

UNIVERSITY *of* LIMERICK

ERASMUS + ACADEMIC MODULE BOOKLET

Academic Year

2015/2016

Spring

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DEPARTMENT OFFICES

Room No.	Department Office
EO030	International Office
E0001	Admissions Office
E0006	Student Academic Administration
E0005	Co-operative Education
KB3-22	Accounting and Finance
B2014	Chemical and Environmental Sciences
S121	Computer Science and Information Systems
KB3-22A	Economics
MC1-002	Languages, Literature, Culture and Communication
FG013	Law
SR2019	Life Sciences
D2030	Electronics and Computer Engineering
AM065	Information Technology
KB3-018	Marketing and Management
B3027	Materials Science and Technology
D2034	Mathematics and Statistics
SR3020	Mechanical and Aeronautical Engineering
KB3-035	Personnel and Employment Relations
B2040	Physics
P1024	Physical Education and Sports Science
D0033	Plassey Campus Centre (Accommodation)
F1018	Politics and Public Administration
E1006	Print Room
S109	Second Level Education

Contact Information:

Dr. Patricia O'Flaherty

LLP Erasmus Coordinator
International Education Division
Room E0-023
University of Limerick
Limerick
Ireland
Tel: +353 61 202304
Fax: +353 61 213062
E-mail: Patricia.Oflaherty@ul.ie
www.ul.ie/international

Dearbhla McNamara

Erasmus Incoming Administrator
International Education Division, E0-022
University of Limerick
Limerick
Ireland
Tel: +353 61 213133
Fax: +353 61 213062
University of Limerick
E-mail: Dearbhla.mcnamara@ul.ie
incoming.erasmus@ul.ie
www.ul.ie/international

GENERAL INFORMATION

How to Apply:

Nominations must be formally requested to UL by students home university (e.g. International Office). Once nominations are made and the student is accepted by UL the students will be given instructions on how to apply online.

Application Deadlines

Applications should be made online and the deadlines for receipt of applications are:

- **June 30th** of each year for Full Year and Autumn Semester students
- **October 31st** of each year for Spring Semester students

What is ECTS?

ECTS, the *European Community Course Credit Transfer System*, was developed by the Commission of the European Communities in order to provide common procedures to guarantee academic recognition of studies abroad. It ensures a comparable measure of learning achievements, and a consistent way of transferring them from one institution to another. Normally, 60 ECTS credits represent the workload of a year of study, with 30 ECTS credits given for a semester. Credits are awarded only when the course and all examinations have been successfully completed.

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. ERASMUS students can choose from a range of modules and can register for modules from different faculties and departments. (Generally, students are required to take 3 modules from within the subject area of the Bilateral Agreement and may take 2 modules outside this main subject area). Acceptance on these modules is subject to academic prerequisites, timetabling constraints and number of students enrolled.

Number of Modules and ECTS Credits

The normal course load at the University of Limerick is 5 modules per semester. ERASMUS students are limited to a **maximum** of 5 modules and a **minimum** of 3 modules per semester. Each course is awarded 6 ECTS Credits and the normal work load per semester is 30 ECTS credits.

Module Codes

The letters in a module code refers to the subject area e.g. **EC**4101 = Economics and **LA**4101 = Law. The first number (4) stands for an undergraduate module (5=postgraduate), the second number (1) stands for the year (1st year) and the final number (1) indicates the semester in which the module would normally run (1st semester). Modules ending in digits 1-2 would run in the 1st year of a course, modules ending in digits 3-4 would run in the 2nd year of a course, modules ending in digits 5-6 would run in the 3rd year of a course and modules ending in digits 7-8 would run in the 4th year of a course. The three digit codes found at the right of a module title represents the number of corresponding Lecture (L), Tutorial (T) and Laboratory (Lab) hours (in this order).

- L = Number of lectures per semester.
T = Number of tutorials/seminars/language classes per semester;
the latter are smaller groups and more interactive.
LAB = Number of laboratory based classes per semester.

ADMISSION AND REGISTRATION PROCEDURES

Learning Agreements

ERASMUS students coming to study at the University of Limerick must complete a learning agreement prior to their arrival in Limerick indicating their planned programme of study. Students may have to modify the agreed programme of study upon arrival at the University of Limerick for a variety of reasons: timetable clashes, un-suitability of chosen modules, academic pre-requisites etc. The learning agreement form provides for changes to the originally agreed study programme/learning agreement. Agreement to the changes by all parties must be obtained in order to guarantee full academic recognition of all course units followed. It is important that the student knows that the modules and programmes of study finally selected must be approved by the sending and receiving institutions in order to be fully recognised. Changes to the originally agreed programme of study will be indicated on the reverse side of the learning agreement and duly counter-signed by the student and the coordinators of both home and host institutions. It is important to note that changes to the originally agreed programme of study should be made within three weeks after the student's arrival at the University of Limerick.

Teaching and Learning Methodologies

The teaching methodologies used throughout the programme will vary with class sizes, the early years being characterised by large groups and therefore necessitating formal lectures for most modules. Language modules, science modules and information technology modules will require smaller laboratory size interactive groups.

Assessment Methods

Assessment methods include mid-term examinations, multiple choice examinations, individual and group projects, essay/report writing, semester papers, short answer and essay type/problem solving examinations. Both oral and written forms of assessment will be utilised throughout the programme. Class participation is encouraged where appropriate and used as part of the assessment in selected modules.

Local Grading System

A grade, representative of the quality of a student's performance in a particular module, will be awarded at the end of each semester for each module that a student is registered for. Grades range from A (indicating excellent performance) to C3 (satisfactory pass) to F (failure) with intermediate grades in between.

ECTS Grading System

ECTS Grade	UL Grade	Award Equivalent	Quality Point Value (QPV)	Credits Awarded
A	A1	First Honours	4.00	Yes 6 ECTS
A	A2	First Honours	3.60	Yes 6 ECTS
B	B1	Honours 2.1	3.20	Yes 6 ECTS
B	B2	Honours 2.1	3.00	Yes 6 ECTS
B	B3	Honours 2.2	2.80	Yes 6 ECTS
C	C1	Pass	2.60	Yes 6 ECTS
C	C2	Pass	2.40	Yes 6 ECTS
D	C3	Pass	2.00	Yes 6 ECTS
D	D1	Compensating Fail	1.60	Yes 6 ECTS

E	D2	Compensating Fail	1.20	Yes	6 ECTS
F	F	Fail	0.00	No	
	NG	Fail	0.00	No	
	G	Audit	-	No	
	I	Certified illness/bereavement		No	
	M	Awarded in case of projects spanning multiple semesters; or sequences of definitely linked modules		No	
	P	Pass in a module taken on a pass/fail basis		Yes	
	N	Failure in a module taken on pass/fail basis		No	

SPRING SEMESTER MODULES

Kemmy Business School – Spring

Business Erasmus Academic Coordinator

Donal Palcic

Kemmy Business School

Tel: +353 61 213710

Email: donal.palcic@ul.ie

AC4002 Managerial Accounting (Spring/1)

4 hours per week; 13 weeks/8th semester; 26L/13T/13L; ECTS credits:6

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.

AC4004 Accounting & Auditing Frameworks (Spring/2)

3 hours per week; 13 weeks/4th semester; 26L/13T; ECTS credits:6

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.*

AC4018 Corporate Transparency and Business Ethics (Spring 3 & 4)

3 hours per week; 13 weeks/8th semester; 26L/13T; ECTS credits:6

1. Understand the control mechanisms of governance and financial transparency that infer the credibility of financial reporting.
2. Acquire an overview of ethical theories and their potential for engagement with business.
3. Explore the elements of a professional judgement as an approach to making ethical decisions in business.
4. Understand that corporate compliance is fundamental to corporate social responsibility.

AC4024 Financial Accounting and Reporting (Spring/2)

3 hours per week; 13 weeks/4th semester, 26L/13T; ECTS credits:6

The objective of this module is to develop the student's understanding of the theoretical framework of accounting. This objective will be facilitated by exploring the theoretical and technical aspects of selected international accounting standards and issues. The following international accounting standards and issues are examined and analysed: Inventories, Construction Contracts, Property, Plant and Equipment, Government Grants, Borrowing Costs, Financial reporting for inflation, Impairment of Assets, and the financial accounting treatment of Intangible Assets. The information needs of shareholders, (among other stakeholders) will provide the context in which the preparation and reporting of accounting information is studied. These specific accounting standards and issues are further examined in light of the relevant findings from accounting literature and illustrated by practical examples from the business world.

AC4214 Accounting for Financial Decision Making (Spring/2)

3 hours per week; 13 weeks/8th semester; 26L/13T; ECTS credits:6

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 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.

AC4418 Management Accounting 2 (Spring/4)

3 hours per week; 13 weeks/8th semester; 26L/13T; ECTS credits:6

Information for planning and control; budgeting and budgetary control; standard costing and variance analysis; behavioural aspects of accounting control systems; management accounting systems and advanced manufacturing strategies/techniques; decentralisation and performance measurement; transfer pricing; accounting control systems; past, current and future developments in management accounting.

EC4006 Intermediate Macroeconomics (Spring/3)

3 hours per week; 13 weeks/1st/2nd Semester; 26L/13T; ECTS credits:6

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; The ECB and interest rate policy; The ECB and exchange rate policy; The economic performance of the Irish economy in the long-run.

EC4014 International Economics (Spring/2)

3 hours per week; 13 weeks/1st/4th Semester; 26L/13T; ECTS credits:6

The world economy: recent trends in trade and capital flows
Traditional trade theories, The Mercantilists, Smith, Ricardo, Heckscher-Ohlin,
Modern trade theories, 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 (Spring/4)

3 hours per week; 13 weeks/1st/8th Semester; 26L/13T; ECTS credits:6

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 (Spring/2)

3 hours per week; 13 weeks/4th Semester; 26L/13T; ECTS credits:6

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 (Spring/1)

3 hours per week; 13 weeks/2nd semester; 26L/13T; ECTS credits:6

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, costs and benefits of EMU to Ireland, enlarged community, EFTA, eastern Europe and the EU.

EC4108 Contemporary Issues in the Global Economy

3 hours per week; 13 weeks/2nd semester; 26L/13T;ECTS credits:6

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 Students)

3 hours per week; 13 weeks/2nd semester; 26L/13T;ECTS credits:6

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

EC4408 Public Finance (Spring/4)

3 hours per week; 13 weeks/8th semester; 26L/13T;ECTS credits:6

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.

EC4711 EU Economic Environment (Spring/1)

4 hours per week; 13 weeks/1st semester; 26L/26T; ECTS credits:6

Theory of Economic Integration and Customs Unions; The European Monetary System; Economic and Monetary Union. Monetary integration theory and evidence of convergence within the EC. Prospects for 'widening' the European Union; regional Integration-global trends.

EP4003 Entrepreneurship & Innovation (Spring/2)

3 hours per week; 13 weeks/3rd semester; 26L/26T; ECTS credits:6

This module is structured in two main sections (1) Entrepreneurship and (2) Innovation. In each case major concepts and models are used to structure the course.

Distinguish the nature and development of entrepreneurship. Identify and categorise the characteristics and schools of entrepreneurs. Recognise and apply innovation, creativity and new product/service development processes in business. Describe the entrepreneurial and business planning processes. Illustrate the critical role of the entrepreneur and intrapreneur in the process of innovation. Share an understanding of the need for entrepreneurial activity and the enterprising process. Synthesise the principal techniques and concepts necessary in setting up a business.

FI4008 Empirical Finance*

3 hours per week; 13 weeks/8th semester; 26L/13L;ECTS credits:6

Introduction to the theory of empirical finance – the study of financial market decision-making using sample data. Applications in financial modelling: forecasting and simulation. Applications in portfolio management: evaluating the risk-return trade-off and the measurement of portfolio risk. Applications in derivative security valuation: simulated trading and risk-management in an interactive virtual financial markets environment. Applications in risk management: calculation of portfolio value-at-risk under 'event-driven' simulated market conditions. *Prerequisite FI4407 Financial Institutions and Markets and FI4007 Investments: Analysis and Management.*

IN4004 Insurance Law and Claims (Spring/2)

3 hours per week; 13 weeks/4th semester; 26L/13T; ECTS credits:6

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 (Spring/4)

3 hours per week; 13 weeks/8th semester; 26L/13T; ECTS credits:6

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 (Spring/2)

3 hours per week; 13 weeks/4th semester; 26L/13T; ECTS credits:6

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.*

IN4418 Risk Control and Underwriting (Spring/4)

3 hours per week; 13 weeks/8th semester; 26L/13T; ECTS credits:6

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 retention's, structuring of a reinsurance programme.

IN4738 International Insurance (Spring/4)

4 hours per week; 13 weeks/8th semester; 52L; ECTS ECTS credits:6

The function of Insurance is an international market, marine insurance, aviation insurance, transit insurance; the development of a common insurance market in Europe, insurance directives, harmonisation of legal provisions relating to insurance; GATT; Globalisation of insurance, marketing of insurance across borders, international barriers to entry; a review and comparison of a selection of international insurance and reinsurance markets.

MG4037 Strategic Management (Spring/4)

4 hours per week; 13 weeks/8th semester; 26L/13T/13LAB;ECTS credits:6

Multi-perspective nature of strategy, strategic dimensions, strategy processes, theories of corporate competitive advantage – market positioning, resource-based and competitive dynamics. 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 strategic issues, multi-business structures and coherence.

MG4058 Management Consulting (Spring/4)

3 hours per week; 13 weeks/8th semester; 26L/13T;/ECTS credits:6

Practitioner and consultant management methodologies, e.g. strategy projects, inductive hypothesis testing, option evaluation and solution selling. This module is contingent in terms of content and will likely vary from year to year, depending on the contemporary issues in management at time of delivery. Current examples would be managing lean organizations, structuring businesses for unstable markets, turnaround management and managing in developing countries.

MG4604 Air Transportation (Spring/2)

4 hours per week; 13 weeks/4th semester; 26L/26T; ECTS credits:6

History of air transport, national and international regulations for civil aviation and the deregulation of the environment; overview of the world-wide 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.

MI4408 Knowledge Management and Strategy (Spring/4)

3 hours per week; 13 weeks/8th semester; 26L13T; ECTS credits:6

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 (Spring/1)

3 hours per week; 13 weeks/2nd semester; 26L13T; ECTS credits:6

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 (Spring/2)

3 hours per week; 13 weeks/4th semester; 26L13T; ECTS credits:6

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.

MK4006 Marketing Management (Non-Business) (Spring)

3 hours per week; 13 weeks/6th semester; 26L13T; ECTS credits:6

Building upon the foundations of marketing, this module takes a strategic approach to the theory and practice of marketing. The module introduces the concept of the marketing vision and explores the process of strategic analysis based on an assessment of key external and internal forces affecting the firm. An exploration of marketing strategy and the sources of competitive advantage follow with key competitive positioning strategies presented. The module focuses on understanding the management of the marketing function, the development of the marketing mix and the practice of marketing in terms of maximising value to customers and other stakeholders. Core areas to marketing management such as customer behaviour, brand management, services management and relationship marketing are examined. Key models and theories related to marketing planning and implementation are explored.

Prerequisite MK4002.

MK4008 Applied Marketing 2 (Spring/4)

4 hours per week; 13 weeks/4th semester; 13L/13T/13L; ECTS credits:6

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 (Spring/2)

3 hours per week; 13 weeks/4th semester; 26L13T; ECTS credits:6

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 is 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

3 hours per week; 13 weeks/8th semester; 26L13T; ECTS credits:6

Motivation for the development of relational approaches to marketing. Relationship life-cycle models. Interaction and Relationships in service contexts. Intra-organisational and inter-organisational interaction and relationships. Relationships success variables including trust, commitment and shared values. Cultural dimensions to relationships. Collaborative and competitive networks. Relationship marketing strategy and Customer Relationship Management.

PM4008 Employment Relations Practice (Spring/4)

3 hours per week; 13 weeks/8th semester; 26L13T; ECTS credits:6

Understanding conflict; individual conflict: grievance, discipline; collective issues; handling individual issues; applying the regulatory framework to individual issues; conducting a discipline/grievance interview; the nature of negotiation; integrative and distributive bargaining; strategy and tactics of distributive bargaining; negotiation planning and strategy; negotiation breakdown causes and cures; communication and persuasion processes in negotiation; power in negotiation; theory and practice of principled negotiation; third party intervention; preparing an EAT submission; contemporary pay bargaining in Ireland; negotiation exercise and case study.

PM4014 Human Resource Development (Spring/2)

3 hours per week; 13 weeks/4th semester; 26L/13T; ECTS credits:6

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.

PM4022 Principles of Organisational Behaviour (Spring/2)

3 hours per week; 13 weeks/8th semester; 26L/13T; ECTS credits:6

Organisational Behaviour in perspective: Introduction to the field and paradigms of study; Defining the concept; disciplinarily and interdisciplinary nature of the field; dominant methodologies for understanding the social world. Personality: Defining personality; sources of personality difference; the nature/nurture debate. Perception and Cognition: The nature of perception; perception and perceptual influences; the process of perception. Learning & the Individual: Defining learning and theories of learning. Emotion, Stress & Psychological Well being: Emotion in the workplace; stress at work; stress and performances; psychological well-being and self esteem. Communication and the individual: Defining Communication; the purpose and process of communication; communication and effectiveness. Groups & Team Roles: What is a group in psychological terms; function of groups; Hawthorne studies; the group formation process. Power and Politics: Interrelated concepts; sources of power; the use of power; political tactics and their use and legitimacy in organisational life. Organisation Development: What is organisational development; the process of organisational development; models of organisational development.

PM4028 Psychometrics and Psychological Testing (Spring/4)

3 hours per week; 13 weeks/8th semester; 26L/13T; ECTS credits:6

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.

PM4044 Employment Relations: Theory and Development

3 hours per week; 13 weeks/6th semester; 26L/13T; ECTS credits:6

To outline the role of the State, Trade Unions and Employers in industrial relations. To enable students to understand the various theoretical perspectives on employee relations and develop the ability to think critically about the subject. This module will demonstrate to students that conceptual analysis has practical outcomes and consequences. It will also show the historical and economic context in which these perspectives arise and how they are made operational.

Students will be able to evaluate the practical consequences of such approaches and the demands they may place on management.

PM4054 Applied Organisational Behaviour

3 hours per week; 13 weeks/4th semester; 26L/13T; ECTS credits:6

The syllabus allows for the treatment of a small number of critical dimensions of organisational behaviour. Building on material covered in an earlier organisational behaviour module, the module explores a number of processes and issues associated with individual and group behaviour in organisations. It explores the following areas: the development of the individual: personality and individual difference, perception, attitudes, the psychological contract and individual motivation. Group development: structures and roles, the dynamics of groups and teams, communication processes, organisational leadership and organisational citizenship behaviour are also examined.

PM4078 Human Resource Management: Context and Strategy

3 hours per week; 13 weeks/4th semester; 26L/13T; ECTS credits:6

Introduction to course; Introduction to key concepts; Work routines; Work systems and changing priorities of production; The changing context of work; Contemporary influences on HRM; Strategy and strategic HRM; Models of strategic HRM; HRM and industry dynamics; Changing labour markets; segmentation; internal and external labour markets; flexibility and labour markets; organisational flexibility and HRM; International HRM; annual Lovett lecture; diversity; strategic HR planning; strategic rewards; performance management; live case study from Irish or international context.

TX4407 Corporate Taxation (Spring/4)

3 hours per week; 13 weeks/8th semester; 26L/13T; ECTS credits:6

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 de-registration, exemptions and zero rating; inter EU sales and purchases.'

Faculty of Education and Health Sciences – Spring

Erasmus Academic Coordinators Physical Education / Sports Science

Dr Jaimie McMullen

Telephone: + 353 061 23 4848

Jaimie.McMullen@ul.ie

Psychology

Dr. Anca Minescu

anca.minescu@ul.ie

Teacher Training (Spanish)

Dr. Teresa Cuixeros

Teresa.cuixeros@ul.ie

EN4006 Curriculum Studies* (Spring/3)

4 hours per week; 13 weeks/6th semester; 26L/26T; ECTS credits:6

Definition of curriculum; core curriculum; national curriculum structures; international comparisons; hidden curriculum; curriculum planning at school level; de-schooling; curriculum innovation; curriculum evaluation; conceptions of reflective school; school review; action research; teaching mixed ability; modes of assessment; teacher self appraisal. Prerequisite EN4004

EN4008 Teachers as Professional* (Spring/4)

3 hours per week; 13 weeks/8th semester; 26L/13T; ECTS credits:6

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

EN4012 How Young People Learn (Spring/1)

4 hours per week; 13 weeks/2nd semester; 26L/26T; ECTS credits:6

The purpose of this module is to provide students with a critical understanding of key topics in learning theory, examining behavioural, cognitive and constructivist theory. The role of motivation is also discussed and an introduction to learner differences is included, drawing from Gardner's theory of multiple intelligences and Kolb's theory of learning styles. An introduction is given to the personal,

social and emotional development of young people, including ways in which this impacts on the second level school. Students will reflect on their own learning and show an awareness of how their approach differs from that of others. Students will be introduced to key educational thinkers and will be expected to develop an initial outline of their own educational philosophy.

EN4014 Technology and Society (Spring/2)

4 hours per week; 13 weeks/4th semester; 13L/26T/13Lab; ECTS credits:6

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.

EN4016 Responding to diversity in Education (Spring/3)

3 hours per week; 13 weeks/6th semester; 26L/13T; ECTS credits:6

Recognising diversity within self and other; starting educational planning for the needs of the learner; understanding the range of types of student diversity which are found in Irish schools (ability/ disability and specific learning difficulties; gender; sexual orientation; social class; ethnicity/culture and membership of the Traveller community; first language) and its implications for planning and for practice; Policy and legal dimensions of such diversity; Student-centred, active and participatory learning approaches such as problem-based learning, debates, values clarification processes, the use of digital media and ICT in enhancing and supporting learning, photo and image work, ranking exercises, simulations, scenarios, role-playing, research projects (including discussion of surveys, focus groups, interviews and case studies), role of excursions and outdoor learning, and diverse workplace experience; management of non-traditional learning environments (students will have an experience in a non-traditional educational setting)

Health Science Modules

PS4012 Human Development and the Lifespan 1 (Spring/3)

3 hours per week; 13 weeks/6th semester; 26L; ECTS credits: 6

The specific focus of this module is the understanding of the course and causes of human development across the life span, in the physical, cognitive, social and emotional domains. Specific milestones of

human development are outlined, from the perspective of classic and contemporary theories and research. We pay special attention to various contexts of development, such as the peers, school and particular cultures. Students are expected to integrate their experience and observations of human development with the content of the course, and apply their theoretical knowledge in various pieces of coursework. We discuss theories and research in developmental psychology by paying particular attention to the implications these have for parenting, education, and social policy-making. Assessment consists of a final exam (multiple choice questions) accounting for 40% of the final grade, and 2 pieces of coursework, accounting for 30% each. The first piece of coursework includes a written report matching toys with specific stages of cognitive and emotional development in children, and the second coursework is an essay analyzing a life-crisis based on a movie.

