation within limited system resources and to prepare students for co-op.

MF4716 Operations Management 2*
MOE 2-2-0
To give students an understanding of the use of analytical models in the management of resources and to provide students with skills for the application of linear programming and related models to resource management. Prerequisite MF4714.

MF4718 Plant Reliability & Maintenance*
MOE 1-0-2
To give students an understanding of the principles of reliability evaluation and the influence on maintenance strategies, costs and replacement decisions. Prerequisite MF4727.

MF4722 Drawing and CAD*
MOE 1-0-3
To develop the students' communication, visualisation and draughting capabilities. Acquire a good working knowledge of 2D AutoCAD and apply this to communicating design solutions and engineering details and to generate solutions to design problems and present design ideas/solutions using appropriate presentation techniques including computer graphics. Prerequisite MF4111.

MF4724 Machine Design*
MOE 3-0-1
To develop in the students the ability to produce high quality engineering drawings on a CAD system. To apply correct design principles to engineering components and to develop a knowledge of Jig and Fixture design for Manufacturing Systems. Prerequisite MF4722.

MF4726 Discrete Event Simulation*
MOE 1-0-3
To give students an understanding of the techniques of simulation and its application to systems design and to develop skills to carry out a simulation project. Prerequisite MF4714

MF4728 Occupational Psychology
MOE 2-2-0
To acquaint the student with the wider context in which he or she will be working. They will, for example, need management skills.

MF4734 Measurement & Quality Systems*
MOE 2-0-2
By the end of the module students will be able to appreciate the importance of measurement standards and systems; apply sound principles to a variety of measurement requirements; understand and apply scientific principles to the analysis of manufacturing data and use the results of the analysis to identify areas that need improvement. Prerequisite MF4722.

MF4736 Engineering Economy*
MOE 2-0-2
To examine standard approaches to evaluating the relative economic benefit between alternative engineering capital investment proposals. Prerequisite MF4714.

MF4738 Production Engineering 2*
MOE 2-0-2
To introduce the student to the analytical aspects of cutting and forming of engineering materials with particular emphasis on material
removal by the cutting process. Prerequisite MF4746.

**MF4746 Production Engineering 1**  
**MOE** 2-0-2  
To develop expertise in the design of press tools, diecasting and injection mould tooling. Prerequisite MF4724.

**MF4756 Product Design & Modelling**  
**MOE** 0-0-4  
Students will understand the primary issues and considerations involved in designing a new product and develop a creative approach to the solution of design problems; will understand the concepts and practices associated with computer modelling and visualisation technology; will model and develop products and components in contemporary computer modelling software; be able to create comprehensive product models and specifications in the context of the total development of a product and to develop cognitive modelling/visualisation, problem solving and decision making skills. Prerequisite MF4722.

**MF4758 Material Forming 2**  
**MOE** 2-0-4  
To develop an understanding of the concepts of non linear FEA with particular emphasis on Manufacturing Processes and to apply these concepts to manufacturing case studies. Prerequisite MF4747.

**MF4766 Automation Engineering 1**  
**MOE** 2-0-2  
To introduce the student to sensors and pneumatic applications in automation; to introduce the student to basic process control and to indexing and feeding systems as used in manufacturing. Prerequisite MF4724.

**MF4768 Ergonomics**  
**MOE** 1-0-2  
To extend earlier work in design and layout of workplaces and to study the topics of person/machine interface design and workplace design from an ergonomics viewpoint. To counter the effects of adverse industrial environments and to reduce error rates and accidents. Prerequisite MA4004.

**MT4004 Materials Process Engineering/ Polymers**  
**MST** 2-0-2  
The general principles of polymer processing: flow in liquids; drag flow and pressure flow, Newtonian and non Newtonian behaviour; flow behaviour of polymer melts; extrusion of polymers; injection moulding; blow moulding; rotational moulding; cellular polymers; reaction injection moulding. Prerequisite MT4023

**MT4008 Properties of Materials (B)**  
**MST** 2-0-2  
Rubber elasticity; impact behaviour and fracture; two phase polymer systems, thermodynamics and miscibility, blends and alloys; polymer stability, combustion, weathering, degradation and protection, physical ageing.

**MT4018 Biomaterials 2**  
**MST** 2-1-0  

**MT4023 Materials 2**  
**MST** 2-1-2  
Metals (metal structures, equilibrium constitution and phase diagrams, case studies in phase diagrams, driving force for structural change, kinetics of structural change, diffusive transformations, nucleation, displacive transformations, light alloys, steels, alloy steels), ceramics and glasses (structure of ceramics, echanical properties of ceramics, cements and concretes), polymers & composites (structure of polymers, mechanical behaviour of polymers, composites: fibrous, particulate and foamed, wood), designing with metals, ceramics, polymers & composites, case studies and laboratory experiments incorporating examples of mechanical testing, failure analysis, design and materials selection.

**MT4028 Biocompatibility**  
**MST** 2-0-2  

**MT4104 Physical Metallurgy**  
**MST** 2-0-2  
Dislocation theory; strengthening mechanisms in metals and alloys: phase transformation and control of microstructure; Austenite decomposition in steels; tempering of martensite; examples of commercial materials exhibiting above mechanisms.
MT4208 Materials Selection & Design
MST 2-0-2
Basic principles of materials selection; assessment of design function; selection procedures; selection for mechanical properties.

MT4217 Optical Fibre
MST 2-0-0
Optical fibres: fibre fabrication, imperfections, fibre strength and durability, measurement of mechanical characteristics, cleaning of fibres, fibre joining, novel fibre types; optical fibre devices; tapering and polishing for field access, tapered and polished couplers, beam expanders, mode shapers, light concentrators, evanescent field devices, stability and long term reliability; optical fibre sensors; process control, medical diagnostics, monitoring electric, gas and nuclear utilities, industrial automation and robotics.

MT4508 Surface Engineering
MST 2-0-2

MT4518 Surface Technology
MST 2-0-2
To acquaint engineers and technologists with the concepts of corrosive degradation and wear processes and to give methodologies by which these processes can be decelerated by the use of electrochemistry, coatings, heat treatments or mechanical working.

MT4904 Materials Technology 3 *
MST 2-0-2
To expand the awareness of the student of the processing of engineering metallic materials. To enable the student to understand the effect of the processing route on the subsequent material properties. Casting; forming; extrusion, forging, rolling, sheet metal; joining; classification of processes; component quality assessment; non-destructive testing. Prerequisite MT4923

MT4943 Materials Processing
MST 2-0-2

PD4004 Design visualization ‡
Teaches the students to use CAD (Adobe Illustrator and Photoshop) in the design process to produce product proposal renderings ranging from basic 2D renderings to photo-realistic visualizations of the designs.

PD4014 Design concept development and realization‡
Builds on PD4036 (fall semester module) and develops and further professional design methodology:Prerequisite PD4036 Design Realisation

PD4124 Contemporary design culture‡
Allows the students to become acquainted with design professional from a variety of disciplines. It also affords the students an opportunity to travel abroad to experience design and cultural in another context

PE4112 Production Technology 1
MOE 1-0-1
Safety in the laboratory; fundamentals of measurement and inspection; process capability, quality, accuracy; basic machining, cutting tool geometry and materials; cutting speeds and feed rates; work holding, positive and frictional restraint, degrees of freedom; joining: mechanical, manual metal welding, oxy-acetylene welding, adhesive bonding; joint design; engineering drawing; communication and visualisation; technical sketching, conventional representation; BS308: projection systems; auxiliary views; sections and sectional views, dimensioning: detail and assembly drawings, surface intersections and developments; limits and fits BS4500.

PN4112 Process Technology 1 (Metal)*
MOE 2-0-1
Safety in the workshop; care and correct use of hand tools and equipment; correct and safe operation of machine tools; milling of metals and hard plastics; drilling and turning of metals, plastics, wood and wood composites; fundamental hand working techniques; basic foreign; design and realisation of decorative and functional artifacts; application of protective finishes.

PN4116 Process Technology 3*
MOE 2-0-1
Multistart thread cutting; straddle and gang milling; generation of geometric forms; cutting times and metal removal rates for machining; ISO standards for tooling; Taylor's equation for tool life; optimum speeds and feed rates; manufacture of mechanical systems elements; consideration of the impact of selected processing methods on the work environment. Prerequisite PN4113

‡ Please note that PD modules have 1 hour lecture, 3 studio lab hours and an additional 4 hours studio time aside from the 3 studio lab hours per week. ID modules have 1 hour lecture, 2 hours hands free drawing and 4 hours studio per week.
PN4218 Engineering Design Graphics 2 *

MOE 1 - 0 - 4

Communication of engineering design problems and solutions; bolt and spring design; detail and assembly drawings in engineering design; schematic diagrams of pneumatic and hydraulic systems; sketching engineering component details; geometric modelling; surface and boundary definition of composite solids; advanced cognitive modelling strategies; the computer as a graphics learning tool; three-dimensional CAD; computer graphics in design representation/communication; visualising three-dimensional compositions; strategies for freehand representation; three-dimensional objects libraries; solid primitives; boundary representation and constructive solid geometry considerations; wireframe and solid modelling techniques; composite solid models; shading - placing lights and camera; extrusions; three-dimensional faces. Prerequisite: PE4216

PN4226 Engineering/Building Design Graphics 1

MOE 1 - 0 - 4

Intersection of surfaces (composite) - hinged planes; advanced problems in planes and their applications; skew line analysis - synthesis of geometries; conics - centres of curvature; special curves - their properties and applications; perspective projection; advanced transformation geometry; the geometry of sheet metalwork; gears and gear drives; conventional representations in engineering graphics; link mechanisms and their loci; construction of cam profiles to various specifications; schematic diagrams of electric and electronic systems.

PN4228 Engineering/Building Design Graphics 2*

MOE 1 - 0 - 1

Problems in advanced perspective projection; shadow in perspective; reflection in perspective; mining and topographic geometry; earthworks geometry - curved gradients; applied area conversions; projective geometry; building design details; surface and boundary definition of composite solids; advanced cognitive modelling strategies; the computer as a graphics learning tool; computer graphics in design representation/communications; visualising three-dimensional compositions; strategies for freehand representation; three-dimensional objects libraries; solid primitives; boundary representation and constructive solid geometry considerations; surface, wireframe and solid modelling techniques; composite solid models; shading - placing lights and camera; extrusions; 3D faces. Prerequisite: PN4226

PN4318 Machine Control*

MOE 2 - 0 - 1

The concept of automatic control; open and closed loop control; the machine control unit for NC and CNC systems; concepts of position and velocity transducers; programming languages for CNC controllers; tool path graphics; information input systems; pneumatic, hydraulic and electrical power systems for machine control. Prerequisite: PE4216

PT4112 Manufacturing Technology 2*

MOE 0 - 0 - 1

Precision measurement and inspection; process capability; quality and accuracy; machining; fundamental treatment of the shear plane; workholding; welding techniques; mechanical joining. Prerequisite: PT4111

PT4114 Manufacturing Technology 3*

MOE 2 - 0 - 1

Screw threads, BS3643; machining; screw-cutting; multi-start and left-hand threads and worms; eccentric and taper turning; straddle and gang milling; the dividing head for simple and compound milling; the production of fine machines surfaces by grading, lapping, honing, super finishing and diamond machining; marking out methods and accuracy. Prerequisite: PT4112

PT4118 Manufacturing Technology 6*

MOE 2 - 0 - 1

Special machining processes; injection mould and pressure die-casting design; design of piercing, blanking, cropping and sawing tools; design of specialist tools/tooling systems for above processes. Prerequisite: PT4117

PT4324 Productivity Methods 2A

MOE 2 - 0 - 2

Operator ability; decision making; operator error; safety; human-machine interaction.

PT4424 3D CAD Modelling *

MOE 0 - 0 - 4

The engineering design process and the 3D feature based model as a design database; its relevance to concurrent engineering; design visualisation; creating features; surface, solid and parametric modelling and design; design intent; planning parts for design flexibility; relations and equations; parametric dimensions; modelling for manufacture and assembly; design for manufacturing; assembly models and drawings; drawing documents; BOMs design of simple fixtures; creating design tables using Excel for multiple part and assembly configurations; Library features; importing and exporting files; CAD standards for data exchange; STL files and the FDM rapid prototyping system, linking with CAM. The CAD database and other downstream applications; equation solvers, FEA, simulation software. Prerequisite: PT4423

PT4428 Process Design*

MOE 2 - 0 - 2

Production flow analysis in cellular manufacturing and functional layout. Design of a manufacturing chain using a number of manufacturing cells. Process improvement technique based on process benchmarking and design of experiments using traditional and Taguchi methods. Failure Modes and Effect Analysis (FMEA). Process optimisation using set up time reduction techniques SMED. Product prototyping including hand crafted models and rapid prototyping methods. Prerequisite: PT4427
PT418 Automation T3*

MOE 2-0-1

The concept of integrated manufacturing systems; CAD as a data generating system; databases; database management systems, storage of data relational and hierarchical data bases; data modelling expert systems MRP, CAPP, (group coding systems), computer aided production and inventory control; integration of functional areas; MAP, TOP, EDI. Prerequisite PT4157

WT4004 Wood Technology and Design 2

MST 1-0-4


WT4006 Architectural Technology: Services and Control Technologies

MST 2-0-4

Conditions affecting human comfort, water: quality, sources and treatment, domestic cold water supply and distribution, domestic hot water supply, domestic heating; fuel types, boilers, alternative energy sources, drainage above ground: design principles, single discharge stack systems, materials, drainage below ground: design principles, combined and separate systems, materials, treatment of domestic effluent, electricity; generation and distribution, intake and distribution in domestic dwellings, switching, safety principles and devices, thermal insulation of domestic dwellings: principles, u-values, energy rating of buildings, sound insulation of domestic dwellings; walls, floors, doors and windows, natural and artificial lighting: illumination requirements for domestic dwellings, ventilation of domestic dwellings; design principles, air conditioning, electronic and pneumatic control systems in domestic dwellings, design issues relating to ecology and the environment, renewable and non-renewable energy sources, strategies for teaching services & control technologies at second level, designing, planning and managing appropriate learning activities.