PS4032 Psychology and Social Issues (Spring/1)

3 hours per week; 13 weeks/2nd semester; 26L/13T; ECTS credits: 6

This module will explore a range of contemporary social issues bringing to bear upon them the methods and theoretical perspectives of psychology in an attempt to better understand their causes and consequences. Using the social issue as a focus, students will gain insight into the discipline of psychology and engage in debating and evaluating the theory and method of psychology. Through a psychological analysis of the causes and consequences of social issues students will gain insight into how these issues might be resolved. Issues covered will include; the media and human behaviour; social conflict; the use and abuse of power; sex and sexuality; society and mental health; social inclusion and exclusion; bullying at work; equality and advocacy; parenting and childcare; the environment. Coursework: Students will be required to write a 1000 word essay on career choice (50% of final mark). A final exam accounts for the other 50%.

PS4033 Introduction to Research Methods (Spring/3)

3 hours per week; 13 weeks/6th semester; 13L/26Lab; ECTS credits: 6

The module lectures will cover the core principles of psychological research design and analysis. This will involve a recap of basic statistical concepts as well as covering the main types of quantitative research methods and various statistical analyses used in psychology. The lab practicals will allow you to conduct a piece of group research in which you will implement the skills and techniques outlined in the lectures. The coursework for this module will consist of a group project to be written up as a research report. Groups of six students will select a topic, perform a literature search, find appropriate measures, collect, analyse and interpret data. This will be submitted in the required format. The title, methods and results section will necessarily be identical for all group members, but the rest of the report must be the individual's own work. This will constitute 45% of the marks for the course. An additional 10% of marks will be allocated through peer assessment of contribution to the group project. In the final week of term there will be a statistics class test which will constitute the final 45% of marks for the course.

PS4034 Empirical Psychology II (Spring/3 and 4)

3 hours per week; 13 weeks; 3rd semester; 26T; ECTS credits: 6

This module is designed to develop students' ability to design, collect, code and analyse empirical data using non-experimental approaches in psychology. Classical approaches to psychology emphasise the importance of the experimental paradigm to understanding behaviour and mental processes. This lab-based module introduces students to the shortcomings associated with the traditional experimental approach and familiarises them with alternative correlation and observational paradigms via a series of practicals. Students learn to design, conduct, code and analyse quantitative psychometric data whilst paying due consideration to the welfare of participants and attending to the appropriate ethical guidelines. Evaluation is based on two pieces of lab-reports, each accounting for 50% of the final grade.

PS4037 Cognition 1 (Spring/2 and 3)

3 hours per week; 13 weeks/6th semester; 26L; ECTS credits: 6

The module will cover the major topics of cognitive psychology. The lecture is designed to provide you with a broad overview of cognition research. Cognition deals with the basic psychological processes such as: encoding, storing, and retrieving information, forming judgments, and decision making. This course will consider to a large extent how the social situation interacts with human information processing in constructing social reality. You will learn about theories, and how these can be translated into research questions (hypotheses) that are tested (e.g., with experimental designs) and modified. You will also learn to critically evaluate merits and limits of scientific findings. Assessment on the module is via coursework and exams. The final exam will make up 50% of your grade. Two written assignments will accompany the module and contribute 25% each to the final grade for the module. More specifically, you are required to write a critical review on a published article and a report on empirical research undertaken in labs.

PS4042 Psychology: Theory and Method 2 (Spring/1)

3 hours per week; 2 tutorial meetings; 13 weeks/2nd semester; 26L/4T; ECTS credits: 6

The aim of this module is to continue with a broad introduction to the historical evolution, issues, debates, themes and theories in psychology which started in Introduction to Psychology 1. Much of what is covered will be covered in more depth in later modules, and this module is designed to provide a broad foundation to the subject. The course will provide a good grounding in a range of theoretical perspectives in psychology. This module is the second of two modules which provide a broad introduction to the discipline of psychology. This module will cover the humanistic perspective, social constructionism, interactionism, and individual differences. Assessment includes a final exam (2 hours, 2 essay questions), accounting for 70% of the final grade, and 2 written reports reviewing a book or an article, accounting for 15% each.

PS4047 Social Psychology II (Spring/2 and 4)

3 hours per week; 13 weeks/1st Semester; 26L/13Tut; ECTS credits: 6

Social psychology is a sub-speciality in the field of psychology that considers the nature and causes of human social behavior, with an emphasis on how people think about others, and how they relate to each other. As thinking is the axis around which social behaviour revolves, social psychology focusses on relationships between these individual mental processes and social behaviors. This module will critically examine the tenets of theory and applications of social psychology in the areas of prejudice and stereotyping, understanding conflict, gender relations, the influence of society on the individual, the influence of arts and cultural activities in development and maintenance of group identity. Coursework: Students will be required to undertake a set essay involving the critical evaluation of social psychological theory and application. This will be of 2500 words in length and constitute 40% of the final mark for the module. Exam: There will be a 2.5 hour exam at the end of the module. The exam will constitute 60% of the final mark for the course.

PS4052 Practical Psychology 2 (Spring/1)

3 hours per week; 13 weeks/2nd semester; 26 LAB; ECTS credits: 6

This practical class introduces the range of methods employed in psychology to students. The value of experiments, observational, survey and interviews and case studies work are considered using illustrative examples. Practical skills in the experimental and survey methods are developed through the use of selected examples. Students are encouraged to become increasingly familiar with SPSS for coding of data and simple inferential statistics are introduced. Evaluation is based on two pieces of lab-reports, each accounting for 50% of the final grade.

PS4097 Developmental Psychopathology (Spring/3)

3 hours per week; 13 weeks/6th Semester; 26L/13Tut; ECTS credits: 6

The specific focus of this module is developmental psychopathology. Developmental psychopathology is a domain of psychology which concentrates on how psychosocial and biological factors contribute to psychological adjustment and maladjustment. The module will introduce students evidence relating both environmental and genetic determinants of mental health and consider the role that developmental factors may have in the expression of mental health problems.

PS4108 Approaches to Social Identity

3 hours per week; 13 weeks; 3rd semester; 26L; ECTS credits: 6

The Social Identity approach in social psychology originated in an interdisciplinary effort to explain large-scale intergroup conflict. This module places the Social Identity perspective in its historical context

and introduces students to cognate theories and methods elsewhere in social psychology and in other disciplines with a view to enriching their understanding of social psychology. Topics include: evolution of the Social Identity approach; advances in Self Categorisation Theory; discursive approaches to social identities; ethnography and displays of identity; approaches to national identity, and group consciousness and collective action. Evaluation consists of group presentations (which is peer-reviewed (10%) and lecturer-evaluated (15%) evaluated) accounting for 25% of the module mark; a midterm reflection paper (up to 1500 words) worth 25%; and a final exam (2 hour, with two essay questions representing the five topic areas covered). The exam will constitute 50% of the final mark for the course (25% for each essay).

PY4011 Physical Education Curriculum and Assessment

4 hours per week; 13 weeks; 4th semester; 26L/26T; ECTS credits: 6

This module provides you with an opportunity to understand curriculum concepts and investigate the extent to which personal orientations and philosophies impact on curriculum. Along with your understanding of the physical education curriculum within the Irish school system, and what you believe is worth learning, you will be directed towards pursuing the use of particular curriculum/instruction models within your own teaching. Understanding assessment and its relationship to learning goals and learning experiences will allow you to determine what is worth assessing and how this can be done in a meaningful, relevant and effective way.

PY4046 Pedagogy of Dance/Gymnastics (Spring/3)

5 hours per week; 13 weeks; 8th semester; 26L/39LAB; ECTS credits: 6

No module description available

PY4048 Pedagogy, Exercise and Children's Health

5 hours per week; 13 weeks; 8th semester; 26L/39LAB; ECTS credits: 6

The module gives the students an opportunity to critically examine the role physical education plays in promoting physical activity and the health of the individual and the nation. The role of Health Related Activity and Kinesiological Aspects on the curriculum is examined and means of successfully providing this aspect of the curriculum are discussed. Additionally, students require the opportunity to consider and reflect on various models of teaching, which cater for different populations. *Prerequisites PY4401, PY4601*

PY4053 Philosophy and Aesthetics in Physical EducationΔ

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.

PY4058 Applied Studies in Athletics/ Outdoor Adventure Education

5 hours per week; 13 weeks; 8th semester; 13L/39LAB/13T; ECTS credits: 6

Athletics Three distinct strands guide this module: theory, teaching, and coaching. Outdoor Adventure It is essential in outdoor adventure settings to be able to work collaboratively. With this in mind, you will be given opportunities to demonstrate your personal abilities in addition to your abilities to work in a team-oriented environment. Throughout the course, we will focus on both the science of good teaching and leadership (honing your delivery of information, planning lessons/events making decisions, and dealing with conflict) as well as the art of teaching and leadership (developing trust, communicating with sensitivity, finding your own niche within a team of leaders, balancing intellect with intuition, and inspiring those you lead).

PY4064 Teaching and Learning for Individuals in Physical Education

3 hours per week; 13 weeks; 4th semester; 13L/26LAB; ECTS credits: 6

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.

PY4072 Pedagogy of Invasion Games (Spring/1)

4 hours per week; 13 weeks/2nd semester; 26L/26LAB; ECTS credits:3

No Module description available

SS4102 Psychology 1: Socio-Psychology Foundations Sport & Exercise (Spring/1)

4 hours per week; 13 weeks/2nd semester; 26L/26LAB; ECTS credits:6

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.

SS4103 – Psychology of Movement Development from Infancy to Adolescence

Motor skill development: Motor development as a part of human development; motor development as (a) a process and (b) as a field of study. Descriptions of the phases of motor development from infancy through adolescence to adulthood (reflexive, rudimentary, fundamental skills, sport specific skills) noting the changing characteristics. Factors influencing motor development (growth, maturation, genetics (nature), environment (nurture); historical overview of theories to explain motor development with focus on the maturation perspective of 1930s and more recent dynamic systems theory; influences of the individual, the environment and task demands Methods of investigation. Concepts of direction of development, readiness, critical/sensitive periods. Motor development in infancy, childhood and adolescence; early and late developers, implications for teaching and coaching. Importance of a developmental philosophy. Perception and perceptual development with focus on vision. Balance and its development. Evaluation of stimulation and perceptual motor training programmes at various phase of development. PSYCHO-SOCIAL DEVELOPMENT This module aims to develop a fundamental knowledge and understanding of how developmental issues from childhood to adolescence can influence participation and performance in sport and physical activity. This module will include content relating to youth sport participation and development including models of development in sport, the influence of significant others, stages of development, motivation and participation in sport, and burnout and dropout in sport. This module will compare and contrast readiness for youth sport competition from the biological, social, cognitive and psychological perspectives. The module content will consider psychological considerations of participation in sport and physical education from childhood to adolescence and will critically examine current practices in this area. This module will also critically consider best practices in this area based on research from youth sport and motor development, specifically addressing issues such as long term participation patterns, competition, and program characteristics.

SS4128 Applied Sport Psychology

4 hours per week; 13 weeks/8th semester; 26L/26LAB; ECTS credits:6

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 – Support Systems to Muscle Contraction (Spring/2)

5 hours per week; 13 weeks; 4th semester; 13L/39LAB/13T; ECTS credits: 6

The challenge to cardiovascular and respiratory function induced by physical activity. Cardiac and vasomotor regulation at rest and during exercise. Adaptation of the cardiovascular system to acute and chronic exercise. Respiratory and ventilatory control at rest and during exercise. Adaptation of the ventilatory system to acute and chronic exercise. Respiratory buffering, bicarbonate loading and exercise performance. Altitude-induced changes in cardiorespiratory function. Altitude training as an ergogenic aid. Validity and sensitivity of cardiorespiratory measures of exercise performance. 2. To provide an introduction to the published Scientific literature on exercise and cardiorespiratory function. 3. To attain laboratory competence in the measurement of cardiovascular and respiratory function.

SS4304 Introduction to Basic Biomechanics (Spring/2)

5 hours per week; 13 weeks/2nd semester; 39L/26LAB; ECTS credits:6

Theoretical Content Revision of basic mechanical concepts but with special reference to sports examples: Forms of motion, linear and angular kinematics and kinetics. Introduction to segmental modelling techniques: cadaver dissection data, water displacement. Construction of generalised link segment models for digitising video. Qualitative analysis - deterministic models. Centre of gravity and radii of gyration. Fluid mechanics and air flow effects with applications to cycling, skiing, and aquatics. Differentiation of video data by finite differences, Integration of force traces by midpoint rule and Simpson's method. Projectiles: importance of angle, speed and height of release/projection and distance travelled and applications in sport. Analysis of specific sports/activities to include: Walking and running, selected gymnastic skills and diving, throwing and striking skills, jumping and throwing and sprint start. Practical Content Qualitative Analysis: derivation and use of deterministic models of performance. Use of video and observation skills. Strategies for improving technique/performance. Creating spatial models for digitising video. Video analysis: loading and deleting files, stick figure animation techniques point and CG tracing, linking sequence windows, calibration techniques data in SI units, Calculation and smoothing techniques, graphing data and analysis of graphs. Exporting data to Excel and Word.

SS4318 – Novel Methods in Biomechanics (Spring/4)

3 hours per week; 13 weeks; 8th semester; 13L/26LAB; ECTS credits: 6

* Consider the use of novel experimental research design in biomechanics, to include single-subject analysis. * Discuss the presence of variability relating to movement performance and injury. * Evaluate a range of methods used to examine gait. * Explain the organisation of the neuromuscular system within the dynamical systems theory. * Assess the use of different filters and data capture frequency for sports movements.

Affective (Attitudes and Values) * Illustrate an understanding of the theoretical principles of innovative analysis techniques in biomechanics. Psychomotor (Physical Skills) * Demonstrate an appreciation of the developing techniques of applied biomechanics from a wide range of disciplines. *Prerequisites SS4308, SS4305*

SS4402 Exercise and Health Fitness (Spring/1)

4 hours per week; 13 weeks/2nd semester; 26L/26LAB; ECTS credits:6

Exercise Prescription 2: Components of physical fitness. Principles of training specific to all components. Field tests for physical fitness. Physical Conditioning 1: Structure, phases and components of cardiovascular endurance (walk/jog, exercise bikes, treadmills, steppers, rowers, cross-country skiers, exercise to music etc.) and resistance (body, machine and weights) training classes/sessions. Safe selection, structuring and teaching of appropriate exercises. Adaptations and progressions. Application of training principles. Safety guidelines. Pedagogical aspects of class management. Designing and implementing programmes. Basic weight training schedules (priority and circuit). Monitoring intensity. Use of music. First Aid: Principles of first aid and action at an emergency. Assessment of the situation. Examining a casualty. Respiratory system, asphyxia, CPR for adult/child/baby theory and practical, recovery position. Circulatory system, wounds, bleeding, shock, dressings and bandages. Disorders of consciousness. Soft tissue and bone injuries. Treatment of burns, scalds, chemicals/poisons and electric shock. Medical emergencies. Crush and spinal injuries. Casualty transportation.

SS4404 Coaching Science and Performance 3 (Spring/2)

4 hours per week; 13 weeks/4th semester; 26L/26LAB; ECTS credits:6

Theories of organisations, identifying the administrative structure and function of Irish NGB's through case studies (GAA, IRFU, FAI etc). Operating within an organisation, minutes, meetings and time management. NCTC induction course: historical perspective, player/athlete support, national coaching development programme. Organisation 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. Coaching: 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. Exercise Prescription 4: Specific case studies of asymptomatic participants for health related activity and sports specific training. Health appraisal, knowledge of participants goals, selection of appropriate field tests, assessment and evaluation of field tests, programme design for six weeks, delivery of programme, ongoing monitoring of participant and programme, post programme evaluation, guidelines for future work.

SS4405 Sports Injuries

4 hours per week; 13 weeks/4th semester; 2L/2LAB; ECTS credits:6

Syllabus * The incidence and causes of sports injuries; risk factors and mechanisms of injury. * Classification of soft tissue injuries, body response to trauma, phases of tissue healing. * A review of the most common sports injuries. * Application of first aid principles to injuries, use of RICES in first handling of injuries, E.A.P., procedures for referral to medical/other agencies, * Goals of sports rehabilitation, components of rehabilitation programme. * Prevention and rehabilitation of injuries through the application of stretching and strengthening exercises, sports massage and the aquatic environment. * Overview of the modalities used in the treatment of sports injuries. * Rehabilitation programmes for specific injuries, functional progressions, guidelines for return to sport. * The role of medications in the treatment of injuries. * The role of the sport scientist in the sports medicine team. * Psychology of sports injuries, research in sports injuries. *Prerequisite SS4302*

SS4418 Clinical Applications of Exercise

3 hours per week; 13 weeks/8th semester; 26L/13T; ECTS credits:6

The course begins with a structures review of the evidence for benefits of exercise and health. Practical aspects of exercise prescription, including pre-participant screening, components of exercise prescription, outcome measures and progression. The course covers the application of exercise in the following conditions: people with: neuromuscular disorders, with a focus on multiple sclerosis. cardiorespiratory disorders, including COPD and myocardial infarction. vascular disease, with a focus on peripheral arterial disease. osteoporosis. learning disorders, focusing on autistic spectrum disorder. pregnancy. *Prerequisites SS4202, SS4203*

FACULTY OF SCIENCE AND ENGINEERING

ERASMUS Academic Coordinators

Mechanical Engineering:

Mr. Hassan Kaghazchi
Department of Mechanical and Aeronautical
Engineering
Tel: +353-61-202107
email: hassan.kaghazchi@ul.ie

Materials Science:

Gerry Higgins
Department of Materials Science and Technology
Tel: +353-61-20269
email: gerry.higgins@ul.ie

Wood Science/Forestry:

Dr Murt Redington
Department of Materials Science and Technology
Tel: +353-61-202472
email: murt.redington@ul.ie

Electronic Engineering:

Reiner Dojen
Department of Electronic & Computer Engineering
Telephone: +353-61-203442
email: reiner.dojen@ul.ie

Computer Science:

JJ Collins
Department of Computer Science & Information
Systems
Telephone: +353-61-202409
email: j.j.collins@ul.ie

Mathematics:

Gordon Lessells
Department of Mathematics & Statistics
Telephone: +353-61-202018
email: Gordon.lessells@ul.ie

Life Sciences:

Department of Life Sciences

Chemical and Environmental Sciences

Dr Bernadette O'Regan
Department of Chemical & Environmental Sciences
Telephone: +353-61-202552
email: bernadette.oregan@ul.ie

Product Design

Dermot McInerney
Department of Design and Manufacturing Technology
Telephone +353 61 212876
Email: dermot.mcinerney@ul.ie

ENGINEERING MODULES – Spring

IE4214 Industrial Organisation + (Spring/2)

3 hours per week; 13 weeks/4th semester; 26L/13Lab; ECTS credits:6

Production planning: types of manufacture, resources (4 Ms), bill of materials, routing, layout by templates and string diagrams, quality system; organisational functions; determining functions, grouping, integration, alternative structures; estimating; types of cost, cost elements, use of time data, final cost/selling price, break-even; project planning; Gantt, networks, critical path, uncertain times, resource levelling, time-cost trade-offs, line-of-balance; inventory control; pareto analysis, ABC, EOQ, Little's law, JIT; executing plans; dispatching expediting, push/pull, planned review.

IE4238 Operations Analysis AM (Spring/4)

5 hours per week; 13 weeks/8th semester; 39L/26T; ECTS credits:6

Linear programming; Introduction to integer programming; application of linear programming; project work.

IE4248 Project Planning and Control (Spring/4)

4 hours per week; 13 weeks/8th semester; 26L/13T; ECTS credits:6

Project planning: networks; work breakdown structures (wbs), job ordering procedures, multiple projects, concurrent engineering: milestones, review points and slip charts: project life cycles: from concept through design- validation-production-service; support and disposal: computer programs for project management. [p] Man management: effective communications, cross-functional experience;

relationships, organisational make-up, change management. Cost estimation for products; projects: estimating resource, time; cost requirements and constraints: life cycle costs, detailed; parametric cost estimating models, 3-estimate method: opportunity costs of project delays: budget determination, opening; maintaining accounts: basic profit; loss determination.

IE4712 Operations Integration (Spring/1)

4 hours per week; 13 weeks/2nd semester;
26L/26LAB;ECTS credits:6

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.

ME4002 Introduction to Engineering 2 (Spring/1)

4 hours per week; 13 weeks/2nd semester; 26L/26T;
ECTS credits:6

Oral presentation techniques and use of information technology; teamwork skills; metal casting processes; shaping processes for plastics: extrusion, injection moulding, compression moulding, blow moulding, thermoforming; shaping processes for polymer matrix composites: open moulds, closed moulds; powder metallurgy and processing of ceramics; metal forming; material removal processes; heat treatments; surface treatments; joining; mechanical assembly; rapid prototyping; microfabrication processes; quality control, measurement and inspection; manufacturing systems; sustainability.
Prerequisite ME4001

ME4008 Orthopaedic Biomechanics and Mechanobiology (Spring/4)

5 hours per week; 13 weeks/8th semester; 39L/26T; ECTS credits:6

Development and structure of bone; Bone biomechanics; Composition and structure of cartilage; Cartilage biomechanics; Structure and mechanics of the ligament and tendon; Computational models in orthopaedic biomechanics; Cell mechanics; Models of cell mechanical behaviour; Cellular mechanotransduction; Bone mechanobiology; Cartilage mechanobiology; Ligament and tendon mechanobiology; Techniques in mechanobiology; Mechanical stimulation of cells; Orthopaedic tissue engineering; Bioreactors in Tissue Engineering;

ME4101 – Aircraft Mechanisms

2 hours per week; 13 weeks/2nd semester; 13L/13T;
ECTS credits:3

Kinematics of Simple Mechanisms and Linkages. Analysis of Four Bar Linkages. Analysis of landing gear systems, ailerons and wing spoilers. Cams: Kinematic analysis of follower motion, velocity and acceleration of cams, construction of cam profiles, Forces analysis of

cams. Gears: Torque and power transmission, helicopters rotor gearboxes Balancing: Balancing of aircraft engines, static and dynamic balance Gyroscope: Gyroscope analysis and gyroscopic effects on wings. Gyrocompasses.

ME4112 Engineering Mechanics 2* (Spring/1)

4 hours per week; 13 weeks/2nd semester; 26L/26LAB; ECTS credits:6

Application of Newton's laws to particles and rigid bodies in equilibrium (dynamics); kinematics of particles, Cartesian, polar, normal and tangential co-ordinates; kinetics of particles, work, kinetic energy, potential energy, impulse and momentum; kinetics of systems of particles; rigid bodies in plane motion, motion relative to rotating axes, mechanisms; rigid bodies in three-dimensional motion, Euler's equations of motion, gyroscopes.