WT4008 Safety in Technology Classrooms

MST 1-1-0


WT4014 Introduction to Geology and Soil Mechanics

MST 2-1-2

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. Prerequisite WT4102

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.

WT4018 Advanced Timber Construction

MST 2-0-2


WT4102 Wood Science 1

MST 2-0-2

Microscopic and macroscopic structure of wood; chemical composition of wood; wood-moisture relationships; mechanics; physics of wood; conversion of wood; effect of process on structure property relationships.

WT4104 Wood Science 2*

MST 2-0-2

Wood: moisture relationships in wood; modification of wood-moisture relationship; air-drying and natural seasoning; steaming, re-moisture, moisture gradient control; kiln drying, fundamentals of kiln-drying, defects, equilibrium; kilns and instrumentation: specialised seasoning methods; physical properties of wood. Prerequisite WT4102

WT4106 Architectural Technology: Materials Technology and Design

MST 2-0-4

Properties and characteristics of various materials: wood and wood based products, metals, polymers, ceramics and glass, composites (cement and concrete), adhesives, sustainability and materials, environmental issues associated with the manufacture and disposal of materials, testing of materials: tensile, compressive, shear tests, cube test/ slump test of concrete, moisture content of aggregate, silt content of sand, bulking test of sand,
bonding of bricks, blocks and stone; advanced processing techniques: shaping, jointing, finishing, jigs and templates, safe use of tools, equipment and fixed machinery, finishing and protecting surfaces, project management for the coordination of design and make activities for senior cycle students, communication of design and associated elements for senior cycle students, strategies for teaching materials technology & design at second level, designing, planning and managing appropriate learning activities for materials technology & design.

**WT4202 Design Studio**

Learning styles & Bloom's taxonomy; engineering terminology and SI units; demonstration of the engineering process through analysis, design, model building and testing; introduction to research methodologies via minor research projects broadly related to engineering and construction; projects involving individual presentations and team debates; Report writing on given engineering scenarios. Industry participation through invited speakers or industrial visits will be accommodated whenever practical.

**WT4204 Mechanics of Design**

Detailed design of components, carcass and finished assemblies; standards, tests, specification, case studies; ergonomics and manufacturing considerations; analysis and innovative improvement of existing products. Prerequisite: PT4111

**WT4207 Structural Design (Wood)**

Structural analysis and design with emphasis on timber and timber based products; stress grading visual and machine; lies struts, beams, frames and panels; loading; stresses axial, bending and shear; materials; solid, composites, Glulam, plywood; fabrication site and factory; performance and maintenance. Prerequisite: WT4104

**WT4208 Building Services 2**

Pipe sizing for hot and cold water installations, pipe sizing for multi-storey buildings, force and pressure, hydraulics; 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; heating, heat loss calculations, temperature drop through structures; gas supply and distribution, gas controls, safety devices, heating and fumes; sprinklers, risers and hose reel installations, classification of fire risks, dry and wet risers; Portable and fixed extinguishers, automatic fire detectors, alarms and dampers, pressurisation of escape routes, automatic fire ventilation; lifts, escalators and service ducts; ventilation; ducts and fans, solar heating, heat pumps; daylighting, integration with electric light, artificial lighting, design of lighting, lighting controls.

**WT4209 Wood Technology 2**

Wood processing, Decorative process for wood. Finishing of wood. Selection of tools, processes and fittings to meet specific applications. Material and process selection. Safe use of electrical powered hand tools and equipment. Introduction to the process of design. Factors influencing project design and realisation in technology subjects at second level. Critical appraisal of design projects. Communication of design: freehand sketching, working drawings templates. Assessment models for design projects. Promote individuality and creativity. Presentation and demonstration techniques related to technology teaching at second level. Compilation and presentation of design reports. Strategies for teaching this subject area at second level. Designing, planning and managing appropriate teaching and learning activities for this subject area. Prerequisite: WT4201

**WT4304 Machining Technology 2**

Machine optimisation, analysis of factors governing mass production processing; product design, process and assembly inter-relationships; introduction to CNC machining; planned maintenance; practical applications. Prerequisite: MT4303

**WT4404 Wood Technology 1**

Evolution of design in wood; materials selection, detailing and finishes to satisfy structural, functional and environmental criteria; applications primary, secondary and temporary elements of buildings, finishes of interiors; project design and analysis. Prerequisite: WT4303

**WT4502 Construction Technology**

Site selection and analysis for residential construction. Soil identification, properties and behaviour – factors affecting drainage and foundation choice. Concrete technology and mix design, environmental considerations in residential construction – sustainable technologies for water disposal and energy. Intro to housing estate development and planning applications. Interpretation of construction drawings. Trouble shooting residential building problems via case histories. Irish architectural heritage and conservation. Prerequisite: WT4401.

**WT4504 Building Services 1**

User requirements, comfort and climatic conditions; statutory regulations; cold water sources; cold water installation; domestic hot water systems; electrical generation, transmission and distribution; ventilation; natural daylighting of buildings; laboratory practices.
WT4604 Land Surveying  
MST 1-0-2  
Surveying fundamentals, tape & offset surveying; levelling, the theodolite and its use, tension determination, steel tapeing 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 hydrographic surveying, photogrammetry, construction control surveys, geographic information systems, global positioning systems, construction applications, field coding, automatic target recognition, typical field operations, remote-controlled surveying. Practical case studies and fieldwork.

WT4704 Building Measurement  
MST 3-0-0  
The aim of this module is to illustrate measurement techniques and procedures for buildings and associated works. 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, roof finishes and coverings, waterproofing; reinforced concrete structures, columns, beams, slabs, formwork, concrete finishes, reinforcement, precast elements; structural steelwork; structural timber, standard joinery components; mechanical and electrical installations; drainage, underground and above ground, earthworks and groundworks.

WT4804 Estimating and Costing  
MST 3-0-0  
The overall aim of this module is to introduce some standard estimating and costing techniques that apply to building construction works. Organisation of the estimating function, procurement paths, standard forms of contract, tender documentation; estimating methods, contractor selection, project appreciation, enquiries to suppliers and tender planning; resource costs, unit rate pricing, sub contractors, cost planning, fluctuations; provisional sums, preliminaries, cashflow forecasts, completing the estimate, tender submission and follow up; impacts of new developments on estimating, new procurement methods, partnering, target cost estimating, gain share, negotiations and development of incentives; value engineering and developing value for money solutions.

WT4902 Model Making  
MST 0-0-3  
An introduction to machines, equipment and tools for cutting, shaping, joining and finishing; health and safety in the workshop; model making techniques using wood, metals and plaster of Paris; analysis of shapes and graphic presentation; analysis and selection of applied finishes for various applications and effect. Prerequisite ID4811

INFORMATICS AND ELECTRONICS MODULES

Digital Processing Systems  
ECE 2-1-0  

CE4204 Operating Systems 1  
ECE 2-1-0  
Operating system definitions, components, command shells, services overview; review of 80x86 assembly language programming techniques; MS-DOS memory map organisation; process execution; interrupt handlers; resident utilities; data structures used in operating system design; disk storage organisation; introduction to Microsoft Windows.

CE4206 Operating Systems 2  
ECE 2-1-2  
Process communication; memory management; file systems to support multi-tasking; deadlock; input/output; computer security and protection; analytic modelling; case study; project. Prerequisite CE4204

CE4208/4226 Distributed Systems  
ECE 2-1-2  
Overview of distributed computing; process and communication models; naming, identification and location of resources, services and objects; concurrency and synchronisation in distributed environments; remote procedure calls; integrity and security; review of distributed object-oriented middleware. Prerequisite CE4206

CE4218 Real Time Systems  
ECE 2-1-2  
Introduction to language features; operating system features; design approach; design and modelling using petri nets; design and analysis; real-time program verification; formal techniques; case study.

CE4516 Digital Systems  
ECE 2-1-2  
The benefits of a fully-synchronous sequential system; sequential circuits; Moore and Mealy type circuits; use of memory as a combinatorial element; state reduction; controllers; VHDL; project.
CE4518 Computer Architecture  
ECE 2-1-2
Review of Von-Neumann architecture; computer performance measurement; floating point arithmetic; instruction set design and architecture; processor implementation techniques; pipe lining; memory hierarchy design.

CE4608 Computer Networks 2*  
ECE 2-1-0
Local area versus wide-area networks. Topology and standards. ISDN and B-ISDN, narrowband and broadband, services, interfaces, and protocols. System Communication Design Considerations. Design and validation of communication protocols. Data security in networks, network security threats and encryption fundamentals. Prerequisite: CE4607

CE4702 Computer Software 2  
ECE 2-0-2
Overview of C: comparison of C and other procedural languages; C program development environments; format studies and good practices; constants and variables; operators and expressions; functions and program structure; C preprocessor; type definitions; programming practice; coding, style, documentation.

CE4704 Software Testing and Inspection  
CSI 2-1-1
On successful completion of this module students will be able to take a program specification, write corresponding test cases; given a specification and an implementation of a program, write the tests, run them and report on the errors found. Introduction to testing: limitations of testing; test types and their place in the software development process; program reading and comprehension; refactoring code; inspections, walkthroughs and desk-checking; programming with assertions; using a debugger for white-box testing; reporting and analysing bugs; test case design; test case execution and regression testing; requirements for white-box and black-box testing tools.

CE4706 Intelligent Systems  
CSI 2-1-1
To familiarise students with a targeted subset of the principles and methods of Intelligent Systems and distinguish between Cartesian artificial intelligence (AI) and intelligent systems. 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. The course includes the history and development of Intelligent system concepts through AI and Expert Systems to Cognitive Science and issues in representation, reasoning and machine learning.

CS4004 Software Testing and Inspection  
CSI 2-1-0
To provide a comprehensive knowledge and understanding of the role of information systems and information technology in the planning and control of organisational activities, with particular emphasis on the selection and implementation of Enterprise Resource Planning (ERP) software. Since ERP systems originated in the manufacturing sector, the module will centre on their application in a manufacturing context, extending to the integration of other organisational functions such as personnel, accounting and customer relationship management. Evolution of Planning Systems: MRP, MRP II, ERP; core business processes; core subsystems of enterprise resource planning; concepts and terminology of manufacturing and supply chains; data reference models for manufacturing; CIM-QSA; the manufacturing database; material requirements planning; supply chain management; production planning and control systems; demand planning; forecasting; master scheduling; distribution planning and control; advanced planning and scheduling systems; capacity planning systems; just-in-time systems and techniques; computer integrated manufacturing principles; OSI and manufacturing automation protocol; implementation of ERP systems; business process re-engineering (BPR).

CS4006 Intelligent Systems  
CSI 2-1-1
This module aims to provide students with an understanding of how different kinds of phenomena are represented as digital information. Its objectives are to give students an appreciation of the role of software in rendering and manipulating digital representations, and an introduction to the skills and techniques of abstract representation (modelling) of social and economic phenomena. Brief syllabus: mapping between the represented and representing world; intrinsic versus extrinsic mappings; representing information in various forms of media; document content and structure;
content model; semantic structure; metadata and metatags; modelling correlations among media objects; simulation versus animation; model criteria; models versus real systems; abstraction and similarity; classification and types of models; metaphor as a special type of model; purposes of models; analyzing social, biological and business phenomena, in order to design and construct models of those phenomena; models in software development; formal approach to building models; model validation and documentation; developing model templates.

CS4112 Computer Science 2*  
Array merging and sorting algorithms and implementations; selection, exchange, insertions sort; implementations of search; insert and delete on ordered and unordered tables, hash tables, stacks, queues and binary trees using arrays and linked lists; recursive algorithms. Prerequisite: CS4111

CS4115 Data Structures and Algorithms*  
Binary trees, including threaded trees, multiway trees (excluding B, B+ and B* trees), linked lists and networks; recursion, and the elimination of recursion form algorithms; quick sort, heap sort, shell sort, merge sort and bin and radix sorting; tree searching; graph algorithms. Prerequisite: CS4113

CS4117 Digital Sound Synthesis  
Mathematics of waves; physics of sound; biology of audition; psycho-acoustics; introduction to signal processing; introduction to sound recording; synthesis fundamentals; sound transformation; sound synthesis in music; sound synthesis in speech; auditory scene analysis.

CS4125 Systems Analysis and Design*  
CS4 2-1-1
This module focuses on the requirements, analysis, and design phases of systems development life cycles using an object-orientated method and the unified modelling language (UML). Various software lifecycles are introduced to provide the student with a conceptual map of the different phases and approaches used in software development. Reuse of artefacts is discussed and emphasised using analysis and design patterns, architectural styles and frameworks; and through the production of model artefacts that facilitate reuse. Prerequisite: CS4513

CS4146 Document Architectures*  
CS4 2-0-2
Students are exposed to structure, design issues and to the practical tools and programming environments involved in representing and manipulating forms of information that are commonly used in computer systems. Prerequisites: CS 4411 and CS4512 Imperative Programming 1 & 2

CS4156 Introduction to Applied Digital Signal Processing  
CS4 2-1-0
Discrete signal processing; Continuous versus Discrete models; Architecture of Digital Signal Processing Systems; Sampling; Filtering; Storage; Transformation of signals. Signal Analysis and Synthesis: Applications: Common File and Data Formats: Protocols.

CS4158 Programming Language Technology  
CS4 2-1-2
On completion of the module, Students should be able to:- Carry out simple transformations of context-free grammars, and construct LR parsing tables for simple grammars; Design a Context Free Grammar for manageable subsets of conventional programming languages; Implement a static semantic analyser and translator for the manageable subset by inserting the semantic actions in the appropriate places. Brief syllabus: natural and formal languages - moods, tenses; ideographic and phonetic alphabets - tokens; phrase structure; production systems; phrase structure grammars; Chomsky's hierarchy of grammars; languages, sentences and sentential forms derived by grammars; review of parse trees and syntax trees; generalised state machines, configurations and transitions; regular grammars, regular expressions and FSMs; software design based on REs; context free grammars; parsing: leftmost derivations and top-down parsing; table driven parsing techniques.