ME4116 Aircraft Vibrations (Spring/3)

3 hours per week; 13 weeks/6th semester; 26L/13T; ECTS credits:6

Oscillatory motion; free vibration of single degree of freedom systems; harmonically excited vibration; transient vibration; transient vibration; systems with two or more degrees of freedom; vibration of continuous systems; sources of aircraft vibrations; flutter and aero elasticity; control of aircraft vibrations.

ME4226 Mechanics of Solids 2 (Spring/3)

4 hours per week; 13 weeks/6th semester; 26L/26LAB; ECTS credits:6

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*

ME4306 Biomaterials 2 (Spring/3)

5 hours per week; 13 weeks/6th semester; 39L/26T; ECTS credits:6

Materials for hard tissue orthopaedic materials, survey of applications (TJR, substitution, fixation) alloys bone cements, substitutes (bioactive and resorbable). Dental implant applications and materials Dental restorative materials Regulatory affairs: 93/42/EEC, MDD, FDA, EN46000, AIMDD, IVDD and related standards.

ME4328 Aircraft Maintenance (Spring/4)

4 hours per week; 13 weeks/8th semester; 26L/26T; ECTS credits:6

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.

ME4412 Fluid Mechanics 1 (Spring/1)

4 hours per week; 13 weeks/2nd semester; 26L/26LAB; ECTS credits:6

Characteristics and Properties of Fluids. Fluid Static's and Manometry. Principles of Continuity, Momentum and Energy conservation applied to fluid dynamics, e.g. Drag of a Two Dimensional Body. Boundary Layer theory with applications to smooth and rough pipes. Effect of pressure gradient on boundary layer. Flow over flat plate and airfoil sections. Drag, lift and dependence on Airfoil Section geometry.

ME4414 Fluid Mechanics 2 (Spring/2)

4 hours per week; 13 weeks/6th semester; 26L/13T; ECTS credits:6

Dimensional analysis and dynamic similarity with applications; inviscid flow theory and applications; vortex motion; analysis and performance evaluation of turbines, fans and pumps; selection of hydraulic machines from specific property requirements; navier-stokes equations with applications, lubrication theory; compressible flow; channel flow. *Prerequisite ME4313*

ME4417 Boundary Layer Theory (Spring/4)

6 hours per week; 13 weeks/8th semester; 26L/26T/26LAB; ECTS credits:6

The Derivation of the Three-Dimensional Viscous, Steady, Compressible Equations of the Conservation of Mass, Momentum and Energy. The Distinction between Differential and Integral Solutions. Differential Solutions for Simple Pipe Flow with Heat Transfer and Couette Flow. The Von-Karmen Integral Solution of Flat Plate Flow with Heat Transfer. Dimensional Analysis for Free and Forced Convection: the Non-dimensionalised Differential Equations. Shear Stress Drag and the Reynolds Colburn Analogy. Theories of Turbulence: The Prandtl - Mixing Layer Theory, the K-E Model. The Effect of Turbulence on Drag and Heat Transfer: The Elements of a Turbulent Boundary Layer. *Prerequisite ME4412*

ME4516 Thermodynamics 2* (Spring/3)

4 hours per week; 13 weeks/6th semester; 39L/13LAB;ECTS credits:6

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

ME4526 Introduction to Heat Transfer* (Spring/3)

4 hours per week; 13 weeks/6th semester; 26L/13T; ECTS credits:6

Fourier's law of heat conduction the convection equation thermal resistance's and their application two-dimensional heat conduction: an analytical example numerical methods in heat conduction time varying heat transfer: the lumped heat capacity method forced convection: standard heat transfer correlations and their application free convection: standard heat transfer correlation's and their applications thermal radiation: an introduction heat exchange design equations: the log mean temperature difference.

Prerequisite ME4312

ME4528 Propulsion Systems (Spring/4)

5 hours per week; 13 weeks/8th semester; 39L/26T; ECTS credits:6

An overview of propulsion systems and the development of thrust. A review of the conservation equations of fluid mechanics. The thrust equation. Propulsion efficiencies and implications for system design. A review of compressible fluid flow covering isentropic flow through ducts, constant area heat transfer and shock wave formation. The thermodynamic design of air-breathing engines covering the ramjet, the turbojet, the turbofan and the turboprop. Typical engine performance and aircraft matching. Detailed aerothermodynamic design of intakes, combustion chambers and exhaust nozzles. Detailed internal design of compressors and turbines covering two-dimensional blade row velocity diagrams, boundary layer flow and performance limitations.

ME4616 Finite Element Analysis* (Spring/3)

4 hours per week; 13 weeks/6th semester; 39L/13LAB; ECTS credits:6

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.

ME4714 Instrumentation and Control (Spring/2)

3 hours per week; 13 weeks/4th semester; 26L/13LAB;ECTS credits:6

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.

ME4718 Fluid Process Control (Spring/4)

4 hours per week; 13 weeks/8th semester; 26L/26LAB; ECTS credits:6

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*

ME4726 Flight Mechanics* (Spring/3)

Visiting students cannot avail of the inflight laboratory, but can attend class and write the exam

4 hours per week; 13 weeks/6th semester; 39L/13T; ECTS credits:6

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*

ME4736 – Physiological Fluid Mechanics 1 (Spring/3)

Viscous and inviscid flow theory and applications. The role of transport phenomena in biological systems and the definition of these processes, including momentum, convection, diffusion and binding interactions. Introduction to the primary physiological convective transport systems: cardiovascular system, respiratory system, urological and lymph systems. Properties of physiological fluids and constitutive relations; Newtons law of viscosity, non-Newtonian rheology and time dependant viscoelastic behaviour. The derivation of the conservation relations for fluid transport, dimensional analysis and scaling. Introduction to Mass Transfer, Ficks law of diffusion. Transport of Gases between blood and tissues: oxygen-haemoglobin equilibria and the dynamics of oxygenation of blood in lung capillaries.

ME4746 Physiological Fluid Mechanics 2 (Spring/3)

5 hours per week; 13 weeks/6th semester; 39L/26T; ECTS credits:6

The role of transport phenomena in biological systems and the definition of these processes, including momentum, convection, diffusion and binding interactions. Introduction to the primary physiological transport systems: cardiovascular system, respiratory system, gastrointestinal tract, liver and kidneys. Extension of fluid mechanics of capillary flow into oscillating flow. Introduction to mass transport, derivation of the relevant conservation equations, dimensional analysis and scaling. Estimating mass transfer coefficients using correlations. Ficks law of diffusion (dilute solutions), the Stokes-Einstein equation and estimation of frictional drag coefficients. Osmosis and mass transport through membranes. Introduction to thermal transport, conduction, convection and radiation and derivation of the conservation equations. Estimation of heat transfer coefficients. Thermal regulation of biological systems

ME4818 Mechanical Design + (Spring/4)

3 hours per week; 13 weeks/8th semester; 26L/13LAB; ECTS credits:6

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 (Spring/3)

FULL YEAR STUDENTS ONLY – Linked with ME4807 in the Autumn Semester

4 hours per week, 13 weeks/6th semester; 26L/26T; ECTS credits:6

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 allowable, 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.

MF4728 Occupational Psychology (Spring/4)

4 hours per week; 13 weeks/8th semester; 26L/26T; ECTS credits:6

To acquaint the student with the wider context in which he or she will be working. They will, for example, need management skills.

MF4756 Product Design & Modelling* (Spring/3)

4 hours per week; 13 weeks/6th semester; 52LAB; ECTS credits:6

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.*

MF4768 Ergonomics* (Spring/4)

3 hours per week; 13 weeks/8th semester; 13L/26LAB; ECTS credits:6

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.*

MT4002 Materials (Spring/2)

5 hours per week; 13 weeks/4th semester; 39L/26LAB; ECTS credits:6

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 (dislocations and yielding in crystals, strengthening methods and plasticity of polycrystals) Fast fracture and toughness (micromechanisms of fast fracture) Fatigue failure (fatigue of cracked and uncracked components, mechanisms, design against fatigue) Creep and creep fracture (kinetic theory of diffusion, mechanisms of creep and creep-resistant materials) Design with materials Case Studies and laboratory experiments incorporating examples of mechanical testing, failure analysis, design and materials selection.

MT4008 Properties of Materials (B) (Spring/4)

3 hours per week; 13 weeks/8th semester; 26L/13LAB; ECTS credits:6

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.

MT4208 Materials Selection & Design* (Spring/4)

2 hours per week; 13 weeks/8th semester; 13L/13T; ECTS credits:6

Basic principles of materials selection; assessment of design function; selection procedures; selection for mechanical properties.

MT4518 Surface Technology (Spring/4)

4 hours per week; 13 weeks/8th semester; 26L/26T; ECTS credits:6

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.

MT4943 Materials Processing (Spring/2)

4 hours per week; 13 weeks/3rd semester; 26L/26LAB ECTS credits:6

Metals: Casting. Forming: extrusion, forging, rolling, sheet metal work. Joining: mechanical, welding, adhesion, brazing. Polymers. Processing Techniques.

PD4004 Design Visualisation Studio (Spring/2)

3 hours per week; 13 weeks/4th semester; 26L/13LAB; ECTS credits:6

Appreciate the place of the visual image in design. Use a variety of manual design communication methods. Use computers software to model, render and animate design ideas and solutions. Make 3D models of design concepts. Produce a response to a design assignment which reflects a thorough appreciation of visualisation techniques. The visual image, visual thinking, graphic ideation. Visualisation systems. Traditional media, including presentation and rendering techniques. Computer-modelling, rendering and animation. Design for electronic media. 3D Studio – Studio basics and applications. Importing CAD models, Lighting, Rendering, Texturing, Animation. Design presentation assignment.

Prerequisite modules:ID4811, ID4812

PD4104 Design Studio 4 (Spring/2)

4 hours per week; 13 weeks/2nd semester; ECTS credits:6

Produce concept design solutions. Take a user based design approach. Understand the ethics of design. Consider value systems where users are central to the process of design. Understand the formal procedural framework for evaluating design problems. Develop the skills of collaborative design. Design concept development and realisation based on specifications. Ideas development. Concept - generation and development. Concept evaluation, rationalisation and compromise based on specifications and constraints. Elaboration of specifications and presentation of final concept. Sustainability, environmental and universal design issues.

PD4102 Design Studio 2 (Spring/1)

6 hours per week; 13 weeks/2nd semester; ECTS credits:6

This module comprises three complimentary streams, Design Methods, Design Techniques and Design History. These combine to introduce the student to the designed product in total taking into account practical considerations, aesthetics and social conditions.

PE4112 Production Technology 1 (Spring/1)

2 hours per week; 13 weeks/2nd semester; 13L/13LAB; ECTS credits:6

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.

PD4124 Contemporary Design Culture (Spring/2)

3 hours per week; 13 weeks/4th semester; 26L/13LAB; ECTS credits:6

Contextualise their individual works within contemporary and historical practice. Trace the development of modern design philosophies.. Understand the practicalities of working as a professional designer. Debate and discuss design styles, trends, philosophies and ethos. Present design projects which reflect an understanding of the above. Produce an essay exploring a facet of design culture or trend in depth. Discussion and Debate - The Design Soapbox. Contemporary design approaches. International trends. Design Philosophy, Sociology and Psychology. Trend forecasting. Professional Practice. Defining Roles. Forecasting and Trends. Practitioner Lectures and Workshops. Market focus and business development. Field trips and Exhibitions.

PE4112 Production Technology 1 (Spring/1)

2 hours per week; 13 weeks/2nd semester; 13L/13LAB; ECTS credits:6

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.

PN4002 – Technical Graphics 2 (Spring/1)

6 hours per week; 13 weeks/2nd semester; ECTS credits:6

Plane and descriptive geometry problem solving skills. Geometric constructions and theorems, areas of figures, ratios and area conversions. Plane loci incl. the ellipse, parabola as loci, Generating and developing design ideas and strategies. Isometric drawing, isometric scales. Basic transformations and mappings. Surface developments and package design. Scaled drawing. Technical sketching. Pedagogic strategies. Using the SolidWorks user interface. File management. Online help. Visualising objects and selecting the best sketching profile. Introduction to robust sketching for design intent. Sketch relations. Basic part modelling using extruded and revolved features. Open and closed profiles. Thin features. Feature end conditions such as blind, through all and mid plane. Capturing design intent through dimensioning and relations. Applied features including chamfers, fillets and shelling. Basics of bottom-up assembly modelling. Basic mates. Creating basic Part and Assembly drawings. Methods of visualisation and communication of CAD entities.

PN4102 Process Technology 1* (Spring/1)

3 hours per week; 13 weeks/2nd semester; 26L/13LAB; ECTS credits:6

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 artefacts; application of protective finishes.

PN4106 – Design and Automation (Spring/3)

5 hours per week; 13 weeks/6th semester; 26L/13T/26LAB; ECTS credits:6

Components of an automated system, controllers, servo motors and feedback. A/D and D/A conversions. Binary and analog outputs and inputs to devices. Interfacing with, and control of devices using CircuitWizard software. Robot classification and control, degrees of freedom, programming techniques. Peripheral Interface Controllers (PICs) and their applications to simple automation projects. Design of working PIC circuits incorporating Input and Output devices. Compressors, receivers, valves and cylinders. Use of pneumatic simulation software. Design and construction of pneumatic circuits. Design, analysis and testing of planar linkages for Generation of a straight line motion by linkage mechanism. Reproduction of a path traced by one point at another tracing point with a change in scale. Transfer of torque and motion between non-coaxial shafts with changing relative alignment. Automotive steering mechanisms and suspension mechanisms. Indexing: Intermittent timed motion.

PN4108 – Manufacturing and Service Systems Design (Spring/4)

4 hours per week; 13 weeks/8th semester; ECTS credits:6

1. The large picture. International competition and specialisation, the extended enterprise, international supply-chain concept, structure of supply-chains and individual business units. Design questions. Types of flow: information, materials and monetary flows, IT-based enterprise planning and control superstructures. The key importance of the engineer's talents. 2. What is a product? contemporary concept of a product - product, service and product-service offerings, product and process life-cycles, getting customers what they want: the production-consumption cycle, representation - bill-of-materials, bill of capacities, types of order-fulfilment - make-to-stock, engineer-to-order, make-to-order, configure-to order, off-the-shelf. Demand-pull versus supply-push, Just-In-Time concept. 3. Objectives - What is meant by High-Performance - Economy, agility, innovation, security/risk. Two concepts of time - machine time, capacity and cost; cycle-time, delay and WIP. Forms of waste and economy of operations. Variabilities in the system. System responsiveness and agility. Service-cost trade-offs. Time-to-market and innovation. System risk and human-tech work. 4. The nervous system of an enterprise: a complex spectrum of enterprise control systems - material flow, information flow, quality, operations scheduling, physical plant, human resources, supply base, markets, proprietary process and product knowledge, finance. 5. The enterprise anatomy: Front-line departments in a business unit - Marketing, Research and Development, Engineering, Manufacturing, Logistics. Drilling-down the hierarchy - global supply-chains, companies, facilities, work-centres, operators and machines. 6. Designing the individual work-centre: what is work? physical work and knowledge work, design of work-centres, functions of machines and operators, fitting the machine to the operator, task analysis and performance prediction, error prediction, standardisation, simplification and minimal work-flow, implications of good and bad design. 7. Designing the facility: process analysis, layout of facilities, space allowances, adjacency desirability, minimal distance, WIP, capacity determination and bottlenecks, safety, hazardous processes and storage, security. Implications of good and bad design. 8. Combining enterprises into supply-chains: supply-make-deliver, location decisions, transportation alternatives, site selection, why companies choose one country over another. Placing inventory - dynamic phenomena in supply-chain control - the beer game. Implications of good and bad design. 9. Operationalising soft systems improvement - PDCA cycle (plan-do-check-act), motivation and human-centred operations improvement, quality circles, ASRS reporting systems in air transportation, six-sigma, lean, future soft technologies?

PN4206 – Process Technology 4 (ED) (Spring/3)

4 hours per week; 13 weeks/6th semester; ECTS credits:6

Multistart thread cutting in the lathe. Precision surface grinding techniques. Grinding wheel technology. Correct use, handling and storage of grinding wheels. ISO standards for tooling. Grade selection criteria for tungsten carbide tooling. Taylors equation for tool life. Optimum speeds and feed rates to maximise tool life. Engineering materials in machine design, materials selection, specification and

identification for bearings, shafts, gears, housings and other machine components Bearings, ball and roller bearings. Selection of bearings, bearing mounting arrangements. Machine joint design, fasteners, rivet cotters, keys and welded joints. Stress on machine joint components, Twisting of Shafts, Deflection of Beams. Basic treatment of Shear Force and Bending moment diagrams. Factor of safety. Revision on basic concepts of machine design Forces on screw threads. Design of cams. Design of work holding and clamping systems involving screw threads and cams. Consideration of the impact of selected processing methods on the work environment.

PN4306 – Design & Communication Graphics 2 (Spring/3)

6 hours per week; 13 weeks/2nd semester; ECTS credits:6

Freehand sketching of geometry problems. Dynamic mechanisms: involutes and spirals, cycloidal curves, gears, cam profiles, helix and helical applications. Structural forms: singly and doubly ruled surfaces, hyperbolic paraboloid, hyperboloid of revolution, geodesic domes, plane directors. Geologic geometry: dip, strike and thickness of ore strata, road geometry, cuttings and embankments for level and inclined constructions, skew boreholes. Surface geometry: dihedral angles, surface developments of transition pieces, intersection of oblique surfaces. Assemblies: sectional views, surface finish and texture symbols. Apply 3D CAD to the design process, geometric principles and problems. Multibody part design techniques. Sweep, loft and boundary features. Splines and 3D sketches. Advanced 3D CAD modelling tools. Reference geometry. Toolbox and part configurations. Top-down assembly modelling approaches. Creating sub-assemblies. Advanced mates. Working with drawing views. Alternate position and detail views. Assembly mechanisms. Assembly analysis. Surface and hybrid modelling techniques. Sheet metal, weldment, mould and die tools. Animation and simulation analysis of 3D CAD assemblies. 3D CAD pedagogy.

PN4308 Design & Communication Graphics 3 (Spring/4)

6 hours per week; 13 weeks/8th semester; ECTS credits:6

Intersection of surfaces, hinged planes. Platonic solids: octahedron, dodecahedron, icosahedron. Advanced second auxiliary problems. Advanced perspective. Shadow projection. Advanced conics, conjugate diameters, evolutes. Advanced descriptive geometry of lines and planes including skew lines. Projection of oblique solids, section planes as a problem solving tool. Advanced plane geometry. Applied 3D CAD and associated pedagogy. Generate and solve design briefs. Mechanisms: trochoids, gears, cams. Advanced structural forms. Advanced geologic geometry. Advanced surface geometry. Advanced assemblies. Advanced cognitive modelling strategies. 3D CAD tools applied to communicate and solve a range of geometry and design problems. Designing for sustainability and usability. Examination design and assessment. Use of 3D CAD to develop teaching resources.

PN4318 Machine Control* (Spring/4)

3 hours per week; 13 weeks/8th semester; 26L/13LAB; ECTS credits:6

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.

PT4001 – Sustainable Development (Spring/1)

3 hours per week; 13 weeks/2nd semester; 26L/13LAB; ECTS credits:6

Definitions and contexts for understanding social and human aspects of sustainable development, critical thinking, challenging assumptions, examination of knowledge creation, semiotics. Climate change, the physical science and international politics, energy, energy use in everyday living, transport, sources of energy and GHG emissions for different sources, energy dependence, renewable energy (wind, biofuel, solar, wave), efficiency and conservation, peak oil. The economics of sustainability, does sustainable innovation enable sustainable growth? Consumption and production, environmental impact of everyday things, how marketing influences, life cycle thinking, behavioural thinking, systems change and intervention, creativity and innovation, corporate social responsibility, ethical investment. Food, sustainable food production, energetics of food production, sustainability of the food chain. Sustainability and public policy, sustainable development in the national context, the public policy making process, horizontal policy issues, regional and local, European Community and the environment. Sustainability metrics, using scientific analysis to quantify sustainability as guidance for policy makers, environmental taxes, non-environmental subsidies. Sustainable communities, building sustainable community action, bottom up approaches, role of local democracy and environmental and social movements, local agenda 21.

PT4004 – Introduction to Quality Management (Spring/2)

4 hours per week; 13 weeks/4th semester; ECTS credits:6

1. What is Quality and why is it important; 2. Quality Control / Assurance; 3. Quality Management Systems, 4. Development of Total Quality Management; 5. Continuous Improvement; 6. Documentation, Audits, Standards (ISO9000:2000); 7. Human Resource issues, 8. Quality Tools and techniques: Quality Function Deployment, Failure Mode and Effects Analysis, Statistical Process Control, Six Sigma; Benchmarking

PT4008 Deliver and Return within Supply Chains (Spring/4)

4 hours per week; 13 weeks/8th semester; ECTS credits:6

Concepts of Logistics and Distribution, Introduction to history and development, Channels of distribution, Planning framework for logistics, Logistics network planning and management. Physical Logistics Planning Warehousing, stocking, order-picking, Transportation, modes of transport, intermodal freight. International Contracting in Logistics International Contracts, Customs, Regulations, Incoterms, Managing transaction risk, payments, exchange rate exposure. Regulation and Green Logistics Reverse logistics and product lifecycle management, return of goods at end of life, Logistics and the environment.

PT4014 Plant Automation (Spring/2)

4 hours per week; 13 weeks/4th semester; ECTS credits:6

Spreadsheet basics: MS Excel, cell attributes (number, character formats), relative/absolute, formulas functions inc arithmetic, trig, conditional), row/column calculations, configuring charts (category data line/bar, scatter plots, primary/secondary axes, formatting), row/column calculations, functions (sum, sumproduct, statistical, financial), linking between worksheets, add-ins, pivot tables, macros. Spreadsheet automation: macros, visual basic for applications MS VBA, conditional looping and branching, vector (list) and matrix (array) lookup. Applications to observation and data analysis for building an evidence base: experimental observations (1) continuous variables (time), work hard versus work smart experiment, t-test to compare outcomes (manual and excel function). (2) binary attribute variable (present/absent), occurrence sampling, confidence intervals, chart on number line. (3) associative relationship: linear regression curve-fitting, trendline fit to observed data, extension to non-linear regression-based models. Process visualisation: MS Visio, 5S lean process improvement, flow charts, critical questioning matrix, performance improvement (time). Standard Time, rating observations: correction to standard time using linear regression trendline fit for correction and comparison of observers and methods (trendline function). Optimisation: MS Solver add-in, most profitable mix of products subject to constraints of capacity, market, and material availability. Decision philosophy: continuous improvement PDSA, evidence-informed decisions, scale of **scientific evidence used in healthcare delivery**.