CS4212 Computer Organisation 2*  
CS4 2-1-1
Introduction to low level programming; assembly language programming; interrupts, the principle of interrupts; interfacing; installation and testing of CPU and peripheral components; the microarchitecture of computer systems; advanced computer architectures; introduction to computer networks. Prerequisite: CS4211

CS4225 Computer Networks *  
CS4 2-1-2
Data communications; analog and digital; switched and broadcast networks; LANs and WANs, MACs; data link protocols; packet switching, circuit switching; frame relay, cell relay; transport protocols, ISO and internet, connectionless and connection oriented operation; internetworking. Prerequisite: CS4213

CS4228 Telecoms Network Architectures*  
CS4 2-1-3
The requirements to support speech traffic, digital switching principles, PCM trunks, the PDH, cross connects, provision of leased lines, signalling CCSS7, management in PDH systems; properties of transmission systems, echo cancelling, fibre, coax and micro-wave systems; packet switching X.25, ISDN principles, LAPD protocol, frame relay, asynchronous transfer mode switching and
multiple: virtual channels, virtual paths, the SDH architecture; user network interfaces for B-ISDN, MANS MAC DQDB, ATM over SDH; intelligent networking principles; management of telecom networks, operations centres. TMN architecture mobile communications, VLR, HLR, MSCs. Prerequisite CS4218

CS4317 Software Engineering 4* CSI 2-2-0
Recursively defined sets; functions over recursively defined sets; proofs by structural induction; grammars as recursively defined sets; syntax and semantics of predicate logic; predicate calculi, soundness and completeness issues; non standard logics: operational semantics of simple programming languages; introduction to program proof techniques. Prerequisite CS4112

CS4358 Interactive Multimedia CSI 2-1-0

CS4411 Database Systems* CSI 2-1-0
Introduction: justification and objectives; persistent data storage techniques; database management systems; database models; relational model; theory of relational database management systems (RDBMS); relations and functional dependency; relational operations; RDB design methods; particularly normalisation: RDB languages: algebraic: calculus-based including SQL and PROLOG: QBE systems: data definition mechanisms, data manipulation techniques; RDB Extensions and development; query optimisation techniques and strategies; database concurrency issues; transactions, locking protocols and serialisability recovery; DBMS technology development; distributed systems object-oriented knowledge-bases and expert systems. Prerequisite: CS4213

CS4512 Imperative Programming 2* CSI 2-2-2
Functions and parameter types; functions as variables; pointers, dynamic data, and referencing; relationships between pointers and arrays; two-dimensional arrays and their manipulation; iterative and recursive solutions; design and implementation of recursive algorithms; file processing; file types; file processing algorithms; linked list data structure; memory allocation for lists; array implementation of a linked list; basic stack operations; array and linked list implementations; arithmetic expression evaluation using stacks; stacks and recursion; introduction to abstract data types; Prerequisite CS4411 Imperative Programming 1

CS4556 Business Orientated Programming Languages* CSI 2-1-2
The Software Market, File-processing and business-orientated algorithms, Program Maintenance, COBOL and OO-COBOL programming.

CS4558 Leveraging Legacy Applications CSI 2-0-2
This course will provide students with the knowledge and skills required to integrate legacy applications into next generation business systems. Software Re-engineering of COBOL programs, Integrating Legacy Systems using Object Wrappers, Web enablement and GUI front ends. Interfacing with middleware (CORBA, DCOM, DODB, COM etc).

CS4566 Requirements Engineering* CSI 2-1-1
The Requirements Engineering Process; methods and techniques for the elicitation and discovery of system and software requirements; the modelling and analysis of requirements; the communication of requirements, tools for the management of requirements; the validation and agreement of requirements; organisational and social issues surrounding these tasks. Prerequisite – CS4125 Systems Analysis and Design.

CS4702 Language Programming 1 CSI 2-1-1
What is computer programming; introduction to the architecture of a computer; the concepts of abstraction; sequence; selection; and iteration; the development of simple algorithms using these concepts; realisation of abstraction; sequence; selection and iteration in a programming language; practical exercises involving experiments with a series of simple text processing programs;

CS4816 Artificial Intelligence* CSI 3-0-3
General outline of AI including history; search strategies; game playing; knowledge representation; expert systems; natural language processing; machine learning; connectionism. Prerequisite: CS4315

CS4818 Professional Issues in Software Engineering* CSI 2-2-0
Software contracts; intellectual property rights; employee relations in the software industry; product liability; computer crime; professional codes of conduct - ADM/BCS; social impacts of IT; case studies. Prerequisite: CS4817

CS4826 Human Computer Interaction CSI 2-2-0
Early work on human factors and “man-machine communication”; from command languages to direct manipulation; cognitive ergonomics; usability engineering; future developments of artificial intelligence, multimedia, virtual reality;
ubiquitous computing; computer-supported collaborative work; human factors in the system design process.

**CS4918 Business Information Technology 3**  
**CSI 2-1-0**

Benefits of information technology; identifying opportunities for IT; new business through the use of IT; organisational structure; planning of information technology; overview of planning in business; importance of IT planning; developing IT strategies; acquisition of computing resources; legislation; financing and investment appraisal techniques; factors involved in hardware/software selection; materials and services available; estimating system performance and evaluation of computer systems; personnel recruitment procedures; managing and organising the introduction of new technology; social impact of information technology.  
**Prerequisite:** C34926

**CS4942 Computer Science 4**  
**CSI 2-1-2**

The physical symbol system hypothesis and it’s relationship to programming paradigms; declarative and logic programming; introduction to prologue; concepts in artificial intelligence; some AI applications.

**EE4004 Electrical Engineering 2**  
**ECE 2-0-2**

Electromagnetic induction; energy storage elements; sinusoidal signals; three phase systems; tuned circuits; coupled circuits.

**EE4008 Avionics**  
**ECE 2-2-0**

Introduction to navigational, communications and air traffic control systems; radio wave propagation and radiation; introduction to radar; basic radar principles; pulse radar; radar transmitters and receivers; radar displays; Doppler radar; secondary radio; navigation aids for aircraft; aircraft guidance and control, collision avoidance systems; instrument landing systems; satellite navigation systems.

**EE4018 Engineering Management**  
**ECE 2-1-0**

The firm and its environment; introduction to economic, managerial, behavioural and social responsibility theories of organisational objectives; present market trends and business in the 21st Century; general external analysis (national, international and global) industry analysis, internal analysis; specific functional activities; finance; human resource management; information technology; operations management.

**EE4102 Electrical Science 2**  
**ECE 2-0-2**

Electromagnetic induction; energy storage elements; sinusoidal signals; three phase systems; tuned circuits; coupled circuits.  
**Prerequisite:** EE4101

**EE4108 Microwave Devices**  
**ECE 2-1-0**

Microstrip and stripline; waveguides; microwave measurements; microwave solid state amplifiers and oscillators; cavity and slow wave devices.  
**Prerequisite:** EE4117

**EE4114 Circuit Analysis 2**  
**ECE 2-1-2**

Fourier Series; Matrix Analysis; Filters; distributed Parameter circuits.

**EE4117 Electromagnetics 1**  
**ECE 2-1-1**

Electrostatics; magnetostatics; time varying field; transmission lines.

**EE4214 Control 1**  
**ECE 2-1-2**

Actuators and dynamic system modelling; system time response; system frequency response; frequency domain compensation; transducers.  
**Prerequisite:** EE4113

**EE4218 Control 2**  
**ECE 2-0-1**

Optimal control; adaptive control; predictive control.  
**Prerequisite:** EE4217

**EE4308 Analogue Integrated Circuit Design**  
**ECE 2-1-2**

CMOS technology; processes, device modelling, layout considerations, passive components; analogue models for CMOS and bipolar devices; computer simulations; review of basic building blocks; logic gates, current mirrors, differential and high-gain stages, output buffers; design examples from bipolar and CMOS perspectives; amplifiers topologies; single-stage and two-stage op-amp designs; implementations CMOS, bipolar and bi-mos processes; stability issues; specifications; simulations; on-chip implementations of continuous time filters; technology limitations; the switched capacitor alternative; development of SC design methods; stray-intensive circuitry.  
**Prerequisite**: EE4317

**EE4314 Active Circuit Design 2**  
**ECE 2-1-2**

Operational amplifiers characteristics; op-amp linear applications; feedback; op-amp non-linear applications; AC coupled amplifiers; tuned amplifiers; active filters; probes.  
**Prerequisite:** EE4313

**EE4316 Active Circuit Design 3**  
**ECE 2-1-2**

Oscillators; the Gilbert cell; phase locked loops; A/D and D/A revisited; Am receivers; FM.  
**Prerequisite:** EE4314

**EE4318 Active Circuits 5**  
**ECE 2-1-2**

Low-noise Amplifier Design; fundamental noise; semiconductor noise; low noise amplifiers;
EE4408 Asics 2  
Analogue simulation using spice, analogue asic layout techniques; asic operational amplifiers; asic d-a converters and a-d converters.

EE4416 Solid State 1  
Atomic structure; semiconductor properties; solid-state devices.

EE4512 Digital Systems 2*  
Counters; MSI devices; sequential MSI; registers; logic arrays; register transfer language and introduction to simple computer organisation; simple processor operations. 
Prerequisite: EE4513

EE4514 Digital Systems 4*  
Bus buffering and de-multiplexing; bus cycle timing; the memory interface; drums; I/O interfacing; the centronics and RS 232 interfaces; the P.C. expansions bus; IEEE 488 bus; typical peripheral interfaces. 
Prerequisite: EE4513

EE4516 Digital Systems 5  
The benefits of a fully-synchronous sequential system; sequential circuits; Moore and Mealy type circuits; use of memory as a combinational element; state reduction; controllers; VHDL; project.

EE4608 Telecommunications Systems 2*  
General telecommunication system design; technical, economic, user and social requirements and tradeoffs; generation approach; compatibility and reverse compatibility constraints; decision bodies and processes; national and international; case studies; television systems design; linear systems analysis; radar; microwave and mm-wave telecommunication system design.  
Prerequisite: EE4607

EE4616 Communications & Theory*  
Basic structure of a communication system; communication theory; amplitude modulation; frequency modulation; receiver systems; digital signals; information theory. 
Prerequisite: EE4414

EE4617 Communication Theory 1*  
Information source encoding theory and techniques; communication channels; m-ary discrete memory less channels, binary symmetric channels; Shannon-Hartley theorem and the possibilities and limits to error free transmission; channel coding; interleaving principles; linear block coding; cyclic codes; convolutional codes.  
Prerequisite: EE4616

EE4618 Signals & Systems 1  
Systems signals; signal representation; system response; sampling discrete time systems.

ET4122 Analogue Electronics 2*  
The operational amplifier; the differential amplifier; modes of signal operation common mode input; common mode gain; common mode rejection ratio; Op, amps with negative feedback; inverting and non inverting, voltage follower; output and input impedance with feedback; bias currents and offset voltage follower; output and input impedance with feedback; bias currents and offset voltage compensation; Op, amp. frequency response; open-loop response; closed-loop frequency responses; stability; gain margin and phase margin; positive feedback, stability analysis compensation; Op, Amp applications. 
Prerequisite: ET4314.

ET4132 Introduction to Web and Database Technology  
The module will introduce the students to the concepts and techniques underlying the World Wide Web, such that they will gain a working knowledge of how to design and build web sites. The module will also present an introduction to databases and data manipulation. Focus: Brief history of the Internet. Web servers. Web browsers and protocols. Web programming, overview of HTML, DHTML, CSS and ActiveX controls. Multimedia on the WWW including Audio, Video and graphics. Data and information characteristics, differences and structures. Data management, simple file storage and retrieval, introduction to data modelling. Introduction to the concept of DBMS.

ET4142 Computer Systems Architecture  
This module will develop students skills to study, experiment and report on a representative electronics based real world system from sensors to on-line delivery of data in a user friendly format. Study will be through a problem-based approach. Electronic systems students will focus on the sensors and data gathering while ICT students will concentrate on the user friendly display, database and web access.
ET4152 Digital Electronics 2*  
**ECE 2-0-2**  
Combinational logic; Karnaugh maps; sequential logic; elementary sequential circuit design; logic families; use and three state logic elements; MSA; memories; programmable logic devices; the microprocessor. Prerequisite: ET4111

ET4204 Analogue Electronics 4*  
**ECE**  
The aim of this module is to introduce the structure and uses of the operational amplifier for a range of electronic voltage signal conditioning and instrumentation applications. Will be based around an introduction to the structure, operation, and uses of the operational amplifier for a range of electronic voltage signal conditioning and instrumentation applications. Focus: operational amplifier structure and behaviour, uses of operational amplifier in voltage amplification circuits/low-pass/high-pass/band-pass filters/non-linear circuits, electronic filters, the Instrumentation Amplifier, construction of an Instrumentation Amplifier. Prerequisite: ET4203.

ET4204 Robotics 1: Sensors and Actuators*  
**ECE**  
This module introduces students to fundamental principles of measurement of physical phenomena utilising various sensing techniques, transducer action and signal conversion, various actuator types and principles of operation, specification of a complete measurement system. Focus: SI units, principles of sensor operation, the ideal transducer, electrical signal output, resolution/accuracy/linearity definitions and relevance, Op-Amp as applied to sensing systems, DACs, ADCs successive approximation and integrating, overall concepts of accuracy, drift, resolution and common mode rejection applied to a measurement system. Prerequisite: ET4703.

ET4228 CAD/CAM Systems  
**ECE 2-1-2**  
The CIM philosophy, designing CIM systems, systems analysis, computer based production management systems, CIM data flows; CAD/CAM principles, computer aided design and engineering, electrical/electronic drafting and design, simulation; computer aided manufacture, NC,CNC, robotics, robot and CNC machine tool programming, FMS.

ET4234 Embedded Software II*  
**ECE**  
The aim of this module is to use C to develop an embedded application. The objectives are to provide the student with techniques to develop embedded applications using C and assembly and to demonstrate these techniques with applications using timers and serial/parallel communication. Focus: Explanations on how to write, compile link and test C programs for an embedded system. Detail C programming language extensions necessary to support an embedded architecture such as memory models, bit types, reentrant functions. Describe how to interface assembly and C code and the mechanisms for passing parameters to functions and returning values. Introduce Lint and how to debug and simulate embedded C applications. Cover C coding guidelines and practices for embedded systems. Describe the operation and control of hardware timers. Introduce serial and parallel communication standards. Prerequisite: ET4233.