PT4022 Introduction to Quality Management (Spring/1)

4 hours per week; 13 weeks/4th semester; ECTS credits:6

Syllabus:

1. Quality Control / Assurance, Quality Management Systems, documentation, audits, standards (ISO9000:2000)
2. Total Quality Management, human resource issues, sourcing policy
3. Quality Costs
4. Problem solving tools
5. Benchmarking and Quality Function Deployment.

PT4112 Manufacturing Technology 2* (Spring/1)

1 hour per week; 13 weeks/2nd semester; 13LAB; ECTS credits:6

Precision measurement and inspection; process capability; quality and accuracy; machining; fundamental treatment of the shear plane; work holding; welding techniques; mechanical joining.

Prerequisite PT4111

PT4424 3D CAD Modelling (Spring/2)

4 hours per week; 13 weeks/4th semester; 52 LAB; ECTS credits:6

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 (Spring/4)

4 hours per week; 13 weeks/8th semester; 26L/26 LAB; ECTS credits:6

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

PT4515 – Automation T 1

Definition of open and closed loop control. Boolean Algebra, logic elements, counters, scalars and shift registers, basic circuitry, input-output signals. Programmable logic controller hardware and software, applying programmable logic controllers to the control of manufacturing equipment. Field bus technology. Pneumatics pneumatic control, pneumatic circuit design, electro-pneumatics. Hydraulics hydraulic control, hydraulic circuit design. Interfacing Basic signal types A/D D/A conversion. Data transmission. Sensors digital and analogue: proximity switches, photoelectric sensors, resistive, capacitive and inductive sensors, bar codes and vision systems. Fault finding Standard Fault finding techniques. Concepts, Production Flow Analysis, Cellular layout/Batch Definition Elements of Cellular

manufacture, AGV and AGV systems, Co-ordinate Systems, Robot Grippers, LabVIEW Software.

PT4518 Automation Technology 3 (Spring/4)

4 hours per week; 13 weeks/8th semester; 39L/13LAB; ECTS credits:6

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. 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 PT4517

RE4006 - Spatial Robotics

5 hours per week; 13 weeks/8th semester; 26L/26LAB/13TUT; ECTS credits:6

Design of Modern Robotic Systems. Component specification; Robot Arms, sensors and actuators. Position Control; Rigid Transformations, Kinematics, Inverse Kinematics. Robot Programming, Sensor System Integration, Robot Grippers. Positioning And Navigation, Position Estimation, Trajectory Following. Advanced topics: Robot arms: Payload analysis, Jacobians, Quaternions, Dynamics. Robot navigation: Explicit incorporation of uncertainty in Robotic Systems design, parametric approaches stochastic models of uncertainty, Kalman Filter design, specification and implementation.

RE4017 – Machine Vision

5 hours per week; 13 weeks/8th semester; 26L/26LAB/13TUT; ECTS credits:6

Image Formation: Pin-hole camera model, Projective geometry, colour space RGB & HSL Image Distortion and camera calibration Image Acquisition: Lenses, Camera Systems, Sampling. Low-Level Image Processing for Machine Vision: Filtering, Edge-Detection, Thinning, Photometric Stereo, Shape-From-Shading, Interest point detection. Motion: Motion Field and Optical Flow High-Level Image Processing: Region Segmentation And Labelling, Classification, Object Detection. Neural Approaches To Image Processing. Structure From Motion. Example Application (Picking Parts From A Bin). Stereovision Visual Servoing; Position Based and Image Based Visual Servoing.

WT4005 – Architectural Technology: Heritage and Design

Humans and shelter. Social, cultural and traditional aspects of providing shelter. Historical development and diversity. Built heritage: significance of old buildings, site visits, recording heritage, builder as designer and artisan. Vernacular architecture: Evolution of Irish vernacular architecture. Congruence of building and landscape. Aesthetics of vernacular buildings. Formal architecture: Design, scale and proportion of formal buildings. Formal architectural styles. Streetscapes. Organisation of urban spaces. Conservation: Restoration and reconstruction of rural and urban buildings. Design influences and considerations. Site selection: environmental, ecological and safety considerations. Design of domestic dwellings: light, space, comfort, privacy, energy, universality. Architectural modelling. Strategies for teaching Architectural Heritage & Appreciation at second level. Designing, planning and managing appropriate teaching and learning activities for Architectural Heritage & Appreciation.

WT4014 Introduction to Geology & Soil Mechanics

5 hours per week; 13 weeks/2nd semester; 26L/13T/26LAB; ECTS credits:6

This module introduces the most common engineering material encountered in the construction industry; this introductory module on soil mechanics is presented by exploring the origin and material characteristics of soil starting with some contextual lectures in civil engineering geology. Working in small teams, students then undertake a single engineering project for the semester. The project will develop specific skills in basic site investigation, soil classification and fundamental soil properties, soil compaction theory and practice, effective stress and seepage. The course is designed to challenge the student to seek the key concepts in geology and soil mechanics and apply these concepts through a project and self-directed learning to achieve the following key objectives:

To provide a clear understanding of the role of geology and soil mechanics in achieving a successful construction project.

To form the basis for subsequent modules on Soil Mechanics and Geotechnical Engineering Design.

To generate enthusiasm for the subject through field trips, practical experimentation and case histories.

WT4016 – Wood Technology and Design 2

Pedagogic approaches to integrating design and manufacturing techniques and processes in senior cycle project work. Stages and functions of design. Model making and prototyping. Materials selection for sustainability. Material and process carbon footprint. Design and selection of wood and composite jointing techniques. Material optimisation. Design strategies. Programming and operation of CNC equipment. Data transfer from CAD systems. Analysis of the application of these technologies in the school. Production procedures. Organisation of work. Classroom/workshop/laboratory organisation. Fostering creativity in classroom activities. Assessment procedures and criteria. Presentation techniques. Design portfolios.

WT4018 – Advanced Timber Construction

Elements of timber frame construction: beam, truss, shear wall, stressed skin panel, ground floor wall, party wall, cladding, insulation, connectors. Methods of construction: system construction, proprietary products, site assembly Methods of design: truss, floor, wall, lateral resistance, multi-storey Methods of analysis: EC5, limit state design, self weight, wind, snow Physics of wooden buildings: flow of heat, flow of moisture, flow of sound, flow of fire, flow of light

WT4102 Wood Science 1 (Spring/1)

3 hours per week; 13 weeks/2nd semester; 26L/13LAB; ECTS credits:6

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* (Spring/2)

3 hours per week; 13 weeks/4th semester; 26L/13LAB; ECTS credits:6

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

Properties and characteristics of various materials: wood and wood based products, metals, polymers, ceramics and glass, composites (cement and concrete), adhesives. Sustainability and materials. Ecological impact of materials and processes. 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.

WT4107 Pulp Fibre and Board Manufacture 1 (Spring/3)

4 hours per week; 13 weeks/7th semester; 26L/26LAB; ECTS credits:6

Concepts in modifying wood: deconstruction, combination, chemical and physical changes. Commination: fibres, pulping, mechanical, chemical, physical, chips, particles, veneer, sections. Fibre Products: Papers manufacture, types, specification, modification, print requirements. Cardboard, specification, corrugation, packaging. Hardboard, insulation board. Medium and high density fibreboard, manufacture, types, properties, end uses.

WT4202 Design Studio* (Spring/1)

3 hours per week; 13 weeks/2nd semester 13L/13T/13LAB; ECTS credits:6

The process of problem analysis to function and markets; the principle and elements of design relationships, shape, form, and texture; seminars/projects; exploration of design theory through visits and workshop sessions.

WT4208 – Building Services 2 (Spring/4)

3 hours per week; 13 weeks/8th semester 13L/13T/13LAB; ECTS credits:6

* Heating and air-conditioning services: energy performance measurements using, SBEM and NEAP; heating and air conditioning, temperature drop through structures; gas supply and distribution, gas controls, ventilation ducts and fans, solar heating, heat pumps and biomass. * Hot and cold water services: Pipe sizing for hot and cold water multi-storey buildings, force and pressure, hydraulics. * Drainage services: sustainable urban drainage, retention tanks, oil separation, green roof, grey water recycling * Electrical services: electrical terms and installations, supply and distribution of electricity, supply controls, protection, conductor and cable rating, methods of wiring and distribution systems, single phase power circuits; electrical installations in large buildings; site electricity, electric space heating * Access services: lifts, escalators and service ducts, automatic control. * Lighting services: integration with electric light, natural lighting, artificial lighting, design of lighting, lighting controls * Safety services: classification of fire risks, safety devices, heating and flues; sprinklers, risers and hose reel installations, dry and wet risers; portable and fixed extinguishers, automatic fire detectors, alarms and dampers, pressurisation of escape routes, automatic fire ventilation fire detection, security systems. * Electrical services: supply to non domestic buildings micro generation (solar and wind) * Data services; audio visual, broadband and telephony.

WT4302 – Wood Technology 2 (Spring/1)

Wood processing techniques and procedures. Decorative process for wood. Wood turning, veneering, marquetry, laminating, inlaying, pyrography, carving and shaping of wood. Manufactured boards, Wood Adhesives. Finishing of wood. Material preparation, finish selection, techniques and procedures. Selection of tools/equipment, processes and fittings to meet specific applications. Safe use of electrically powered hand tools and equipment. Hazard analysis and

risk assessment. Safe demonstration techniques and procedures. 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 modelling. 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.

WT4304 Machining Technology 2* (Spring/2)

3 hours per week; 13 weeks/4th semester; 26L/13LAB; ECTS credits:6

Machine optimisation, analysis of factors governing mass production processing; product design, process and assembly interrelationships; introduction to CNC machining; planned maintenance; practical applications.

Prerequisite MT4303

WT4404 Wood Technology 1* (Spring/2)

3 hours per week; 13 weeks/4th semester; 26L/13LAB; ECTS credits:6

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 and Management 2 (Spring/2)

4 hours per week; 13 weeks/2nd semester; 26L/26Lab; ECTS credits: 6

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 waste 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 (Spring/2)

4 hours per week; 13 weeks/2nd semester; 26L/26Lab; ECTS credits: 6

* Heating ventilation and air conditioning services; district heating, heat loss calculations, thermal insulation, ventilation, air filters, heat recovery systems; principles of air conditioning, dual duct and convector

air conditioning systems, DEAP. * Hot and cold water supply services; low, medium and high pressure hot water heating. * Drainage services; below ground drainage systems, pipe materials and pipe laying, soakaways, drain testing and inspection. * Waste services; soil and waste systems, modified single stack and ventilated stack systems; resealing and anti-siphon traps, air pressure in discharge stacks; irrigation systems, sewage pumping, refuse disposal systems; sewage disposal, settlement tanks, bio-filters.

WT4604 Land Surveying (Spring/2)

3 hours per week; 13 weeks/4th semester; 26L/13LAB; ECTS credits:6

Surveying fundamentals, tape & offset surveying; levelling, the theodolite and its use, tension determination, steel taping differential levelling, traversing, angle measurement electromagnetic distance measurement, satellite positioning systems, survey methods, analysis & adjustment of measurements, areas & volumes, setting out, curve ranging, topographic surveying, construction control surveys, geographic information systems, global positioning systems, construction applications, field coding, automatic target recognition, typical field operations. Practical case studies and fieldwork.

WT4704 Building Measurement (Spring/2)

3 hours per week; 13 weeks/4th semester; 26L/13LAB; ECTS credits:6

Setting down dimensions, alternative systems, applied mensuration, general rules for taking-off; measuring substructures, excavations, formwork areas, various foundation types and measurement; walls, floors, concrete, blockwork, masonry, partitions and suspended ceilings; internal surface finishes, dry linings roofs, structural elements, roof finishes and coverings, waterproofing; internal finishes, windows, doors, staircases, fixtures and fittings; reinforced concrete structures, columns, beams, slabs, formwork, concrete finishes, reinforcement, precast elements; structural steelwork; structural timber, standard joinery components; plumbing, fittings, mechanical and electrical installations; drainage, underground and above ground, external works, roads, pavings, earthworks and groundworks, landscaping; demolitions, alterations and renovations.

WT4902 Model Making (Spring/1)

3 hours per week; 13 weeks/2nd semester; 26L/13LAB; ECTS credits:6

An introduction to Health and Safety in the workshop
An introduction to machines, equipment and tools for cutting, shaping, joining and finishing. Model making techniques using wood, plastics, metals and plaster of Paris, involving mould making for vacuum forming and plaster casting. Analysis of shapes and graphic presentation relative to material and process selection for designing the model.

WT4904 – Design for Teachers

Design process. Principles and elements of design. Shape, form, colour and texture. Problem definition and analysis. Topic and Task analysis. Flow diagrams and flow charts. Interpretation of design briefs. Formulating design briefs suitable for junior cycle technology subjects. Research and investigation techniques. Problem solving capabilities. Product development. Design communication techniques. Proportion. Aesthetics. Anthropometry. Model making. Design and realisation of a solution to a particular problem. 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.

methods and resources. Further experience of design as an iterative and creative process subject to constraints; Synthesis of ideas from strength of materials, `Assembly and Techniques; and `Drawing and Representation; in a design task; Assignments will typically involve prototype or model construction, as well as material or component testing; Presentation for critique of research results and proposals.

CE4004 – Mechanics of Solids (Spring 2)

4 hours per week; 13 weeks/2nd semester; 26L/26LAB;ECTS credits:6

Infinitesimal strain at a point in a two dimensional stress field and Mohr strain circle. Selection of strain gauges for measurement on metals, thin circular plates. Complex stresses and criteria for failure of isotropic homogeneous materials (Rankine, Tresca and Von Mises). Linear elastic fracture mechanics. Fatigue. Unsymmetrical bending of open and closed thin walled beams: shear centre. Constitutive relations. 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.

CE4008 VLSI Digital Processing Systems (Spring 4)

4 hours per week; 13 weeks/2nd semester; 26L/26LAB;ECTS credits:6

Pipelining and parallel processing. Signal flow graphs, Fine grain pipelining. Block processing. Low power architectures. Fault-tolerant DSP. Cyclic and acyclic convolution. Digital filter structures. CSD techniques, Distributed arithmetic, Fast convolution algorithms. Parallel FIR filters. Multidimensional convolution. Sampling-rate converters. Cooley-Tukey FFT, Goertzel algorithm. Bounds on multiplicative complexity. Multidimensional transforms. Modular arithmetic. Galois field Architectures for multiplication, division and exponentiation. Trellis and tree searching with the Viterbi algorithm, VLSI structures for the Viterbi decoder. Berlekamp Massey Algorithm for Toeplitz Systems.

CE4014 – Hydraulics and Water Engineering (Spring 2)

5 hours per week; 13 weeks/2nd semester; 39L/26LAB;ECTS credits:6

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

Design of water distribution pipe networks, pump types and characteristics, surface profiles and backwater curves, design of hydraulic structures. *Prerequisite CE4003*

CE4024 – Structural Steel and Timber Design (Spring 2)

4 hours per week; 13 weeks/2nd semester; 26L/26LAB;ECTS credits:6

Structural Steel Manufacture and composition; a review, section properties tables, design of fully restrained, partially restrained and unrestrained beams, truss design, design of long and short columns; axial and combined loading conditions, design of pinned and moment connections, baseplate and splice design, structural detailing and fire & durability issues. * Timber Design Properties and conversion of timber; a review, beam design, column design; axial and combined loading conditions, truss design and stability issues, Introduction to diaphragm & shearwall design, bolted, nailed and stapled connections, glulam, LVL and I-beam design, structural detailing and fire & durability issues.

CE4025 – Transport Planning and Design (spring /3)

4 hours per week; 13 weeks/2nd semester; 26L/26LAB;ECTS credits:6

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

CE4028 – Energy Efficient Buildings: Modelling and Design (spring 4)

5 hours per week; 13 weeks/2nd semester; 39L/26LAB;ECTS credits:6

Building design and energy use: historical trends, current status and future trends Building energy policy at national and EU level; factors affecting human comfort; Steady-state and transient thermal physics of buildings; heat transfer mechanisms; performance metrics; typical metric values for building including exemplar low-energy and passive builds; design related and environmental performance drivers; overall form, aspect ratio, surface-to-volume ratio, percentage glazing, orientation, site context, solar irradiance, prevailing winds, shelter, design features including insulation, solar shading, low-e coatings, automated shading and ventilation. Overview of strategies for modelling building thermal physics; thermal resistance networks; lumped capacitance; steady-state vs. transient; dimensionless scaling parameters and empirical correlations; compiling input data - building fabric, thermal mass, weather data, building use, active, passive and mixed mode ventilation, thermal sources, heating & cooling systems, control strategies and feedback. Design thermal model, build and digitise model, configure inputs, configure outputs, solve and interpret outputs; describe scope and limitations of model; suggest

FACULTY OF SCIENCE AND ENGINEERING

INFORMATICS & ELECTRONICS MODULES – Spring

CE4002 – Engineering Mechanics (Spring 1)

4 hours per week; 13 weeks/2nd semester; 26L/26LAB;ECTS credits:6

Load paths through structures under; vertical gravity load; horizontal loads from wind / stability. Methods of providing lateral stability; shear walls, cores, frames, strut / x-bracing; Field trip to significant building / structure to investigate / sketch load paths in-situ; Structural form; funicular shapes; applied to cables and arches; Bending moment and shear force diagrams under point and uniform loads, for simply supported and fixed end beams; Member forces in pin-jointed trusses; Introduction to structural dynamics / resonance; Introduction to relationship between bending moment / elastic modulus / bending stress; Design, develop and construct small structure to carry 150g load, including trial models and associated calculations to determine main member forces; Develop research

modifications to enhance energy usage, update model, analyse response and appreciate cost benefit of improvements.

CE4034 – Building Energy Systems (Spring 2)

5 hours per week; 13 weeks/2nd semester; 39L/26LAB;ECTS credits:6

Dwelling Energy Assessment Procedure DEAP Heat: Introduction to energy, thermal insulation, heat loss calculations, principles of air conditioning. Lighting: sources, efficiency and control. Ventilation: ventilation, air filters, heat recovery systems. Hot Water: Hot water supply, low, medium and high pressure hot water heating, district heating. Noise: managing noise.

CE4048 Geotechnical Engineering Design (Spring 4)

5 hours per week; 13 weeks/2nd semester; 39L/26LAB;ECTS credits:6

This module applies the material covered in WT4014 and CE4015 in the context of designing geotechnical structures for building or infrastructure projects. The course is designed to challenge the student to apply soil mechanics tenets through case-based projects. The following are the key objectives of the module:

To develop geotechnical design skills.

Apply the principles of soil mechanics and geology to design. To generate enthusiasm for the subject by analysing design problems including computer modelling based on laboratory and field data from case histories.

CE4058 – Project Planning and Control for the Built Environment (Spring 4)

5 hours per week; 13 weeks/2nd semester; 39L/26LAB;ECTS credits:6

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

CE4206 Operating Systems 2* (Spring/3)

5 hours per week; 13 weeks/6th semester; 26L/13T/26LAB; ECTS credits:6

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 Distributed Systems * (Spring/4)

5 hours per week; 13 weeks/8th semester; 236L/13T/26LAB; ECTS credits:6

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 middle ware.

Prerequisite CE4206

CE4518 Computer Architecture (Spring/4)

5 hours per week; 13 weeks/8th semester; 26L/13T/26LAB; ECTS credits:6

Review of Von-Numann architecture; computer performance measurement; floating point arithmetic; instruction set design and architecture; processor implementation techniques; pipe lining; memory hierarchy design.

CE4702 Computer Software 2 (Spring/1)

4 hours per week; 13 weeks/2nd semester; 26L/26LAB; ECTS credits:6

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.

CE4717 Language Processors (Spring/3)

3 hours per week; 13 weeks/2nd semester 26L/13T/; ECTS credits:6

Compiler structure: Definition of terms. Source, object and executable files. Symbols, definition and resolution. Phases of a compiler and their functions. Single and multi-pass compilation. Cross-compilation, interpreters and pseudo-machines. Grammars: Mathematical grammars for language definition. BNF and EBNF notations. Parse trees. Properties of grammars. The Chomsky hierarchy. Syntax diagrams. Restrictions on grammars. Parsing: Top-down parsing. Lookahead. Recursive descent. LL(l) grammars. First, follow and predict sets. Syntactic error detection and recovery for recursive descent parsers. Semantic processing: The symbol table. Handling semantic errors. Code generation for a simple stack machine: Translation of expressions to reverse-Polish form. Procedure calls and block structure. Static and dynamic scope. Storage management for modern languages. Scanning: Regular expressions. State machine implementation. Nondeterministic automata and translation to deterministic automata. The use of a scanner generator such as LEX. Table-driven parsing techniques: LL(l) table-driven parsers. Shift-reduce parsers. LR parsing. The LR(0) Characteristic Finite State Machine. LR(l). SLR. LALR(l). The use of a parser generator such as

yacc. Code generation for register architectures. Introduction to code optimisation techniques.

CS4004 Software Testing and Inspection (CSI 2-1-1) (Spring/2)

3 hours per week; 13 weeks/4th semester; 26L/13T; ECTS credits:6

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. Brief syllabus: 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

CS4005 Perpetual Systems and Multimedia (Spring/ 3)

3 hours per week; 13 weeks/4th semester; 26L/13T; ECTS credits:6

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

CS4006 Intelligent Systems (CSI 2-1-1)

4 hours per week; 13 weeks/2nd semester; 26L/26LAB; ECTS credits:6

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. Brief syllabus: To provide students with an understanding of the basic principles, methods and application domains for Artificial Intelligence. To introduce students to the development of Intelligent Systems, Knowledge Representation, and Machine Learning. 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.

CS4014 Software Development Project (Spring/2)

4 hours per week; 13 weeks/2nd semester; 26L/26LAB; ECTS credits:6

This module is intended to provide the student with an opportunity to undertake a semester long software development project. A student will gain experience of working in a team and the confidence to tackle a large software system.

Syllabus:

A substantial semester-long software project is set.

Students, working in teams, produce a complete implementation.

A partially specified project is presented.

Students complete the requirements and then take the project through the design, coding and testing stages.

The language and technology of implementation depends on the type of project specified but will generally allow students as much free choice as possible.

(Lectures and labs will run from weeks 1 to 5 inclusive).

These along with tutorials during this period will build on existing modelling, design and programming skills required to achieve the proposed system.

During the remainder of the semester students will meet with their assigned supervisor to discuss their work to date in a tutorial setting on a regular basis.)

CS4016 Directed Study for MMPTS CS4022 – Digital Instrument Fundamentals (Spring/3)

4 hours per week; 13 weeks/2nd semester; 26L/26LAB; ECTS credits:6

Music notation, traditional instrument design and electronic music interfaces; Understanding notation, rhythm, time signatures, key signatures, dynamics and articulation; The development of cross platform hybrid music interfaces and the establishment of digital instrument protocols. *Prerequisite CS4032*

CS4022 Digital Instrument Fundamentals (Spring/1)

4 hours per week; 13 weeks/2nd semester; 26L/26LAB; ECTS credits:6

This module is intended to provide the student with an opportunity to undertake a semester long software development project. A student will gain experience of working in a team and the confidence to tackle a large software system.

Syllabus:

A substantial semester-long software project is set.

Students, working in teams, produce a complete implementation.

A partially specified project is presented.

Students complete the requirements and then take the project through the design, coding and testing stages.

The language and technology of implementation depends on the type of project specified but will generally allow students as much free choice as possible.

(Lectures and labs will run from weeks 1 to 5 inclusive).

These along with tutorials during this period will build on existing modelling, design and programming skills required to achieve the proposed system.

During the remainder of the semester students will meet with their assigned supervisor to discuss their work to date in a tutorial setting on a regular basis.)

CS4026 – Digital Media Software and Media Systems 4 (spring/3)

3 hours per week; 13 weeks/6th semester; 26L/13T; ECTS credits:6

On successful completion of this module, students should be able to: 1. Implement a range of digital media systems. 2. Demonstrate relevant software skills which build on those established in the prior Digital Media Software & Systems modules 1-3. 3. Determine the tasks required in building a media system. 4. Collaborate with others in a small group in achieving those tasks. 5. Present the results in a coherent fashion.

On successful completion of this module, students should be able to: 1. Appreciate the relationship between technical achievement and artistic endeavour. *Prerequisites CS4034*

CS4028 E-Business Architectures (CSI 2-1-1)

On successful completion of this module students should be able to: select an appropriate e-business model for a given situation and design the system accordingly; select an appropriate e-business framework and tailor it to a given situation; demonstrate an awareness of the legal, ethical and security issues surrounding e-business; In addition, students should be aware of trends affecting e-business. **Brief syllabus:** Components of a business model; structure of an e-business model (EBM); classification of EBMs; taxonomy of EBMs; logical, technological, and organisational architectures for e-business; the value of e-business frameworks (EBFs); EBF functionality; EBF types; EBF categories; enabling technology; overview and architecture of EBFs; criteria for evaluating EBFs; what qualifies as web services; web services technologies; web services architecture; e-marketing and e-advertising concepts; e-customer relationship management; search-engine registration; social, legal and ethical issues in e-business; network security; wireless technology and m-business: location-identification technologies, wireless marketing, wireless payment options, privacy and the wireless internet;

CS4034 – Digital Media Software and Systems 3

3 hours per week; 13 weeks/6th semester; 26L/13T; ECTS credits:6

Audio: Implementing sound synthesis algorithms; Statistical Models; Video: Non-linear video editing; Chroma and luminance processing algorithms; Video effects algorithms; Synchronisation systems; Rendering algorithms; *Prerequisite CS4063*

CS4036 – Advanced Digital Audio and Video

4 hours per week; 13 weeks/2nd semester; 26L/26LAB; ECTS credits:6

Advanced approaches to composition and structure; The phenomenology of time; Collaborative and service logistics; Installation and real-time interactive systems; Real-time performance software for video and audio; Analysis of software systems and key works. *Prerequisites CS404, CS4054*

CS4043 Games Modelling Design (Spring /2)

3 hours per week; 13 weeks/4th semester; 26L/13T; ECTS credits:6

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

Syllabus:

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

CS4052 – Foundations of Interaction Design (Spring/1)

4 hours per week; 13 weeks/2nd semester; 26L/26LAB; ECTS credits:6

This course will provide the student with an understanding of the key elements required for the design of interaction. After a consideration of basic principles of design, the key features of narrativity and interactivity will be explored and analysed. The potential of different kinds of media to support interactivity will be studied. Methods of involvement of participants in the creation of new media will also be covered. *Prerequisite CS4031*

CS4056 Mobile Application Data (Spring/3)

4 hours per week; 13 weeks/2nd semester; 26L/26LAB; ECTS credits:6

(No description given)

CS4065 Web Infrastructure (Spring/3)

3 hours per week; 13 weeks/4th semester; 26L/13T; ECTS credits:6

This module will encourage students to develop standards-complaint web applications. Students will learn how different capabilities can be provided by competing technologies. A substantial web development project will be undertaken by students - the nature of the application domain of this undertaking will depend on the students chosen programme of study.

Syllabus:

- Categories and characteristics of web applications; - Similarities and differences between the development of traditional, not web-based applications and the development of web applications; - Modelling web applications: content, hypertext, presentation and customization modelling; - Modelling methods such as OOWS model driven approach, OOADM, UML, IDM approach, WebML, WebRATIO, HERA, WSDM, MDA; - Web application architecture: categorizing architectures, layered architectures, data-aspect architectures; - Web application design: information design and software design; presentation, interaction and functional design; - Technologies for web applications: hypertext and hypermedia; client/server communication; client-side technologies; document-specific technologies; server-side technologies; current concepts, methods, techniques and tools; - Security for web applications: encryption, digital signatures and certificates; secure client/server interaction; client security issues; service provider security issues; - Semantic web: roles of software agents, semantic markup and ontologies; semantic web applications; semantic web services;

CS4072 - MEDIA PROGRAMMING 2 (Spring/1)

4 hours per week; 13 weeks/2nd semester; 26L/26LAB; ECTS credits:6

- Vector and bitmapped image formats; - Drawing simple shapes and drawing text on existing images; - How we digitize/encode sounds; Nyquist theorem; manipulating samples; - Using iteration and selection constructs to increase/decrease sound, normalizing sound; - Creating sound clips, splicing sound, reversing and mirroring sound; - Composing and blending sounds; - Encoding, manipulating and creating movies; - Reading from and writing to text files; string manipulation; *Prerequisite CS4061*

CS4074 – AUDIO AND VIDEO PRODUCTION (Spring/2)

4 hours per week; 13 weeks/2nd semester; 26L/26LAB; ECTS credits:6

To provide the student with an understanding of; (1) the techniques for recording, processing and dissemination of audio and video (2) audio and video processing on both the temporal and spectral domain.

Syllabus:

Advanced mixing techniques. Advanced mixing techniques. Principles of audio reinforcement systems. Surround sound mixing, time code and synchronization. Digital video non-linear editing system. Advanced video editing techniques. Compositing and effects. Visual treatments. Finishing and disc authoring.

CS4076 – EVENT DRIVEN PROGRAMMING (Spring/3)

4 hours per week; 13 weeks/6th semester; 26L/26LAB; ECTS credits:6

Rationale And Purpose Of The Module:

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

Syllabus:

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

CS4078 – Applied Interaction Design (Spring/4)

3 hours per week; 13 weeks/6th semester; 26L/13T; ECTS credits:6

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

CS4082 INTRODUCTION TO WEB DEVELOPMENT (Spring/1)

5 hours per week; 13 weeks/2nd semester; 26L/13T/26LAB; ECTS credits:6

This module will introduce students to the concepts and techniques underlying the World Wide Web, such that they will gain a working knowledge of how to structure and build websites. Students will be

introduced to databases and SQL in order to create dynamic, data-driven web applications. Examples and project work will be relevant to each group of students in so far as possible.

Syllabus:

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

CS4084 MOBILE APPLICATION DEVELOPMENT (Spring/2)

5 hours per week; 13 weeks/2nd semester; 26L/13T/26LAB; ECTS credits:6

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

Syllabus:

Challenges to be faced when developing applications for mobile devices. Platform specific mobile applications and/or mobile web applications; mobile application lifecycles. Mobile applications and their architectures. Overview of operating systems (OSs) and Application Programming Interfaces (APIs) to choose from when developing applications for mobile devices. Comparison of native development environment options; software development kits (SDKs) and emulators. Installing and configuring the development environment. Managing application resources; designing user

interfaces; data storage and retrieval options; synchronization and replication of mobile data. Communications via network and the web; networking and web services; wireless connectivity and mobile applications. Performance consideration: performance and memory management; performance and threading; graphics and user interface performance; use various facilities for concurrency. Security considerations: encryptions, authentication, protection against rogue applications. Location based application; location API. Packaging and deploying applications for mobile devices.

CS4092 PROGRAMMING 2 (Spring/1)

6 hours per week; 13 weeks/2nd semester; 26L/26T/26LAB; ECTS credits:6

To continue with the design approach in Programming 1, through a series of design exercises given in tutorials. To introduce some classical algorithms, data structures, and other programming constructs, in the design and implementation of more complex programs. To place an emphasis on functional abstraction.

Syllabus:

a. A more detailed (from Programming 1) examination of functions and parameter types. b. Introduction to two-dimensional arrays and their manipulation. c. Sorting and searching techniques; problem solution considerations. d. A more detailed (from Programming 1) examination of classes, objects and encapsulation. e. Introduction to common data structures: Stacks, linked lists, queues. f. Introduction to abstract data types g. Recursion: defined; iterative and recursive solutions; recursion as a problem solving technique; designing recursive algorithms; implementations of recursion. h. An introduction to file processing; file design considerations; streams; file types; file processing algorithms.

CS4112 Computer Science 2* (Spring 1)

5 hours per week; 13 weeks/2nd semester; 26L/13T/26LAB; ECTS credits:6

Aims: To introduce students to formal ways of thinking about programs, in terms of their syntactic structure, their design, and formal assertions about the progress of a computations. On successful completion of this module the student should be able to: recognise the equivalence of mathematical functions and computer programs; construct assertions about a program, and combine them into an inductive proof concerning the programs behaviour; understand underlying mathematical structures of such structures as record-structures, arrays and enumerated types, as well as constructs such as the assignment statement, the conditional expression, and formalise the signatures of operations on these structures; given an informal definition of a construct, to define its syntax as a set of productions in one of the common metalanguages, to parse strings of text to determine if they are syntactically correct, and to ascertain whether static semantic constraints have been satisfied; understand the mathematical basis of common patterns, such as inducing of an n-ary operator from a binary operator, and to apply these patterns to

different problems; specialise and combine simple design patterns, so as to derive a single inductive definition of a program implementing the evaluation of several functions, and to derive functional recursive and iterative programs. Brief syllabus: set theory, functions; propositional logic; constructing assertions about individual program statements; Inductively defined functions; recursive and iterative implementations of inductively defined functions; proof by induction of assertions about simple while programs; structural induction and it's use in describing the syntax of arithmetic and boolean expressions; regular and context free grammars; BNF, EBNF, syntax charts; composite types such as records and arrays in terms of Cartesian products, disjoint unions, finite maps and powersets; type completeness. copy semantics; 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 (CSI 2-1-1)

4 hours per week; 13 weeks/6th semester; 26L/13T/13LAB; ECTS credits:6

To provide a uniform theoretical treatment of the data structures and algorithms used in systems and applications programming. This course includes a practical component to reinforce learning and to encourage students in the practical use of theoretical material. On successful completion of this module students should be able to select appropriate data structures given requirements for data storage and data retrieval patterns. In addition, students should be able to identify the trade-offs of various graph representation schemes. Brief syllabus: mathematical review, binary trees, linked lists and networks; recursion; divide and conquer algorithms: quicksort, heapsort, merge sort and bin and radix sorting; tree searching; graph algorithms.

CS4125 Systems Analysis and Design (CSI 2-1-1) (Spring/3)

4 hours per week; 13 weeks/6th semester; 26L/13T/13LAB; ECTS credits:6

To equip the students with the knowledge and techniques required to plan and control the analysis and design phases of the information systems life cycle. On successful completion of this module students should be able to: use object modelling techniques (e.g., class diagrams, object interaction diagrams, sequence diagrams) to represent a given problem situation; evaluate a given design using criteria such as modularity, information hiding, coupling and cohesion; choose between process modelling and object modelling for a given problem situation. Brief syllabus: 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.

CS4157 – Software Quality (Spring/3)

3 hours per week; 13 weeks/6th semester; 26L/13T; ECTS credits:6

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.

CS4162 – VIRTUAL WORLDS (Spring/1)

4 hours per week; 13 weeks/2nd semester; 26L/13T/13LAB; ECTS credits:6

No description available

CS4172 E-HEALTH SYSTEMS (Spring/1)

3 hours per week; 13 weeks/2nd semester; 26L/13T; ECTS credits:6

CS4174 PERFORMANCE TECHNOLOGY (Spring/2)

3 hours per week; 13 weeks/2nd semester; 26L/13T; ECTS credits:6

Students will develop their knowledge of performance technology in the context of digital musical instruments through a combination of laboratory based small group project work and lecture based learning.

Syllabus:

This module will focus on the design and the creation of digital musical instruments. Students will design and build a musical instrument - a complete system encompassing musical controller, algorithm for mapping input to sound, and the sound output itself. Students will focus on improvisation techniques as they prepare their prototypes for live performance. The module will culminate in a musical performance where students will demonstrate their instruments. Key topics will include: Sensor system implementation for live music performance. Software implementation of real time performance systems. Aesthetic issues in digital musical instrument performance.

CS4212 Computer Organisation 2* (Spring/1)

4 hours per week; 13 weeks/2nd semester; 26L/13T/13LAB; ECTS credits:6

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 system; advanced computer

architectures; introduction to computer networks. To provide an elaboration on, and extension of topics in computer hardware and software as introduced in Computer Organisation 1. To introduce the student to programming in low level languages. Brief syllabus: extension and elaboration of topics from Computer Organisation 1; a high level view of a working computer; design of a CPU arithmetic/logic unit to implement a set of specified functions; programming in assembly language, improving program performance; introduction to microarchitectures. Prerequisite CS4211

CS4358 Interactive Multimedia (CSI 2-1-0)

To understand the principles and techniques of Interactive Media. Content creation, processing and management. High-level authoring. Distribution methods. Intellectual Property Rights. Brief syllabus: Introduction to Digital Media: Cognitive Models: Interaction Design: Image, Video and Sound Processing: Authoring: Interfacing high-end authoring systems: Distribution: formats; Intellectual Property Rights.

CS4416 Database Systems (Spring/3)

3 hours per week; 13 weeks/6th semester; 26L/13T; ECTS credits:6

Large-scale data management is a critical activity within modern organisations. The goal of this module is to explain the relevance and explore the fundamental principles of database technology. On successful completion of this module students will be able to write programs that use static and dynamic embedded SQL, cursors, triggers and so forth. Brief syllabus: The concept of a DBMS and DB Architectures are introduced. This module will build upon the notion of a database as introduced in CS4513 and as such contains a revision of those concepts previously introduced, i.e. the relational data model, including issues, such as, Integrity Constraints, Relational Algebra, Relational Calculus, SQL, and Views. Normalisation. Time will be spent discussing the various technologies behind a DBMS, such as, transactions, security, data storage, triggers, and query optimisation as well as writing programs incorporating these. Object DBs, Object Relational DBs and their relevance to the OOP paradigm are discussed. Concepts of Data Warehousing, Data Mining and Decision Support are introduced followed by discussions on the Emerging Technologies of Database Systems. *Prerequisite: CS4213*

CS4457 PROJECT MANAGEMENT AND PRACTICE (Spring/3)

3 hours per week; 13 weeks/2nd semester; 26L/13T; ECTS credits:6

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

Syllabus:

Why management of IS projects can be the deciding factor for success or failure; responsibilities for managing medium to large-scale information systems development projects; from project initiation to

systems implementation; the tools and techniques applicable to planning, monitoring and controlling a project.

CS4458 Computer Support Cooperative Work (CSI 2-0-2) (Spring/4)

4 hours per week; 13 weeks/8th semester; 26L/13T/13LAB; ECTS credits:6

This course will introduce students to the CSCW and groupware field. It will cover basic concepts in the field and include an examination of software systems designed to support cooperative work - their design, use and evaluation. Issues such as peripheral awareness, ownership of information, common information spaces, media spaces, group support systems, coordination mechanisms and contextual factors in the workplace will be studied. Students will use some groupware technologies, and do a project in the course

CS4558 Leveraging Legacy Applications (CSI 2-0-2) (Spring/4)

4 hours per week; 13 weeks/8th semester; 26L/13T/13LAB; ECTS credits:6

This course will provide students with the knowledge and skills required to integrate legacy applications into next generation business systems. Brief syllabus: Software Re-engineering of COBOL programs. Integrating Legacy Systems using Object Wrappers, Web enablement and GUI front ends. Interfacing with middleware (CORBA, DCOM, ODBC, COM etc).

CS4566 Requirements Engineering* (Spring/3)

4 hours per week; 13 weeks/6th semester; 26L/13T/13LAB; ECTS credits:6

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.

To give students the knowledge and skills to be able to elicit, specify, document, communicate, manage and validate the requirements for software-based systems, along with an awareness of the organisational and social issues surrounding this important aspect of software engineering. Brief syllabus: the requirements engineering process; methods and techniques for the elicitation and discovery of system and software requirements; the modelling and analysis of requirements; the documentation 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 – Systems Analysis and Design*

CS4815 COMPUTER GRAPHICS (Spring/3)

4 hours per week; 13 weeks/6th semester; 26L/26T; ECTS credits:6

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

Syllabus:

Physical devices for graphics systems: Input and Output devices, Raster Scan devices, RGB colour systems, Video Memory Models; Implications of these for interactive graphics systems. General structure of Interactive Graphics systems: Issues involved in digitising analogue information: antialiasing techniques; Design and implementation of drawing algorithms for basic shapes: Issues and techniques; Establishing Device, Language and Application Independence: Conceptual levels in graphics systems; Frames of reference and Viewing systems; Control and manipulation of graphics elements: Input and Output primitives, Clipping functions, Transformation (rotation, scaling, translation, reflection, shears) and Segmentation functions; Transformations in 3-D; Projections; Viewing in 3D; Drawing Curves: Techniques, Properties of different types of curves; Basic Modelling: Representation of surfaces via polygons; Realism; Hidden surface removal; Surface generation via bi-cubic curves; Rendering.

CS4826 Human/Computer Interaction (Spring/3)

4 hours per week; 13 weeks/6th semester; 26L/26T; ECTS credits:6

The objective of this course is to develop an understanding of the issues involved in the increasingly important area of human-computer interaction. The course will provide a broad introduction to a variety of topics concerning user requirements, user interface design, usability studies, integrating human factors in software development, and social and organizational factors involved in implementing systems. It will examine guidelines and standards, as well as emerging interaction paradigms. The widespread adoption of graphical user interfaces (GUIs), and the potential afforded by new developments such as groupware, multimedia, hypertext, and virtual reality systems all require that even greater attention be paid to how these technical developments can be packaged and presented suitably to the "user". Brief syllabus: the nature of HCI; understanding the user; human information processing; perception; interfaces and interaction; input and output devices; use & design; the design process; requirements; valuation; usability methods and tools; empirical and analytical methods; standards & guidelines; mobile technology; information appliances; social and organizational constraints; intelligent agents; future trends.

CS4911 – Introduction to Information Technology (Spring/1)

3 hours per week; 13 weeks/2nd semester; 26L/13T; ECTS credits:6

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

and information. - Software: general purpose applications, operating systems features, programming development languages, HTML; proprietary software and Open Source Software. - Hardware: types of computers, input/output devices, CPU, memory and secondary storage û disks and solid state memory. - Development of the PC. - Communications and connectivity: modems, communications channels, networks: LAN, WAN. - The Internet and the Web: access, browsers, URLs, search engines, multi-media. - Security issues: virus, firewall, proxy server. - Computers and society: dependence of society on computers, development of WP, e-commerce, the WWW impact on the media and advertising. - Future hardware and software developments. - Word Processing and spreadsheet practice. - Data representation. - HTML exercises.

CS4925 – Business Information Technology 1 (Spring/3)

3 hours per week; 13 weeks/2nd semester; 26L/13T; ECTS credits:6

- Business Information Technology/Systems: Brief Historical Perspective; Review of Terminology; Taxonomy of Information Systems. - Social Context: Socio Technical Environment; Defining the Socio Technical Environment (Individual, Group, Organisation and Society); Understanding and Capturing the Socio-Technical Environment. - Organisational Context: Information Systems Planning and Strategy; Developing an Information Technology Plan; The Role of Managers in Technology Planning; Planning as Emergent. - Market Context: High Technology Customer Behavior; Customer Decision Process; Lead Users; Business Information Technology Adoption; The Origins and Development of Innovation Diffusion Theory; Technology Adoption Life Cycle.

EE4008 Avionics (Spring/4)

4 hours per week; 13 weeks/8th semester; 26L/26T; ECTS credits:6

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.

EE4012 Circuit Analysis 1 (Spring/1)

4 hours per week; 13 weeks/2nd semester; 26L/26T; ECTS credits:6

This module on Circuit Analysis introduces electronic engineering principles for the analysis of DC and AC circuits. Specifically the following topics are covered:

RESISTIVE CIRCUITS: The following topics will be covered: Kirchoff's voltage and current laws, resistor combinations, voltage and current divider circuits, and measuring resistance using the Wheatstone bridge.

TECHNIQUES OF CIRCUIT ANALYSIS APPLIED TO RESISTIVE CIRCUITS: The following topics will be covered: Mesh and nodal analysis, source transformations, Thevenin and Norton equivalent circuits, and maximum power transfer concept. **INDUCTANCE and CAPACITANCE:** The following topics will be covered: Inductors, capacitors, series and parallel combinations of capacitors and inductors, and mutual inductance. **RESPONSE OF RL, RC AND RLC CIRCUITS:** The following topics will be covered: Natural and step responses and switching. **SINUSOIDAL CIRCUIT ANALYSIS CONCEPTS:** The following topics will be covered: Amplitude, frequency, phase, phasors, reactance of capacitor and inductor, complex impedance, power dissipation, power factor. Circuit analysis theorems will cover: Thevenin, Norton, superposition, maximum power transfer theorem, and Kirchoff's voltage and current laws. **AC CIRCUIT ANALYSIS:** The following topics will be covered: Combining impedances, frequency response, source conversions, Thevenin and Norton equivalent circuits, Mesh and Nodal Analysis, and Delta-Y and Y-Delta conversions. **RESONANCE:** The following topics will be covered: Series and parallel resonant circuits, Q factor and bandwidth. **THE TRANSFORMER:** The following topics will be covered: Analysis of a linear transformer circuit, reflected impedance, the ideal transformer, and the autotransformer.

EE4013 Computer Networks

4 hours per week; 13 weeks/ 4THsemester; 26L/13LAB/13TUT; ECTS credits:6

(No Description Given)

EE4014 Electrical Energy

5 hours per week; 13 weeks/6th semester; 26L/13T/26LAB; ECTS credits:6

(No Description Given)

EE4022 Semiconductor Device Fundamentals

5 hours per week; 13 weeks/4th semester; 26L/13T/26LAB; ECTS credits:6

The aim of this module is to provide an introduction to the structure and operation of solid state devices used in electronic circuits. The module will initially introduce semiconductor technology and then the types of electronic devices that are commonly used in electronic circuits. Qualitative descriptions of the types of electronic circuits and their applications for the devices introduced will be provided. The module will cover the following topics: Semiconductor materials; metal-semiconductor contacts and p-n junctions; Semiconductors and light; Hall effect; Field effect transistor (FET) – JFET and MOSFET; Bipolar junction transistor (BJT); Power devices (thyristor and triac); Integrated circuit (IC) technology.