ET424 Java Programming 2*  
**ECE**  
The aim of this module is to further the students knowledge of Java with particular emphasis on classes, objects and Graphical User Interfaces and understand the concepts of inheritance and polymorphism. Focus: Java programming for moderately large applications including programming design and structure. In depth study of object oriented principles, abstractions, inheritance and polymorphism. File and Streams. Use of Abstract Window Toolkit to develop interactive user interfaces. Threads, multithreading, need to develop thread safe code, Garbage collection. Use of UML in software development.

ET4274 Networks Laboratory  
**ECE 1-0-3**  
This module will give students a practical introduction to principles underlying communications systems. The module approach is laboratory-centred. Focus: Signal concepts and measurement techniques, analog and digital signals, frequency, spectrum and bandwidth, introduction to laboratory and equipment. Modulation, how variation of amplitude, frequency and phase of sinusoid by an analogue or digital message will yield. AM modulation, Binary ASK generation and detection, FM modulation and demodulation. Overview of digital signals encoding and transmission. Transmission media, targeted investigations into properties of guided media, unguided media, transmission impairment, performance, data rate

ET4254 Communications and Networking 1  
**ECE 2-1-1**  
On completion of this module, students should understand the main building blocks of communication systems and their functions, the need for different ways of encoding, transmitting and multiplexing signals, the use of different transmission media, principles of digital data transmission and computer communications, the operation of aspects of modern communications infrastructure and principles and concepts in networks. Focus: Definitions and standards bodies for networks and communications. Analog and digital signal concepts, frequency spectrum and bandwidth. Overview of analog and digital signals encoding and transmission. Multiplexing definition, FDM, TDM, WDM, STD M. Transmission media. Digital data transmission. Circuit switching, packet switching. Modems, ISDN overview, DSL technologies. OSI model, LAN, MAN, WAN. Data link control. Introduction to LAN concepts.
and bandwidth. Digital data transmission, parallel interfaces, serial transmission and synchronization.

**ET4284 Outcome Based Labs 2 ECE**

The module will be undertaken by students from both the modified Electronic Systems and will be a follow-on from the Outcome Based Learning Laboratory 1. It will further develop the concepts from the 1st laboratory module and will target data acquisition and embedded systems design. Modular design of real world sensing systems, top down, bottom up design. Sensor selection to meet resolution, accuracy, repeatability criteria and for compatibility with other sensors in the system. Data transmission point to point and through networks. Data logging using microcontrollers and PCs, Data manipulation and storage on a PC. Data display in user friendly format, graphic displays.

**ET 4428 Semiconductor Technology 2 ECE 2-1-3**

Advanced processing techniques; plasma enhanced cvd; mbe; constraints in optical lithography, image reversal, DESIRE, CEL, Bilayer and Trilayer schemes; electron beam lithography; direct write, resist system, prome process technique; x-ray lithography; resist, source and masks; water track; dry etching; role of gas chemistry, partial pressure and input power, rf and microwave plasma discharge systems, merie, surface damage; vacuum technology; basic systems and terminology, rotary diffusion and turbomolecular pumps; measurement; optical and electrical measurement of semiconductor properties; line width measurement; SEM, SIMS, SRP, four point probe, and angle lapping; process simulation; numerical models and algorithms, parameter optimisation, technology development, two-dimensional simulation and its impact on device simulation; topography simulation; numerical models for aerial, latent and relief image formation; process integration; bipolar, NMOS, CMOS and BICMOS technologies, threshold control.

**ET4448 Communications and Networks 4 ECE 2-2-0**

Introduction to digital mobile and personal communications systems; Review of wireless transmission issues; Medium Access control: SDMA, TDMA, FDMA, CDMA; Example of current mobile telecommunications system, evolution to future systems; Key concepts in the dynamic management of resources; Wireless LANs; Mobile IP; mobile TCP issues; Support for mobility at higher layers of reference model.

**ET4458 Speech and Audio Signal Processing ECE 2-2-0**

Source-filter model of speech production; Filter banks, the short-term Fourier transform, spectrograms; Time-domain processing; Frequency-domain processing and nonlinear frequency scales; Cepstral processing; Linear prediction analysis; Pitch and formant estimation; Dynamic time warping and feature vectors; Introduction to speech signal synthesis, coding and enhancement; Music analysis and synthesis, sinewave modelling.

**ET4702 Computing Programming 1* ECE 2-0-2**

Algorithms and problem solving; from algorithms to Programs; overview of C; C program development environments. Prerequisite ET4701.

**ET4725 Operating Systems 1 ECE 2-0-2**


**ET4808 Advanced Graphics & Display Systems* ECE 2-1-2**

Introduction; viewing in two dimensions; homogeneous coordinate systems, matrix transformations; clipping algorithms; advanced programming under a graphical user interface; x windows; the client-server network graphics model; using the x window system; event driven programming; applications programming; viewing in three dimensions; homogeneous coordinate systems and matrix transformations in three dimensions; polygon meshes (wire-frame representations); digital image formats; advanced image database systems; two-dimensional, three-dimensional and moving picture systems; applications development of image based systems and examples. As this course is an elective, it is only offered occasionally. Prerequisite: ET4805.

**MA4002 Engineering Mathematics 2* M&S 2-1-0**

The indefinite integral; the definite integral; areas, lengths, surface areas, volumes and moments of inertia; numerical integration; ordinary differential equations; laplace transform; application of the method to the solution of linear ordinary differential equations; functions of several variables and partial differentiation. Prerequisite MA4001.

**MA4004 Engineering Mathematics 4 M&S 2-1-0**

Variables - disrupt and continuous; the distribution of a variable; basic concepts of probability; Baye's Theorem; discrete and continuous random variables; special discrete probability distributions; moment generation functions; transformations; statistical inference - estimation and hypothesis testing; properties of estimates; maximum likelihood, method of least squares, linear regression.
MA4006 Engineering Mathematics 5*
M&S 2-1-0
Laplace transforms; transform theorems; convolution; the inverse transform; Fourier Series; Fourier transforms; linear partial differential equations; solution by separation of variables; and by integral transform methods; numerical methods: finite differences and finite elements: vector calculus; maxima and minima Lagrange multipliers; line, surface and volume integrals. Prerequisite MA4002

MA4016 Engineering Mathematics 6
M&S 3-1-0
Mathematical logic; concepts of proof and program correctness; sets; relations, functions; recursive definition of functions; difference equations; algorithms and analysis of algorithms; number systems; finite state machines, computability.

MA4102 Business Mathematics 1
M&S 2-1-0
Algebra: linear equations and inequalities, real numbers, function and their graphs; exponential and logs, polynomials; laws of indices, matrices and linear systems, linear programming, mathematics of finance, present value, sinking funds; deferred and complex annuities; data reduction and representation; coefficient of variation, probability concepts, discrete and continuous probability distributions; sampling and sampling techniques; relationship between sample data and population.