EE4024 – Electrical Energy (Electrical Machines)

5 hours per week; 13 weeks/4th semester; 26L/13T/26LAB; ECTS credits:6

Review of electromagnetism, Faradays, Amperes and Lezs laws, MMF, flux, flux density, magnetic field intensity and reluctance, self and mutual inductance, magnetic materials, BH curves, core losses. Magnetic circuits, electric circuit analogies, analysis of simple magnetic circuits. Transformers: Construction and principles, ideal transformer, voltage and current transformers, power transformers, single/3 phase, equivalent circuits, open and short circuit tests, application in power systems, per unit system. Machines - DC motors and generators: construction and principles, separately excited, series, shunt and compound machines. Voltage and torque equations. Equivalent circuits, Power flow. Machine characteristics: open circuit/magnetization, speed, torque and dynamic characteristics. Which configuration for which application. DC machines in modern power generation and motion control. AC machines, rotating magnetic fields, alternators, 3 phase generators, salient pole/cylindrical rotor, derivation of equivalent circuit from open circuit and short circuit tests, synchronous reactance, the phasor diagram (of cylindrical rotor machine) and the Power Angle Curve. Synchronising to an infinite busbar. Steady state stability limit. Induction machines (motors and generators) single phase, 3 phase. Derivation of equivalent circuit, determination of torque speed characteristic. Locked-rotor and no-load tests. Induction generator. Introduction to V/F control. Starting methods and protection. Electrical machines developments for renewable energy generation. AC power real and reactive power calculations. Power factor correction, balanced 3 phase systems analysis, star and delta connected loads, advantages of 3 phase systems, the per unit system.

EE4044 - Communications And Networks Protocols

4 hours per week; 13 weeks/4th semester; 26L/26LAB; ECTS credits:6

(No Description Given)

EE4102 Electrical Science 2* (Spring/1)

4 hours per week; 13 weeks/2nd semester; 26L/26LAB; ECTS credits:6

Electromagnetic induction; energy storage elements; sinusoidal signals; three phase systems; tuned circuits; coupled circuits. *Prerequisite EE4101*

EE4117 Electromagnetics 1 (Spring/4)

3 hours per week; 13 weeks/8th semester; 26L; credits:6

Review of vector calculus. Electrostatics - Electric field, calculation of the electric field, electric potential, conductors and dielectrics,

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

EE4214 Control 1* (Spring/2)

5 hours per week; 13 weeks/4th semester; 26L/13T/26LAB; ECTS credits:6

Actuators and dynamic system modelling; system time response; system frequency response; frequency domain compensation; transducers. *Prerequisite EE4113*

EE4218 Control 2 (Spring/3)

3 hours per week; 13 weeks/6th semester; 26L/13LAB; ECTS credits:6

LINEAR SYSTEM ANALYSIS: Bode, Nyquist, and root locus, transfer function of plant with delay and non-minimum phase systems. Stability and Performance analysis using Bode, Nyquist, Routh-Hurwitz, and Root Locus methods. Design techniques for system compensation using Bode diagrams, Nichols charts and Root Locus. Lead and lag compensation, the application of these using op-amps as an example, internal compensators. Introduction to Modern Control methods using State Space Techniques. PROCESS CONTROL: Terminology and practice, application and use of three term control, PID design in the frequency domain, integral wind-up and similar problems, Benchmark methods for tuning PID controllers, (Ziegler-Nichols, Haalman etc..).

EE4314 Active Circuit Design 2* (Spring/2)

5 hours per week; 13 weeks/4th semester; 26L/13T/26LAB; ECTS credits:6

Operational amplifiers characteristics; op-amp linear applications; feedback; op-amp non-linear applications; AC coupled amplifiers; tuned amplifiers; active filters; probes. *Prerequisite EE4313*

EE4317 Active Circuit Design 4* (Spring/3)

4 hours per week; 13 weeks/6th semester; 26L/26LAB; ECTS credits:6

IC technologies and components: Processing methods. Semiconductor Junctions. Passive (R and C) components and their limitations.

Integration of BJTs, JFETs and MOSFETs. Device characteristics.

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

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

Digital logic families, an overview.

Analogue building blocks: overview of op-amps, comparators and PLLs. CMOS and BiMOS technologies.

Review of some analogue ICs, bipolar and MOS.

EE4328 Power Electronics (Spring/4)

5 hours per week; 13 weeks/8th semester; 26L/13T/26LAB; ECTS credits:6

Introduction (examples of typical power conversion applications e.g. a complete computer power supply system block diagram/space craft system, importance of efficiency, comparison linear vs switching supplies, overview key components utilised in power conversion)

Switch realisation: semiconductor switches: diodes, Power MOSFETs, Thyristors, GTOs, IGBTs, properties, circuit symbols, comparative characteristics and application areas, power losses in switches.

The ideal switch, ripple and switching frequency, conduction losses, switching losses.

Switch mode power conversion: basic concepts; role of inductors, capacitors and transformers.

Analytical treatment of converters in equilibrium (steady-state converter analysis).

Modelling and simulation of converter in steady state (SIMPLIS) Overview conversion topologies (non-isolating buck, boost, buck-boost)

Three phase full wave uncontrolled rectifier with inductive loads: circuit diagram, waveforms, output voltage, input current, input harmonics.

Single phase full wave thyristor controller rectifier: circuit diagram, waveforms and calculations.

Inverters: main concepts, square wave inverters, Sine PWM inverters: circuit diagram, Circuit waveforms, Amplitude modulation index, Frequency modulation index.

Variable Speed Drive: Fixed frequency induction motor torque speed characteristic, V/F operation, torque speed capability with V/F drive, typical V/F drive circuit diagram.

Continuous v discontinuous conduction mode.

Converter dynamics and control (overview small signals models, example topology, transfer functions). Key skill which can be applied broadly.

Energy storage and energy transfer components and magnetics (capacitive, inductive, uncoupled, coupled). Modern rectifiers (topologies, harmonics) High power resonant converters HVAC / HVDC Power systems and conversion basic understanding. Harmonics/Flicker/Reactive Power Control. Modelling of power converters. Low voltage ride-through (wind application)

EE4408 Asics 2 (Spring/4)

5 hours per week; 13 weeks/8th semester; 26L/13T/26LAB; ECTS credits:6

Analogue simulation using spice, analogue asic layout techniques; asic operational amplifiers; asic d-a converters and a-d converters.

EE4514 Digital Systems 4* (Spring/2)

4 hours per week; 13 weeks/4th semester; 26L/26LAB; ECTS credits:6

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

EE4522 - Digital Systems 1

4 hours per week; 13 weeks/2nd semester; 26L/26LAB; ECTS credits:6

(No Description given)

EE4617 Communication Theory 1 (Spring/3)

3 hours per week; 13 weeks/6th semester; 26L/13T; ECTS credits:6

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.

EE4816 Signals & Systems 1 (Spring/3)

4 hours per week; 13 weeks/6th semester; 26L/26LAB; ECTS credits:6

Systems signals; signal representation; system response; sampling discrete time systems.

ET4004 - TCP / IP Networking (Spring/2)

4 hours per week ; 13 weeks/4th semester/26 L/26LAB ;
ECTS credits : 6

The internet and TCP/IP model: Evolution of internet; TCP/IP model (layers description and functions, PDU encapsulation, protocol architecture); TCP/IP internetworking principles. Network layer: Internet protocol (IP) mobile IP, addressing (IPv4 vs. IPv6); NAT operation (static vs. dynamic); subnetting and supernetting; address resolution with ARP and RARP; routing protocols (RIP, OSPF, BGP), Quality of Service (DiffServ vs. IntServ); control and assistance mechanisms (ICMP); internet multicasting (MBone operation) and group management (IGMP) Transport layer; Unreliable datagram transport with UDP; real-time transport with RTP and RTCP; reliable connection-oriented transport with TCP and SCTP; wireless TCP. Application layer: Review of client-server model; domain name system (DNS); TCP/IP configuration; static (BOOTP) vs. dynamic (DHCP); terminal networking with Telnet; file transfer with FTP and TFTP; email service (SMTP, POP, IMAP); browsing with HTTP; network management with SNMP. Multimedia communications; streaming audio, internet radio, VoIP (SIP v H323), video on demand, IPTV.

ET4006 – Electronics (Spring/4)

3 hours per week; 13 weeks/8th semester; 26L/13T; ECTS credits:6

Methodologies for the identification, assessment, and control of risks and hazards associated with processing operations, including HAZOP analysis. Costing of chemical & biochemical plants; stages of costing, methods of cost prediction, exponential, factorial etc. Cost updating. Economic evaluation of chemical and biochemical processing projects; pay-back, ROI, NPV, etc. Sensitivity analysis. Plant location and layout: principles and application. Environmental impact assessment of chemical and biochemical production facilities. Industrial sustainability: concepts and practice. Case study of the application of sustainability metrics to chemical and biochemical processing plants.

ET4014 – Data Security

5 hours per week ; 13 weeks/4th semester/26L/26Lab/13T
ECTS credits : 6

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

attacker, introduction to attacks on protocols, such as replay attacks, man in the middle attack.

ET4018 Mobile and Wireless Communication (Spring/4)

4 hours per week; 13 weeks/8th semester; 26L/26LAB; ECTS credits:6

Digital mobile and personal communications systems: General configuration of cellular systems; comparison a with fixed communications systems; systems overview: Fixed wireless Access, cellular, WLAN, Wireless Personal Area Network (WPAN), satellite. Cellular Concepts: Frequency reuse; channel assignment; capacity; sectoring. Review of wireless transmission; Signals, propagation issues, coding, modulation, multiplexing, spread spectrum. Medium access control: SDMA, TDMA, FDMA, CDMA, WCDMA, effects of Multiple Access Interference and ISI. Mobile telecommunications systems: GSM, GPRS, EDGE, UMTS, HSDPA, future generation (4G) Key concepts in the dynamic management of resources; call control, switching, wireless access and channel allocation, handoff, roaming, HLR and VLR. Wireless network issues: MAC, QoS, ad-hoc networks, MANET. Example systems: Bluetooth, IEEE 802.11, Ultra-wideband (UWB). Mobile IP, mobile TCP issues. Support for mobility at higher communications layers.

ET4027 - Computer Forensics

5 hours per week ; 13 weeks/8th semester/26L/26Lab/13T
ECTS credits : 6

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

ET4028 Host and Network Security (Spring/4)

5 hours per weeks; 13 weeks/8th semester; 26L/13T/26LAB; ECTS credits:6

[Security Fundamentals] Basics of host and network security: threats, vulnerabilities and risk, risk assessment, business continuity and disaster recovery, security policies, defence in depth. [Firewalls] Packet filters, stateful firewalls, proxy firewalls. DMZ concept, layout and design. [Auditing and Intrusion Detection] Audit trail features, user profiling, intruder profiling, signature analysis, network IDS, host IDS, distributed IDS, combining firewalls and IDS. [Wireless Security] Wireless standards and technologies: IEEE 802.11, WEP Bluetooth, BlackBerry, wireless applications. Wireless network threats: wireless packet sniffers, transmission alteration and manipulation, denial-of-service attacks.

[Designing Secure Networks] Host hardening: anti-virus software, host-centric firewalls and IDS. Installing and managing firewalls and IDS. VPN integration. Creating a security policy. [Assessing Network Security] Assessment techniques, maintaining a security perimeter: system and network monitoring, incident response, accommodating change. Network log analysis, troubleshooting defence components, importance of defence in depth. Design under fire: the hacker approach to attacking networks.

ET4038 - [Mobile And Wireless Java

5 hours per weeks; 13 weeks/8th semester; 26L/13T/26LAB; ECTS credits:6

Mobile Service Architecture. Security and Administration issues relating to networks of Java ME compliant systems, including the following services: Security and Trust; Location; Content Handlers; Scalable Vector Graphics and Advanced Media; Payment; Internationalisation. Java APIs for Bluetooth. Role of interactive development environments (e.g. NetBeans Mobility Pack) and Emulators. Wireless connected and network connected devices. Mobile Information Device Protocol.

ET4048 Electronics for Built Environment 2

5 hours per weeks; 13 weeks/8th semester; 26L/13T/26LAB; ECTS credits:6

(No description given)

ET4088 - Energy Management And Technology

**5 hours per week ; 13 weeks/8th semester/26L/26Lab/13T
ECTS credits : 6**

[Energy Management Systems] ISO50001, Energy policy, plan do, check , act [Energy Audit] Basic components of an energy audit, industrial audits, commercial audits, residential audits. Equipment for an energy audit [SMART Meters] Operation & functionality of SMART meters and means of communication with them. [Data logging & Databases] Collection, transmission and analysis of utility (electricity, water, gas) consumption data. [Automated Control for the Built environment] Building management systems, Energy efficient electrical services, energy efficient space and water heating [Economic Analysis] life cycle costing, payback periods, cost benefit analysis [Demand side management] Automation of processes to reduce costs and emissions. Dynamic synchronisation of electrical energy consumption with lowest tariffs.

ET4122 - Analogue Electronics 2

4 hours per week; 13 weeks/2nd semester; 26L/26LAB; ECTS credits:6

SINUSOIDAL SIGNALS: Single phase generation by coil rotating in magnetic field. Trigonometric representation, amplitude, frequency and phase concepts. Voltage and current relationships for resistor,

inductor and capacitor. Reactance. Response of R-C, R-L and L-C circuits to sinusoidal signals. Impedance. Phasor diagrams. Power topics; distinction between power and VA, power factor. COMPLEX ANALYSIS: Analysis of circuits using complex notation, derivation of amplitude and phase data from complex representation of signals and impedance. Transfer functions, frequency response, corner frequency, Bode diagrams for simple R-C circuits. Power dissipation in complex impedance. Maximum power transfer theorem for complex source and load impedances. TUNED CIRCUITS: Series and parallel R-L-C circuits, resonance, Q, bandwidth, dynamic impedance. Circulating current in parallel tuned circuit. COUPLED CIRCUITS: Inductively coupled coils, induced e.m.f., mutual inductance, coupling coefficient. Reflected impedance for loaded coupled circuit for $k < 1$. Input and output equivalent circuits. Properties of ideal voltage and current transformers. The auto transformer.

ET4142 Computer Systems Architecture 1 (Spring/2)

4 hours per week; 13 weeks/2nd semester; 26L/26LAB; ECTS credits:6

Use of a microprocessor in a computer; relationship between hardware, software and operating system; Microprocessor concepts: von Neumann computer, block diagram of microprocessor, fetch-decode-execute cycle. Memory, I/O and microprocessor, read/write cycles. Programmer's model of a simple microprocessor, using simplified 8086 as example. Registers, addressing modes (simplified) and instruction set of an 8086, including unconditional and conditional jump and branch instructions, status bits, the stack and subroutines. Evolution of Pentium from 8086. Example of an embedded system and comparison with a PC. Intro to the PC, its bus structure and relevance of the BIOS. Project work: writing simple assembly and C programs and verifying their operation; exploration of PC using 'My Computer' and other PC-based tools.

Prerequisite : ET4151 Digital Electronics 1

ET4204 - Analogue Electronics 4

4 hours per week; 13 week 4th semester; 26L/26LAB; ECTS credits:6

Cognitive (Knowledge, Understanding, Application, Analysis, Evaluation, Synthesis)

Identify the operational amplifier structure. Explain operational amplifier behaviour: ideal and real. Explain the uses of the operational amplifier in voltage amplification circuits. Construct electronic filters: Students will be able to offer an overview of their purpose and key terminology. Demonstrate knowledge of the uses of the operational amplifier in low pass, high pass and band pass filters. Demonstrate knowledge of the uses of the operational amplifier in non-linear circuits: precision rectifier, oscillators. Identify and explain the Instrumentation Amplifier structure and operation. Construct an Instrumentation Amplifier using the operational amplifier.

ET4224 Robotics 1 : Sensors and Actuators (Spring/3)

5 hours per week ; 13 weeks/6th semester/26L/26Lab/13T ECTS credits : 6

Introduction to Physical Phenomenon : SI Units ; Principles of sensor operation (mechanical, thermal, sound, light). Sensors and Transducers : concept of transducer action as signal conversion with particular emphasis on an electrical signal as the output ; the ideal transducer ; resolution, accuracy, linearity definitions and relevance ; review of some physical phenomena that result in electrical parameter variations. Sensor Interfacing Circuitry Intro : review of Op-Amp as applied to sensing systems, instrumentation amplifiers, diff amps, etc ; simple DACs, ADCs successive approximation and integrating, operating principles and suitability for industrial applications ; overall concepts of accuracy, drift, resolution and common mode rejection applied to a measurement system, complete system composed of a transducer, amplifier and ADC. Actuators : Magneto Motive Force & magnetic circuits, transformers, DC generators and motors ; Motors : DC machines with permanent magnet and field windings, Induction motors, Stepper Motors, Stepper drives ; Motor Drive Circuits.

ET4243 - Web And Database Technology 2

4 hours per week; 13 week 4th semester; 26L/26LAB; ECTS credits:6

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

MA4004 Engineering Mathematics 4 (Spring/2)

3 hours per week; 13 weeks/4th semester; 26L/13T; ECTS credits:6

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* (Spring/3)

3 hours per week; 13 weeks/6th semester; 26L/13T; ECTS credits:6

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*

MA4102 Business Mathematics 1 (Spring/1)

3 hours per week; 13 weeks/2nd semester; 26L/13T; ECTS credits:6

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 (Spring/2)

3 hours per week; 13 weeks/4th semester; 26L/13T; ECTS credits:6

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 (Spring/4)

3 hours per week; 13 weeks/8th semester; 26L/13T; ECTS credits:6

Cluster analysis, principle component analysis, factor analysis, dicriminant analysis, the generalised linear model, maximum likelihood estimation, logit and probit regression, log linear models for categorical data. *Prerequisite: MA4125*

MA4302 Applied Statistics for Accounting (Spring/1)

4 hours per week; 13 weeks/2nd semester; 26L/13T; ECTS credits:6

1. Sampling methods and descriptive statistics - collection and tabulation of data. Descriptive measures and graphical presentation of data. 2. Basic concepts of probability - probabilities of the union and intersection of events, conditional probability, contingency tables. 3. Discrete probability distributions - the binomial distribution. Expected values. 4. Continuous probability distributions ζ the normal and Pareto distributions ζ relevance to natural and economic phenomena. 5. Applications of the central limit theorem - interval estimation. 6. Hypothesis testing - one and two sample tests for population proportions and means. Tests of association. 7. The Pearson and Spearman correlation coefficient and simple linear regression. 8. Time Series Analysis. Trends and Seasonal Variation. Use of moving

averages. Prediction. 9. Use of a statistical package (SPSS) for data input and transformation, as well as carrying out the statistical methods described above.

MA4602 Science Mathematics 2* (Spring/1)

3 hours per week; 13 weeks/2nd semester; 26L/13T; ECTS credits:6

Functions of the calculus; curve sketching; integration and applications; series; partial derivatives. *Prerequisite MA4601*

MA4604 Science Mathematics 4* (Spring/2)

4 hours per week; 13 weeks/4th semester; 26L/13T; ECTS credits:6

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. LCR circuits, damped mass spring, reaction rates); Heaviside unit step function and transforms of piecewise continuous functions; Fourier transform and its relation to the Laplace transform.

Prerequisite MA4613

MA4702 Technological Maths 2* (Spring/1)

3 hours per week; 13 weeks/2nd semester; 26L/13T; ECTS credits:6

Functions of the calculus; curve sketching; series; integration and applications; partial derivatives.

Prerequisite MA4701

MA4704 Tech Mathematics 4* (Spring/2)

3 hours per week; 13 weeks/4th semester; 26L/13T; ECTS credits:6

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*+ (Spring/4)

3 hours per week; 13 weeks/8th semester; 26L/13T; ECTS credits:6

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* (Spring/1)

3 hours per week; 13 weeks/2nd semester; 26L/13T; ECTS credits:6

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* (Spring/2)

3 hours per week; 13 weeks/4th semester; 26L/13T; ECTS credits:6

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 Group Theory (Spring/4)

3 hours per week; 13 weeks/8th semester; 26L/13T; ECTS credits:6

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* (Spring/4)

3 hours per week; 13 weeks/8th semester; 26L/13T; ECTS credits:6

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 (Spring/2)

3 hours per week; 13 weeks/4th semester; 26L/13T; ECTS credits:6

Propagation of floating point error. Zeros of non-linear functions; bisection method, Newton's method, secant method, fixed point method, convergence criteria, rate of convergence, effect of multiplicity of zero, introduction to the use of Newton's method for systems of non-linear equations. Systems of linear equations; Gauss elimination, LU and Cholesky factorisation, ill-conditioning, condition number, iterative methods, Jacobi, Gauss-seidel, SOR, convergence

criterion. Interpolation and Quadrature; Lagrange interpolation, error formula, Newton-Cotes and Romberg quadrature. Numerical solution of ordinary differential equations; initial and boundary value problems, Runge Kutta and Adams Moulton methods, and application to systems of ordinary differential equations.

MS4018 – Dynamical Systems

One dimensional flows: flows on the line, fixed points and stability; bifurcations, flows on the circle. Two dimensional flows: Linear systems, classification of fixed points; phase plane, linearisation, stability and Lyapunov functions. Limit cycles, oscillators. Bifurcations in the plane, Hopf bifurcations, global bifurcations of cycles, quasi-periodicity, Poincare maps. Chaos : Lorenz equations; strange attractors; control of chaos. One dimensional maps : fixed points, periodic points and stability; bifurcations, the logistic map -- numerics and analysis, period-doubling and intermittency; Lyapunov exponents, renormalisation and Feigenbaum numbers. Introduction to time series applications. Fractals : dimensions; strange attractors revisited.

MS4022 Calculus 2 (Spring/1)

5 hours per week; 13 weeks/2nd semester; 39L/13T/13LAB ; ECTS credits:6

McLaurin and Taylor series, order notation bit 'oh', little 'oh', asymptotic equivalence, Taylor's 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.

MS4024 – Numerical Computation (Spring/2)

3 hours per week; 13 weeks/4th semester; 26L/13T; ECTS credits:6

The Matlab language: Introduce Matlab command syntax - Matlab workspace, arithmetic, number formats, variables, built-in functions. Using vectors in Matlab - colon notation. Arrays - array indexing, array manipulation. Two-dimensional Graphics: basic plots, axes, multiple plots in a single figure, saving and printing figures. Matlab commands in `batch` mode: script m-files, saving variables to a file, the diary function. Relational and logical operations: testing for equality/inequality, and/or/not. Control flow: for, while, if/else, case, try/catch. Function M-files: parameter passing mechanisms, global and local variables. Applications of Matlab - topics to be taken from: Numerical Linear Algebra - norms and condition numbers, solution of linear equations, inverse, pseudo-inverse and determinant, LU and Cholesky factorisations, QR factorisation, Singular Value Decomposition, eigenvalue problems. Polynomials and data fitting.

Nonlinear equations and optimisation. Numerical solution of ordinary differential equations. The R language: [Language essentials] Objects; functions; vectors; missing values; matrices and arrays; factors; lists; data frames. Indexing, sorting, and implicit loops. Logical operators. Packages and libraries. [Flow control] for, while, if/else, repeat, break. [Probability distributions] Built-in distributions in R; densities, cumulatives, quantiles, random numbers. [Statistical graphics] Graphical devices. High level plots. Low level graphics functions. [Statistical functions] One- and two-sample inference, regression and correlation, tabular data, power, sample size calculations. Applications of R û case studies in statistics: The applications of R will be explored by considering several case studies in statistics. Each case study is motivated by a scientific question that needs to be answered, and full background material is presented. The cases are grouped by broad statistical topics: data analysis; applied probability; statistical inference; regression methods.

MS4028 – Stochastic Differential Equations for Finance (Spring/4)

3 hours per week; 13 weeks/8th semester; 26L/13T; ECTS credits:6

Introduction to Monte Carlo simulation: Numerical simulation of paths; ensemble averaging and connections to partial differential equations. Examples from Finance and Physics. Stochastic differential equations and Langevin equations. Fokker-Planck/Kolmogorov equation and relation to Black-Scholes equation. Numerical methods for SDEs and Langevin equations: Euler-Maryuma method and higher-order schemes. Pricing barrier options and first-passage problems, including multiple stochastic factors. Trinomial trees and finite difference methods: Pricing on trinomial trees. Analytical methods for partial differential equations. Explicit, implicit, Crank-Nicholson, and ADI implementations for numerical solution of partial differential equations, including options on multiple assets. Modelling markets with stochastic differential equations: Comparison of modelling methods for stochastic dynamics problems in Finance, Physics, and Engineering. The Ito/Stratonovich dilemma. Non-Gaussian distributions and fat tails in the markets. Long-memory effects. Coloured noise and the Ornstein Uhlenbeck process. Autocorrelation functions and spectra of noise sources. Wiener-Khinchin theorem.

MS4111 Discrete Mathematics 1 (Spring/1)

3 hours per week; 13 weeks/1st semester; 26L/13T; ECTS credits:6

Mathematical logic; Boolean algebra; number systems; algebraic structures; relations.

MS4212 Introductory Data Analysis (Spring/1)

3 hours per week; 13 weeks/2nd semester; 26L/13T; ECTS credits:6

Collecting data: sampling,; experimentation; measurement. Descriptive Statistics: frequencies;

histogram; percentiles; mean, median, mode; range, interquartile range, standard deviation, boxplot. Cross-classification: row percentages, column percentages, Simpson’s Paradox. Scatterplots: 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 (Spring/2)

3 hours per week; 13 weeks/3rd semester; 26L/13T; ECTS credits:6

Model building and the methods of operational research; linear programming transportation and assignment algorithms; linear programming in practice; critical path analysis; decision analysis.

MS4327 – Optimisation (Spring/3)

3 hours per week; 13 weeks/3rd semester; 26L/13T; ECTS credits:6

Criteria for Optimality. Conditions for linear equality- and inequality-constrained problems. First-order and second-order Karush-Kuhn-Tucker (KKT) conditions for general non-linearly constrained problems. Unconstrained Optimisation. Univariate Functions: Line Searches. Multivariate Functions: Steepest Descent and Newton's Method, Modifications of Newton's Method including Levenberg-Marquardt Method. Conjugate Gradient Methods. Constrained Optimisation. Penalty and Barrier Function Methods. Computational limitations of penalty function methods - ill-conditioning. Exact Penalty Function Methods. The module will include at least one computer-based project requiring students to select and implement a suitable algorithm for the solution of a non-trivial optimisation problem using either Fortran or Matlab.

MS4404 Partial Differential Equations (Spring/2)

3 hours per week; 13 weeks/4th semester; 26L/13T; ECTS credits:6

Introduction to PDEs, Wave equation, Laplace’s equation, Diffusion equation, first order PDEs.

MS4408 – Mathamatical Modelling (Spring/4)

3 hours per week; 13 weeks/8th semester; 26L/13T; ECTS credits:6

Review of modelling skills, applications from: classical models (e.g. heat transfer), continuum models , financial models, statistical models, mathematical biology, advanced models.

MS4414 Theoretical Mechanics (Spring/2)

3 hours per week; 13 weeks/4th semester; 26L/13T; ECTS credits:6

Kinematics. Dynamics. Work, Energy, Power, Systems of particles, Rotational Dynamics, Oscillatory Motion and Waves, Mechanical Properties of Matter. *Prerequisite Vector Calculus, ODEs*

MS4528 – Mathematical and Statistical (Spring/4)

3 hours per week; 13 weeks/8th semester; 26L/13T; ECTS credits:6

[Models of Fixed Income Securities and Interest Rate Options:] Interest rates, LIBOR, zero rate, forward rates, yield curve, duration, convexity; forwards and futures on currencies; immunization; interest rate swaps; boot-strapping the yield curve; currency swaps; interest rate derivatives: bond options, caps and floors, caplets and swaptions; Black;s models. [Credit Derivatives:] Credit default swaps; hedge-based pricing. Collateralised debt obligations. Credit spreads and implied default probabilities. Bond based pricing of credit derivatives. Spread curves. [Time Series models of equity returns and volatility:] Analysis of return series; tests for skewness and excess kurtosis; stationarity, ACF and PACF; brief survey of AR and MA models; models of volatility: ARCH and GARCH: kurtosis, forecasting; brief survey of variations on GARCH such as I-GARCH, M-GARCH; leverage effect and EGARCH. [Portfolio selection models:] diversification; minimum variance and the Markowitz problem (vector treatment of n-asset problem); market portfolio; CAPM; systematic risk; CAPM as a pricing model; weaknesses of CAPM.

TA4002 Introduction to Science & Technology 2 (Spring/1)

3 hours per week; 13 weeks/2nd semester; 26L/13T; ECTS credits:6

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; conservation 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.*

Faculty of Science and Engineering – Spring

SCIENCE Modules

BC4002/BC4902 Introductory Biochemistry* (Spring/1)

4 hours per week; 13 weeks/2nd semester; 26L/26LAB;ECTS credits:6

Aromatic and aliphatic compounds. Saturated and unsaturated hydrocarbons. Oxygen-containing compounds, acids, esters, alcohol's carbonyl compounds. Nitrogen-containing compounds, amines, amides, amino acids. Polymers. Introduction to biomolecules. Carbohydrates, Lipids, Proteins, Nucleic Acids .Bioinorganics. Anabolic and catabolic processes. Carbohydrate metabolism, Glycolysis and Krebs cycles Bioenergetics, energetics of anaerobic/aerobic glycolysis. Blood composition],oxygen transport,ion transport, sweat, heat, and pH balance Hormonal regulation of cellular processes. Nutrition and digestion. Measurement, diagnosis and analysis in clinical and sports biochemistry *Prerequisite CH4761*

BC4008 Immuno and DNA Diagnostic Techniques (Spring/4)

3 hours per week; 13 weeks/2nd semester; 26L/26LAB;ECTS credits:6

Overview of the immune system. Development and diversity of the system. Cellular and humoral responses. Passive vs. active immunity, vaccination. Complement system. T cell structure and differentiation. Memory. Antibody structure and function. Polyclonal vs. monoclonal Bacterial, insect and eukaryotic expression system used for protein production, especially those applied for antibodies production. Crystallisation of proteins. Usage of monoclonal antibodies for membrane proteins crystallisation. Introduction to crystal structure determination. Interpretation of 3D structure of antibodies. Immuno- and nucleic acids diagnostics (diagnosis for infectious and genetic diseases), for instance PCR and PCR variants, Real-time PCR, RAPDs, RFLPs, DNA profiling and DNA fingerprinting.

BC4705 – Industrial Biochemistry 1 (Spring/3)

4 hours per week; 13 weeks/2nd semester; 26L/26LAB;ECTS credits:6

Practical Aspects of Pharmaceutical Manufacture: International Pharmacopoeia. GMP in the Pharmaceutical Industry. The Pharmaceutical Facility; Clean Rooms, Cleaning Decontamination and Sanitation. Generation of Water for Pharmaceutical/ Biopharmaceutical Processing. Product Flow Through the Facility and Associated Documentation. The ISO series of quality standards. Laboratory accreditation. Validation of methodology and industrial processes in biotechnology. Environment and Industry, the Environmental Protection Agency (EPA) and IPPC Licensing for biotechnology. Industrial enzymes and proteins; range, applications and selected case studies. Stabilizing proteins for industrial use. *Prerequisite BC4903, BC4801*

BC4718 – Industrial Biochemistry 2 (Spring/4)

4 hours per week; 13 weeks/2nd semester; 26L/26LAB;ECTS credits:6

Animal cell culture; Overview and introduction to animal cell culture. Animal cell culture, media, methods and apparatus. Animal cell culture; production of industrially useful products. The drug development process; Regulatory route for new drugs in USA & EU. Biopharmaceutical manufacture; Patenting and biotechnology. Principles of patentability. The patent application process. Sources of biopharmaceuticals. Upstream processing. Downstream processing. Post translational modifications and their significance. Product QC and the range and significance of potential product impurities. Nucleic acid-based biopharmaceuticals; The theory underpinning gene therapy, antisense based products and aptamers. Specific biopharmaceuticals; Students will be provided with 2-3 specific biopharmaceutical products/product families, along with bibliographic details of at least 1 reference source material for each. Students will be expected to source the references, along with any additional pertinent references and undertake self-directed study of the biochemistry and biotechnology of the representative biopharmaceuticals. *Prerequisites BC4903 BC4904 BC4905*

BC4904 – Proteins and DNA (Spring 2)

4 hours per week; 13 weeks/2nd semester; 26L/26LAB;ECTS credits:6

The structure of DNA and other nucleic acids. The molecular concept of a gene.. DNA sequencing. The central dogma - DNA makes RNA makes Protein. Processing of DNA -Replication, transcription and translation. The relationship between DNA and Protein û the genetic code. Eukaryotic and prokaryotic systems. Control sites and elements within DNA. Gene expression û the lac operon. Review of Protein structure, amino acids peptides primary, secondary and tertiary structure of proteins. 3D structures and their representation. Functionality of proteins, Strategies of protein purification and assay. Protein sequencing and analysis. Enzymology, the nature of enzymes, their classification and activities. Enzyme kinetics and catalysis, enzyme inhibitors. Mode of action of enzymes -lysozyme on peptidoglycan. *Prerequisite BC4903*

BY4002 Biology 2* (Spring/1)

4 hours per week; 13 weeks/2nd semester; 26L/26LAB; ECTS credits:6

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*

BY4004 – Horticulture

Composts, growing media and substrates in horticulture, seed propagation, vegetative propagation, seedbed preparation, horticultural crop rotation, vegetable crop production & fertilising, climatic factors associated with plant growth, micropropagation & genetic modification of plants.

BY4008 Genetic and Molecular Biology* (Spring/4)

4 hours per week; 13 weeks/8th semester; 26L/26LAB; ECTS credits:6

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.

BY4104 Ecology 1* (Spring/2)

4 hours per week; 13 weeks/4th semester; 26L/26LAB; ECTS credits:6

Woodland ecosystems; vegetation sampling; freshwater ecosystems; marine ecosystems; rocky shores; brief consideration of sandy, muddy and estuarine ecosystems. *Prerequisite BY4002*

BY4204 – Principals of Human Physiology (Spring/2)

3 hours per week; 13 weeks/4th semester; 26L/26LAB;ECTS credits:6

This module will examine the structure and function of the major human physiological systems. Physiology of the blood, circulation and lymphatic systems. The nervous system: central, peripheral and autonomic. Physiology of skeletal, muscle and integumentary systems. The respiratory system: mechanical properties of breathing, pulmonary and bronchial circulation, the transport of oxygen and carbon dioxide. The digestive system: the gastro-intestinal tract, intake and absorption of nutrients. The renal system: kidney structure and function, osmoregulation and homeostasis, regulation of acid balance. The endocrine system: regulation of calcium and phosphate metabolism. Reproductive system. Sensory system: perception of taste and aroma. The influence of physiological conditions on nutrient absorption will be considered e.g. inborn errors of metabolism on iron metabolism. The impact of food constituents on physiology will be examined e.g. ingestion of toxins. *Prerequisites BY4001, BY4002*

BY4208 Agriculture 2 (Spring/4)

4 hours per week; 13 weeks/8th semester; 26L/26LAB; ECTS credits:6

Dairy herds; sheep production, principles of prod; Principles of beef production; conventional versus intensive production; calf rearing, diseases of cattle; production of milk; markets for dairy products; management of ducting, housing and management.

BY4214 – Principles of Human Nutrition (Spring/2)

3 hours per week; 13 weeks/4th semester; 26L/26LAB;ECTS credits:6

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

Prerequisite Modules:

BY4001

BY4002

CH4102

BY4505 – Pollution Biology (Spring/2)

4 hours per week; 13 weeks/8th semester; 26L/26LAB; ECTS credits:6

Categories of freshwater pollution. Organic pollution of surface and ground water - sources, effects and impacts. Indicators - biological and chemical monitoring; use of biotic indices. Methods for determination of nitrates, phosphorus, chlorophyll a, Ca, Mg, D.O., B.O.D., C.O.D., T.O.C., etc. Microbial pollution - methods. Toxic pollutants in air, water, soil and food. Introduction to toxicological principles: acute toxicity; LD50; chronic toxicity (types of). Uses of lab and epidemiological studies. Introduction to structure activity relationships in toxic chemicals. Risk assessment. Analytical methods. Review of toxic effects of heavy metals, chlorinated hydrocarbons and other organics and inorganics, mycotoxins, radioactive elements. Air pollution: major air pollutants, sources and impacts, i.e. smoke SO₂, NO_x, PAHS CO₂ Ozone, volatile organics CFC's. Global warming causes, models and scenarios; biological impacts. *Prerequisite BY4003*

Prerequisite Modules:

BY4003

CG4008 Process Troubleshooting (Spring/4)

6 hours per week; 13 weeks/4th semester; 26L/13T/39LAB; ECTS credits:6

To provide the student with skills and knowledge in the field of chemical and biochemical process troubleshooting.

Syllabus:

Characteristics of trouble shooting problems and the methodologies used to solve them. Approaches to the analysis and formulation of solutions to process issues. Data gathering and critical thinking techniques. The use of interpersonal communication skills in handling management issues associated with industrial process problems. Practical methodologies: recognising patterns, cause-effect, reasoning, and selection of valid diagnostic actions; process trouble shooting rules of thumb; formulation of realistic solutions to process problems. Selected process trouble shooting case studies in the chemical and biochemical industries. Process trouble shooting simulation lab.

CH4002 Physical Chemistry 1*(Thermo-dynamics and Kinetics) (Spring/1)

4 hours per week; 13 weeks/2nd semester; 26L/26LAB; ECTS credits:6

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, Clausius inequality; Gibbs and Helmholtz free energies; chemical equilibrium; variations with temperature and pressure; introduction to chemical kinetics; zero, first and second order rate laws; activation energy and the Arrhenius equation; accounting for the rate laws; steady state approximation. Michaelis-Menten equation.

Prerequisite CH4701

CH4004 Physical Chemistry 3*(The Liquid State) (Spring/2)

6 hours per week; 13 weeks/4th semester; 26L/13T/39LAB; ECTS credits:6

Second and third laws of thermodynamics, entropy changes, free energy terms. Fundamental equations of thermodynamics. Activity and fugacity. Simple mixtures, Gibbs-Duhem equation. Solubility, Real Solutions, Activity Coefficients, Electrolytic Solutions. Ionic solvation, ion transport in solution, conductivity. Dynamic equilibrium, electrochemical cells (1) Galvanic (2) Electrolytic. Thermodynamics of cell reactions, Nernst equation, free energy changes in cells, electrochemistry series.

Prerequisite CH4003

CH4008 – Organic Pharmaceutical Chemistry 2

4 hours per week; 13 weeks/8th semester; 26L/26LAB; ECTS credits:6

Section A: Regiochemical control: addition of HBr by ionic and radical mechanisms, alcohol formation by acid catalysed hydration and via hydroboration; Chemoselective control: Lindlar's catalyst and dissolving metal reduction; hydride reducing reagents, Reformatsky reaction; use of protecting groups. Stereoselective control: asymmetric induction, diastereomeric selectivity, Felkin-Anh model; enantiomeric selectivity, chiral hydride reagents (Alpine Borane and Alpine Borohydrides), chiral catalysts - Monsanto catalyst for L-Dopa production. Section B: Quantitative structure activity relationships: development and use of the Hammett equation; definition of general and specific acid and base catalysis, use of buffers and kinetic data to distinguish between general and specific catalysis, quantitative analysis of data. Named (and other) Reactions: Oral presentation by students on reactions such as Hydroboration, Reformatsky, Dihydroxylation, Mannich Reaction, Reductive Amination, Birch Reduction, Michael Addition, Allylic bromination, Sharpless Epoxidation, Mitsunobu Reaction, Suzuki Coupling, Heck Reaction, Benzene chemistry.

CH4012 – General Chemistry 2

6 hours per week; 13 weeks/4th semester; 26L/13T/39LAB; ECTS credits:6

Energetics: Enthalpy, entropy and free energy; first two laws of thermodynamics; thermochemistry; equilibrium constants and free energy. Electrochemistry: Free energy and cell potential; emf cells and the Nernst equation; electrochemical series; electrolysis cells and Faraday's laws; batteries and fuel cells. Kinetics: Rate equation, rate laws and orders of reaction; factors affecting rates of reaction; activation energy and reaction profile; Arrhenius equation; catalysts. Structure and bonding: Types of chemical bonding, classification of solids and properties. Bonding in relation to the Periodic table. a) molecular compounds: Lewis structures, VSEPR and molecular shape, polarity; nature of the covalent bond, types of covalent bond - sigma and pi, single, double and triple. b) ionic compounds: nature of the ionic bond; unit cells; lattice energy; factors affecting the strength of ionic bonds. Solubility: Factors affecting the solubility of molecular and ionic compounds - energetics, kinetics and structure. *Prerequisite CH4701*

CH4017 Chemical Nanotechnology (Spring/3)

5 hours per week, 13 weeks/2nd semester; 26L/39LAB; ECTS credits:6

Chemical and physical properties from the macroscale through microscale to the nanoscale. Quantum confinement, surface energy, thermodynamics and capillarity in nanocrystals. Chemical synthesis and modification including 0D, 1D and 3D incorporating II-VI colloidal nanocrystal growth (organic, aqueous and supercritical fluids), semiconductor nanowire growth by vapour liquid solid (VLS), carbon nanostructures synthesis and other methods. Polymer formation at the nanoscale including self-assembling block copolymers, conducting polymers. Hybrid nanocrystal conducting polymer solar

cells. Kinetics of nanocrystal growth and the organic/inorganic interface. Chemical functionalisation of inorganic nanostructures with organic molecules and the bio/nano interface. The hierarchical assembly of nanomaterials using Langmuir Blodgett, electric field and supercrystallisation methods will be reviewed, including collective properties and difference to bulk. A study of microscopy and spectroscopic methods of measurement at the nanoscale will be introduced to include electron microscopy, vibrational and photoelectron spectroscopies, and X-ray diffraction. Industrial applications of nanochemistry, nanosizing of pharmaceuticals, lab on a chip, and liquid crystals. Synthesis and characterisation of a range of colloidal semiconductor, metal and polymer nanocrystals.

CH4054 Introductory Physical Chemistry (Spring/2)

5 hours per week, 13 weeks/4th semester; 26L/13T/26LAB; ECTS credits:6

The first and second laws of thermodynamics; chemical equilibrium; ions in aqueous solution; electrochemical cells; electrolytic conductivity; reaction kinetics and enzyme kinetics. *Prerequisite: CH4071*

CH4102 Organic Chemistry 1 (Spring/1)

5 hours per week, 13 weeks/2nd semester; 26L/39LAB; ECTS credits:6

Alkanes; cycloalkanes: structural formulae, nomenclature, isomerism, conformational analysis, free radical reactions. Alkenes; alkynes; nomenclature, geometric isomerism, electrophilic addition reactions, carbonium ions and Markovnikov's rule. Haloalkanes: nomenclature, substitution and elimination reactions - Sn1, Sn2, E1, E2. Alcohols; ethers; epoxides: methods of preparation and typical reactions. Aldehydes; ketones: methods of preparation, typical carbonyl group reactions - nucleophilic addition, keto-enol tautomerism, reactions at the α position, enolate anions, Aldol condensation, Grignard and Wittig reactions, use of simple protecting groups eg. Acetals. Synthetic methodology - elementary retrosynthetic analysis.

CH4104 Organic Chemistry 3* (Spring/2)

5 hours per week; 13 weeks/4th semester; 26L/39LAB; ECTS credits:6

Amino Acids: structure, stereochemistry, acid ionization, 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 cyclodextrins. *Prerequisite CH4102, CH4103*

CH4152 Introductory Organic Chemistry 1B (Spring/1)

4 hours per week; 13 weeks/2nd semester; 26L/26LAB; ECTS credits:6

Alkanes cycloalkanes: structural formulae, nomenclature, isomerism, conformational analysis, free radical reactions. Alkenes alkynes: nomenclature, geometric isomerism, electrophilic addition reactions - Sn1, Sn2, E1, E2. Alcohols; ethers; epoxides: methods of preparation and typical reactions. Aldehydes; ketones: Structure, nomenclature, methods of preparation. Nucleophilic addition reactions (addition of derivatives of NH₃, Grignard reagents), Hydride reduction reactions, oxidation. Wittig reaction. Kelenosol tautomerisation, reactions at the α position. Aldol condensation. Synthetic methodology - elementary retrosynthetic analysis. *Prerequisite CH4701*

CH4202 Inorganic Chemistry 1* (Spring/1)

4 hours per week; 13 weeks/2nd semester; 26L/26LAB; ECTS credits:6

Covalent bonding; valence bond 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 conductors, 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* (Spring/1)

5 hours per week; 13 weeks/2nd semester; 26L/13T/26LAB; ECTS credits:6

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* (Spring/2)

6 hours per week; 13 weeks/4th semester; 26L/13T/39LAB; ECTS credits:6

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. *Prerequisites CH4003, CH4303*

CH4306 – Analytical Chemistry 4

hours per week; 13 weeks/4th semester; 26L/13T; ECTS credits:6

Mass Spectrometry: Brief review of some basic principals; Fragmentation Patterns; Rearrangements; Interpretation of spectra; Hyphenated techniques. NMR Spectroscopy: 1-D 1H NMR: Review of some basic principals; Relaxation Processes; Homotopic, enantiotopic and diastereotopic systems; Nuclear Overhauser Effect (NOE); Second-Order Spectral Interpretation. 13C NMR: Theory; DEPT 13C nmr; NOE, Quantitative 13C nmr; Interpretation of spectra. Solid State 13C nmr (brief). 2-D 1H NMR: COSY (1H-1H connectivity); NOESY, ROESY (through space 1H-1H proximity), HOSEY; HECTOR (1H - 13C connectivity); INADEQUATE (13C - 13C connectivity); TOCSY (1D and 2D); Interpretation of spectra. Structure elucidation using combined spectroscopic techniques (of those above). Laser Raman Spectroscopy: Theory; Comparison with FT-IR spectroscopy; Spectral interpretation of simple organic molecules and carbon allotropes (diamond, graphite and carbon nanotubes). Problem Sessions/Lab. *Prerequisite CH4303, CH4304, CH4305*

CH4308 Discrete Analytical Methods (Spring/4)

3 hours per week; 13 weeks/8th semester; 26L/13T; ECTS credits:6

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* (Spring/2)

6 hours per week; 13 weeks/4th semester; 26L/13T/39Lab; ECTS credits:6

Survey of analytical methods; electrometric methods; chromatographic methods; spectroscopic methods; mass spectrometry; thermal analysis; water analysis; gas analysis.