MA4104 Business Statistics*
M&S 2-1-0
Hypothesis testing for large and small samples using proportions and averages; simple linear regression and an introduction to multiple linear regression; dummy variables in regression and regression analysis for prediction utilising confidence intervals; test of variances; non-parametric hypothesis testing, chi-square and contingency tables, time series and index numbers - seasonal cyclical and irregular component analysis; forecasting techniques trend bases and regression based methods; introduction to Box-Jenkins forecasting. Prerequisite MA4102

MA4128 Advanced Data Modelling*
M&S 2-1-0
Cluster analysis, principle component analysis, factor analysis, discriminant analysis, the generalised linear model, maximum likelihood estimation, logit and probit regression, log linear models for categorical data. Prerequisite: MA4125

MA4602 Science Mathematics 2*
M&S 2-1-0
Functions of the calculus; curve sketching; integration and applications; series; partial derivatives. Prerequisite MA4601

MA4604 Science Mathematics 4*
M&S 2-1-0
Modelling with differential equations Derivation of differential equations of exponential growth and decay. Application to population growth, radioactive decay and other problems from science and engineering. Ordinary differential equations First order equations of variables separable, homogeneous and linear types; second order homogeneous equations with constant coefficients, Numerical solutions of ordinary differential equations by Euler's method and Runge-Kutta methods. Fourier Series Review of periodic functions; Fourier Series of functions of period and arbitrary periods; Fourier series of even and odd functions; applications to solving second order linear constant coefficient ordinary differential equations with periodic input. Laplace and Fourier Transforms definition of Laplace transform; transforms of elementary functions; tables of transforms; inverse Laplace Transform; convolution: solution of linear constant coefficient ordinary differential equations with applications to physics and chemistry (e.g. circuits, damped mass spring, reaction rates); Heaviside unit step function and transforms of piecewise continuous functions; Fourier transform and it's relation to the Laplace transform. Prerequisite MA4613

MA4702 Technological Maths 2*
M&S 2-1-0
Functions of the calculus; curve sketching; series; integration and applications; partial derivatives. Prerequisite MA4701

MA4704 Tech Mathematics 4*
M&S 2-1-0
Variables; representation of variables; introduction to the fundamentals of probability; Baye's theorem; special distributions; binomial, Poisson, geometric, uniform, exponential, normal; statistical inference; non-parametric tests; correlation and regression. Prerequisite MA4701

MA4708 Quality Control*+
M&S 2-1-0
History and development of quality control; cost of quality; statistical process control; attribute data; machine capability tests; acceptance sampling; introduction to design of experiments and analysis of variance. Prerequisite MA4704

MB4002 Algebra 2*
M&S 2-1-0
Mathematical logic; sets; set operations; relations; mappings; matrix representation; algebra of sets; simple applications to switching theory. Prerequisite MB4001

MB4004 History and Foundations of Maths*
M&S 2-1-0
Contribution of early civilisations; the Hindus and Arabs; Hindu number system, zero, place value; early and medieval Europe; renaissance mathematics, 1500 - 1800; development of algebra, logarithms, co-ordinate geometry, calculus 1800-present; logic; proof and proof
techniques; axiom systems; sets; transfinite arithmetic; real number system; complex numbers; groups; basic ideas. Prerequisite MA4702

MB4008 Groups & Algebras Structures*
M&S 2-1-0
Sets and operations; groupoids and semi-groups; groups; Lagrange's theorem; Sylow's theorems; group of isometries; group of similarities; rings; integral domain, fields. Prerequisite MB4001

MB4018 Differential Equations*
M&S 2-1-0
Basic concepts; problem solving and modelling; differential equations as models; classical mechanics; Newton's laws; simple harmonic motion; projectile motion; first order differential equations; applications; second order differential equations; trial solutions; d-operator techniques; applications; numerical solution techniques. Prerequisite MA4702

MS4014 Introduction to Numerical Analysis
M&S 2-1-0

MS4018 Dynamical Systems
M&S
One dimensional flows. Flows on the line, fixed points and stability, bifurcations and flows on the circle, Two dimensional flows. Linear systems, classification of fixed points, phase plane, linearisation, stability, Limit cycles, oscillators. Bifurcations in the plane, global bifurcations of cycles, quasi-periodicity. Lorenz equations, strange attractors, control of chaos. One dimensional maps, Lyapunov exponents, Feigenbaum numbers. Introduction to time series applications. Fractals dimensions.

MS4022 Calculus 2
M&S 3-1-1
Mclaurin and Taylor series, order notation bit 'oh', little 'oh', asymptotic equivalence, taylors theorem and remainders, applications indefinite integral, integration of standard functions, techniques including integration by parts, substitution and partial fractions definite integrals the limit of a riemann sum, fundamental theorem of calculus, leibniz's rule for differentiating under the integral sign. Introduction to ordinary differential equations. Definition of an ODE, linearity, homogeneity, first order variables separable solution technique by integration first order linear equations by integrating factor, basic second order linear homogeneous odes introduction to functions of two real variables continuity, partial derivatives and their geometrical interpretation, conditions (without proof) for maximum, minimum, saddle-point.

MS4111 Discrete Mathematics 1
M&S 2-1-0
Mathematical logic; Boolean algebra; number systems; algebraic structures; relations.

MS4212 Introductory Data Analysis
M&S 2-1-0
Collecting data; sampling, experimentation; measurement. Descriptive Statistics: frequencies; histogram; percentiles; mean, median, mode; range, interquartile range, standard deviation, box plot. Cross-classification: raw percentages, column percentages, Simpson's Paradox. Scatter plots: least squares line, transforming to linearity, correlation. The Normal Curve; using a normal curve to approximate a histogram, calculations using the normal curve, normal probability plot, transforming to normality. The Sampling Distribution of a mean: illustrate by Monte Carlo, use for sample size determination, confidence intervals and hypothesis testing.

MS4303 Operations Research 1
M&S 2-1-0
Model building and the methods of operational research; linear programming transportation and assignment algorithms; linear programming in practice; critical path analysis; decision analysis.

MS4404 Partial Differential Equations
M&S 2-1-0
Introduction to PDEs, Wave equation, Laplace's equation, Diffusion equation, first order PDEs.

MS4414 Theoretical Mechanics
M&S 2-1-0

TA4002 Introduction to Science & Technology 2*
ECE 2-1-0
Chemistry – discovery of the elements; the periodic table; materials and bonding; chemistry of life; cleaning – detergents and solution; raw materials to products; agriculture and food – food cycles, oxygen, carbon dioxide and nitrogen cycles; nutrition, preservation, pasteurisation and fermentation; evolution of agriculture and agriculturally based industries; Environment – the ecosystem, atmosphere, water, ozone layer depletion; conversation and recycling; biotechnology – the chemistry of DNA.
and DNA replication; structure of RNA and the genetic code; cloning and genomic libraries; DNA fingerprinting; health and leisure – disease and epidemics; diagnostic devices and health technologies; concepts of fitness, aerobics and performance; technology in entertainment; new materials and sports equipment. Prerequisite TA4001.

**TA4004 Introduction to Science & Technology 4**

ECE 2-1-0

Characteristics of a scientific theory; modelling versus explanation, prediction. Evolution of contemporary philosophy of science from Aristotle via Galileo to Popper and Kuhn. Innovation and design; the specification and design criteria, functionality, economics, ergonomics, cost and performance. Brainstorming as a creative tool. Innovation in industry and its management. Prerequisite TA4003.

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