CH4404 Process Technology 1 (Spring/2)

6 hours per week; 13 weeks/4th semester; 26L/13T/39Lab; ECTS credits:6

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 eg. P, PI, PID; control system architecture and dynamic behaviour for SISO processes; controller tuning; control system hierarchies for chemical/biochemical processing plants.

Equipment and instrumentation used in chemical and biochemical processing operations: sensing and measurement: signal transmission; controllers; final control elements. Process modelling; application of material and energy balances in the formulation of quantitative process models; process characteristics and dynamic response behaviour of first and second order systems.

CH4554 Environmental Chemistry* (Spring/2)

6 hours per week; 13 weeks/4th semester; 26L/13T/39LAB; ECTS credits:6

Chemistry of the earth: overall structure, composition, energy flow, inter-relation of the different spheres. Definitions. Concentrations. The hydrosphere composition, the water cycle; equilibria in aqueous systems, distribution diagrams; water pollution. The lithosphere :composition and structure; weathering; leaching and soil chemistry ;mineral resources and pollution; geochemistry; solubility, pH; E-pH diagrams. The atmosphere: composition, chemical processes in the atmosphere, solubility in water; chemistry of acid deposition, greenhouse effect ,ozone depletion, photochemical smog. The biosphere: composition, major and minor elements; sources, utilisation and disposal; toxicology of heavy metals and organics, bioaccumulation. Biochemical cycles for *Prerequisite CH4701*

CH4608 Plant Process Management (Spring/4)

3 hours per week; 13 weeks/8th semester; 26L/13T; ECTS credits:6

Principles of accident prevention; legal, humanitarian and economic reasons for action. Management Responsibilities Accident causation modes. Definitions of hazard and risk. Risk identification ,evaluation and control. Accident investigation, job safety analysis. Safe system of work, emergency procedures Occupational Health. dermatitis, Respiratory diseases, solvents, chemicals ,gases. Noise and vibration, Heat and Cold ;radiation. Human error Occupational hygiene Recognition ;evaluation; control. Accident case studies. Costing of chemical plant; stages of costing, methods of cost prediction, exponential, factorial etc. Cost updating. Economic evaluation of chemical projects; pay-back, ROI,NPV DCFROR etc. Alternative projects. Sensitivity analysis.

ER4404 Managing the Environment (Spring/2)

3 hours per week; 13 weeks/4th semester; 26L/13T; ECTS credits:6

Environmental management systems; environmental monitoring, environmental auditing.

ER4408 Environmental Management 2 (Spring/4)

3 hours per week; 13 weeks/4th semester; 26L/13T; ECTS credits:6

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 2 (Waste Management) (Spring/4)

3 hours per week; 13 weeks/4th semester; 26L/13T; ECTS credits:6

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; novel waste management techniques.

ER4606 Clean Technology (Spring/3)

3 hours per week; 13 weeks/6th semester; 26L/13T; ECTS credits:6

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

FT4204 – Food Chemistry (Spring/2)

5 hours per week; 13 weeks/4th semester; 26L/13T/26LAB; ECTS credits:6

Overview of 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.

FT4428 Advanced Food Chemistry (Spring/4)

4 hours per week; 13 weeks/8th semester; 26L/26LAB; ECTS credits:6

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 its 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.

FT4438 Food Microbiology (Spring/4)

4 hours per week; 13 weeks/8th semester; 26L/26LAB; ECTS credits:6

Roles of major families of microorganisms in food preservation/spoilage, food fermentations and public health. Isolation and characterisation. Physiological characteristics of selected food microbes. Microbial testing and control in food products. Advanced detection methods. Hygiene, cleaning and disinfection in the food

factory. HACCP and Quality Systems. Foodborne pathogens of current concern including *Listeria monocytogenes*, psychrophilic *C. botulinum*, *Aeromonas*, *Yersinia*, *Bacillus cereus*, *Salmonella* etc.

FT4458 – Food Production Systems

4 hours per week; 13 weeks/8th semester; 26L/26LAB; ECTS credits: 3

[Soils and plant nutrition]; soil composition, physical chemical and biological properties. [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].

FT4468 – Food Technology

4 hours per week; 13 weeks/8th semester; 26L/26LAB; ECTS credits:6

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

PH 4008 Hydrocarbon Fuels (Spring/4)

3 hours per week; 13 weeks/8th semester; 26L/13T; ECTS credits:6

Fundamentals of coal, oil and natural gas and their conversion to useful energy products. Hydrocarbon resource terminology - proven reserves, indicated reserves inferred reserves. Coal formation, reserves. Coal extraction and production. Use of coal, combustion, gasification and use in blast furnaces, coke formation. Coal composition, properties, analysis and classification - ranking of coal from sub-bituminous to anthracite. Coal combustion, liquefaction and gasification. Electricity production from coal combustion. Clean coal technology - gasification with combined cycle. Origins and geology of oil and gas. Oil and gas reserves. Non conventional sources of petroleum - oil shale, tar sands and heavy oil deposits. Liquid petroleum fuel and its classification, distillate, non distillate fuels etc. Oil refining and products. Petroleum hydrocarbon structures, the refining process - distillation (fractionation), reforming, alkylation, polymerisation, hydrotreating and sulphur plants. Oil from coal and gas. Oil and gas engines, spark ignition engine, compression ignition engine and sterling engine

PH4012 Physics for Engineers 2 (Spring/1)

5 hours per week; 13 weeks/2nd semester; 26L/13T/26LAB; ECTS credits:6

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

PH4022 - Physics for Environmental and Biosciences

5 hours per week; 13 weeks/2nd semester; 26L/13T/26LAB; ECTS credits:6

Measurement and units: The SI system, basic and derived. Mechanics: Displacement, velocity, acceleration, Newton's laws of motion, force, mass momentum, work, energy, power. Heat: Temperature, calorimetry, specific heat capacity, latent heat, heat transfer, thermal conductivity, α -value. Properties of Fluids: density, pressure due to a liquid and gas, Boyle's law, Charles Law, fluid flow and viscosity, Pascal's Principle, liquid flow in pipes. Optics: Geometrical optics, properties of optics, reflection, laws of reflection, refraction, laws of refraction, mirrors, lenses, total internal reflection, critical angle, optical instruments. Waves: Properties of waves, wave nature of light, Huygen's principle, double-slit experiment, diffraction, interference, diffraction gratings, Young's polarization of light, the electromagnetic spectrum, ultraviolet, visible light, x-rays, γ -ray, infrared radiation. Sound: Nature of sound, The speed sound, speed of sound in different media, the temperature dependence of the speed of sound in air frequency spectrum, audible region, ultrasonic region, infrasonic region, sound intensity level, the decibel scale, sound phenomena. The atoms and Nucleus: Sub-atomic particles, nuclear radiation, radioactivity measurement of radiation, radiation and health.

PH4032 – Physics for General Science 2 (Spring/1)

5 hours per week; 13 weeks/2nd semester; 26L/13T/26LAB; ECTS credits:6

Cognitive (Knowledge, Understanding, Application, Analysis, Evaluation, Synthesis) Discuss the physical processes that underlie wave motion, optics, acoustics and the mechanical and thermal properties of matter. Describe the physical basis and experimental observations of wave motion, optics, acoustics and the mechanical and thermal properties of matter. Derive relevant equations describing wave motion, optics, acoustics and the mechanical and thermal properties of matter from basic laws and principles. Solve numerical problems, from information provided, on the topics covered. Affective (Attitudes and Values)

Discuss the importance of wave motion, optics, acoustics and the mechanical and thermal properties of matter in applied physics.

Psychomotor (Physical Skills)

Perform experiments requiring precise measurement. Use mechanical, optical, acoustical and electronic apparatus for observation and measurement.

PH4038 Energy Storage (Spring/4)

3 hours per week; 13 weeks/8th semester; 26L/13T; ECTS credits:6

Fundamentals of advanced energy conversion and storage. Electrochemical energy storage. Review of electrochemical cells. Electronic and ionic conductivity. Overpotential and ohmic losses. Types of cells. Batteries, fuel cells and supercapacitors. Primary, secondary and redox flow batteries. Lead-acid, nickel-cadmium, nickel-metal-hydride and lithium ion batteries. Vanadium redox flow batteries. Solid oxide, molten carbonate and proton exchange membrane (PEM) fuel cells. Water electrolysis. Hydrogen storage. Gravimetric and volumetric energy density and power density. Energy efficiency and coulombic efficiency. Grid and local energy storage. Batteries for electric vehicles. Environmental and safety considerations. Flywheel energy storage. Principles. Components: rotor, magnetic bearings. Parasitic losses: Friction, hysteresis and eddy currents. Energy efficiency and energy density. Hydroelectric energy storage. Principles. Fundamentals of hydroelectricity. Reversible hydroelectric turbines. Reservoirs and storage capacity. Comparison of storage by conventional hydroelectric plants, tidal hydroelectric plants and pumped storage. Response times. Compressed air energy storage. Adiabatic, diabatic and isothermal systems. Heat exchangers. Energy density and efficiency. Mobile, underground and underwater storage.

PH4042 – Thermal Physics (Spring/1)

5 hours per week; 13 weeks/2nd semester; 26L/13T/26LAB; ECTS credits:6

Temperature: thermal equilibrium; the zeroth law; equations of state; temperature scales. [First law of thermodynamics]: internal energy; heat and heat capacity; reversible processes and work; free expansion and Joule's law. [Second law of thermodynamics]: Carnot cycles, efficiency; thermodynamic temperature scale. [Entropy]: Clausius inequality and entropy; principle of increasing entropy; central equation of thermodynamics; entropy of an ideal gas. [Thermodynamic potentials and Maxwell relations]: internal energy U ; enthalpy H ; Helmholtz free energy F ; Gibbs free energy G ; energy equations; availability A and useful work; mechanical, magnetic & electrolytic systems. [Change of phase]: chemical potential; Clausius-Clapeyron equation; nucleation; Gibbs phase rule. [Microstates and macrostates]: statistical weight of a macrostate; Boltzmann definition of entropy; entropy and disorder. [Equilibrium of an isolated system]: magnetic dipole lattice; Schottky defects. [Equilibrium of a system in a heat bath]: the partition function and the Boltzmann distribution; equivalence of thermodynamic and statistical quantities; the classical gas; heat capacities of solids; perfect quantum gas; Planck's law; thermodynamics of black body radiation. [Equilibrium of a system with variable particle number]: Gibbs distribution; Fermi-Dirac and Bose-Einstein distributions; Bose-Einstein condensation; Fermi energy; density of states; electrons in metals.

PH4048 First/Second Generation Biofuels (Spring/4)

3 hours per week; 13 weeks/8th semester; 26L/13T; ECTS credits:6

1st generation biofuels technologies (Bio-ethanol production, including substrate preparation, microbial conversion and separations, thermo-chemical conversions, including combustion, gasification and pyrolysis and the use of these for green electricity production; biogas production, both from landfill sites, animal dung and waste water treatment, biodiesel production including process basics, product purification and waste treatment). Pure Plant Oil (PPO) pure vegetable oil cold pressing, extraction, refining, biodiesel transesterification to methylester, ethanol from sugar crops, fermentation, distillation; ethanol from starch crops hydrolysis, SNG from biogas; biogas digestion, CO₂H₂O-removal; hydrogen from biogas, biohydrogen digestion, steam reforming/wgs CO₂-removal. Carbohydrate Chemistry. 2nd generation biorefining, ethanol from sugars, batch and continuous processes, ethanol from starch, ethanol from lignocellulosic biomass (pre-treatment either physical or chemical, detoxification, hydrolysis of cellulose, fermentation of biomass hydrolysates. Chemical hydrolysis, pre-treatment (acid/alkaline release, ionic liquids). Hydrolysis processes, platform chemical, potential fuels and fuel additives MTHF, fuel esters. Thermochemical processes; pyrolysis, gasification, upgrading of pyrolysis oil. Biosyngas upgrading Fischer-Tropsch (FT) diesel, water gas shift gs, synthesis, hydrocracking, Methanol Biomethanol from gasification. MTBE Bio-MTBE synthesis methanol and isobutylene; DME biodimethylether, alcohols from syngas; hydrogen from syngas biohydrogen gasification, wgs, CO₂-removal, HTU diesel synthetic biofuel HTU, HDO, refining pyrolysis-diesel synthetic biofuel pyrolysis, HDO, refining SNG from wet materials, biogas, synth. biofuel. Super/subcritical gasification.

PH4062 Nanotechnology 2 (Spring/1)

3 hours per week; 13 weeks/2nd semester; 26L/13T; ECTS credits:6

Nanotribology and Materials Characterization Studies Using Scanning Probe Microscopy: Description of AFM/FFM, Friction and Adhesion, Scratching, Indentation and wear, Phase, electrostatic and related scanning probe microscopies. Surface Forces: Types of Surface Forces; Methods Used to Study Surface Forces; Adhesion and Capillary Forces; Different Modes of Friction and the Limits of Continuum Models. Friction and Wear on the Atomic Scale: Friction Force Microscopy in Ultra-High Vacuum, The Tomlinson Model, Friction Experiments on Atomic Scale, Thermal Effects on Atomic Friction, Geometry Effects in Nanocontacts. Nanomechanical Properties of Solid Surfaces and Thin Films: Modes of Deformation, Thin Films and Multilayers. Mechanics of Biological Nanotechnology: Scales at the Bio-Nano Interface, Viruses as a Case Study. Optical Properties of Nanostructures: Collective oscillation (Gustav-Mie explanation), surface plasmon polaritons, subwavelength optics, nonlinear optical properties, Electron Transport in Nanostructures: Electronic transport in nanostructures, density of states in nanocrystals. Electronic Nanodevices: Quantization of resistance, single-electron transistors, resonant tunnelling diodes, organic molecular electronics. Magnetic Nanodevices: Spintronics. Photonic Nanostructures: Photonic crystals, metamaterials, disordered photonic media.

PH4072 – Electromagnetism (Spring/1)

5 hours per week; 13 weeks/2nd semester; 26L/13T/26LAB; ECTS credits:6

Vector methods: div, grad, curl; line, surface and volume integrals; Electric field E: electric charge, Coulomb's law, electric field E, Gauss's law, divergence of electric field, the Dirac delta function; Magnetic field: magnetic field B, Biot-Savart law, Ampere's law, Lorentz force; Electromagnetic induction: emf, Faraday's law, generators and motors; Maxwell's equations in vacuum: integral and differential form, monopoles; Energy and potential: energy density in E and B fields, scalar potential V and vector potential A; Dipoles and multipoles: electric dipole p, magnetic dipole m, electric multipoles; Conductors: conductivity, Ohm's law, Hall effect; Dielectrics: polarisation P, displacement D, permittivity, electric susceptibility, dielectric constant; Magnetic materials: diamagnets, paramagnets, ferromagnets; magnetic intensity H, magnetisation M, magnetic susceptibility, inductance, transformers; Maxwell's equations in matter: Maxwell's equations in terms of H and D; Boundary value problems: Poisson's equation, Laplace's equation, uniqueness theorem, images; Circuits: transients, reactance, power, and impedance.

PH4092 – Semiconductor Devices (Spring/1)

5 hours per week; 13 weeks/2nd semester; 26L/13T/26LAB; ECTS credits:6

Conduction in solids: elementary band theory of conductors, semiconductors and insulators, doping; donor and acceptor impurities, intrinsic and extrinsic conduction, majority and minority charge carriers. The PN junction: junction diode and applications, Zener diode, the bipolar transistor; transistor action, applications of the emitter amplifier, early effect; the field effect transistor, JFET, MOSFET, characteristics and application in simple circuits. Combinational Logic: Binary Logic, Logic functions; AND, OR, NOT; Truth table; Boolean Algebra; Boolean postulates and theorems, De Morgan; Logic gates - complete set; NAND and NOR implementations of logic functions; Multiple-input gates. Sequential Logic: Memory, feedback, synchronous/asynchronous, Flip-flops, Latches; basic SR latch, gated SR Latch, D-type, Master-slave latch, JK Latch; Shift Registers, Counters, UART (block diagram). Operational and Instrumentation amplifiers: desirable characteristics, comparators, voltage reference, virtual earth, voltage follower, Nyquist-Shannon sampling theorem.

PH4102 – Waves/Light/Modern Physics (Spring/1)

5 hours per week; 13 weeks/2nd semester; 26L/13T/26LAB; ECTS credits:6

Oscillations and simple harmonic motion: transverse and longitudinal waves, superposition, speed, reflection, harmonic waves. Sound: sound waves, sound intensity, Doppler effect. Light: EM Spectrum, Sources of light, Geometrical optics; reflection, refraction, dispersion,

achromatic optics; Physical optics; interference, diffraction, diffraction gratings, polarisation; Optical systems; the microscope, the telescope, the eye. Special Relativity: Einstein's Postulates, time dilation, length contraction, the Lorentz Transformation, relativistic momentum and energy conservation. Atom: Classical models, Planck's quantum hypothesis, the Bohr atom, The photoelectric effect; quantized energy; the de Broglie wavelength. The nucleus: nucleons; isotopes; nuclear structure; binding energy. Radiation: X rays, alpha, beta and gamma radiation, the law of radioactive decay. fission and fusion; nuclear reactors. Detection, dosage.

PH4132 – Modern Physics (Spring/1)

5 hours per week; 13 weeks/2nd semester; 26L/13T/26LAB; ECTS credits:6

Wave mechanics: De Broglie's hypothesis, wave functions and probability amplitudes, the Heisenberg Uncertainty principle. The Schroedinger wave equation: simple solutions in one dimension, transmission, reflection and penetration at a barrier, tunnelling, potential wells, the harmonic oscillator. The Schroedinger equation in three dimensions: the hydrogen atom, quantisation of angular momentum, spatial quantisation, the Zeeman effect. Spin: the fourth quantum number, the Pauli exclusion principle. Special Relativity: Relativistic dynamics, relativistic mass and momentum, total energy, mass/energy equivalence. Spacetime: spacetime diagrams, introduction to four-vectors. Application of relativistic dynamics to particle beam devices and collision experiments. Nuclear Physics: Nucleons and nuclear models, nuclear spin nuclear reactions and cross-sections. Introduction to elementary particles and the Standard Model.

WT4014 Introduction to Geology & Soil Mechanics

5 hours per week; 13 weeks/2nd semester; 26L/13T/26LAB; ECTS credits:6

This module introduces the most common engineering material encountered in the construction industry; this introductory module on soil mechanics is presented by exploring the origin and material characteristics of soil starting with some contextual lectures in civil engineering geology. Working in small teams, students then undertake a single engineering project for the semester. The project will develop specific skills in basic site investigation, soil classification and fundamental soil properties, soil compaction theory and practice, effective stress and seepage. The course is designed to challenge the student to seek the key concepts in geology and soil mechanics and apply these concepts through a project and self-directed learning to achieve the following key objectives:

- To provide a clear understanding of the role of geology and soil mechanics in achieving a successful construction project.
- To form the basis for subsequent modules on Soil Mechanics and Geotechnical Engineering Design.
- To generate enthusiasm for the subject through field trips, practical experimentation and case histories.

FACULTY OF ARTS, HUMANITIES AND SOCIAL SCIENCES – Spring

ERASMUS Academic Coordinators

Humanities (German):
Joachim Fischer
Department of Languages and Cultural Studies
Telephone: +353 61 202354
email: Joachim.fischer@ul.ie

Humanities (Spanish):
Alicia Castillo
Department of Languages and Cultural Studies
Telephone: +353 61 202365
Email: Alicia.castillo@ul.ie

Humanities (French):
Dr. Eva Sansavio
Department of Languages and Cultural Studies
Telephone: +353-61-234858
Email: eva.sansavio@ul.ie

Irish Studies/Less Widely Taught Languages:
Dr Emma Ni Chartaigh
Department of Languages and Cultural Studies
Telephone: +353-61-202797
Email: emma.nichartaigh@ul.ie

English Studies:
Dr David Coughlan
Department of Languages and Cultural Studies
Telephone: +353-61-202035
Email: david.coughlan@ul.ie

Law:
Andrea Ryan
Department of Law
Telephone: +353-61-202356
Email: andrea.ryan@ul.ie

Journalism:
Emer Connolly
Department of Culture and Communication
Email: emer.connolly@ul.ie

Political Science/Public Administration:
Dr. Bernadette Connaughton
Department of Government and Society
Telephone: +353-61-213148
email: Bernadette.connaughton@ul.ie

Social Sciences:
Dr. Carmen Kuhling
Department of Sociology
Carmen.Kuhling@ul.ie

Technical Communications:
Yvonne Cleary
Department of Languages and Cultural Studies
Telephone: +353-61-213466
Email: yvonne.cleary@ul.ie

Music and Dance
Mats Melin
Irish World Academy Music and Dance
Mats.melin@ul.ie

CU4006 – TRAVEL LITERATURE (Spring/3)

3 hours per week; 13 weeks/6th semester; 26L/13T; ECTS credits:6

This module will cover the genre of travel literature, giving a background to the origins and following developments up to the present day and by examining different forms of travel literature. After an introduction to the history of travel literature, utopian literature as well as colonial representation of the 'New World' will be examined in the period dating from the late fifteenth century through to the final decades of the seventeenth century. Comparing and contrasting the representations of America found in the reports of the earliest Spanish explorers with that found in later Puritan accounts, this element of the course will analyze the European 'invention' of America as a prelapsarian utopia. The main part of the module will then concentrate on Ireland as a travel destination, seen from an outsider's perspective through the eyes of European visitors from the Middle Ages up to the twentieth century and compared with travel accounts of Irish writers.

Questions of identity, cross-cultural awareness and language as a communication tool will be analyzed.

CU4014 Analysing Media Discourse (Spring/)

3 hours per week; 13 weeks/2nd semester; 26L; ECTS credits:6

Students will acquire knowledge about the linguistic features of media texts; Students will acquire skills to enable them to engage critically with a range of media texts; Students will be exposed to both qualitative and quantitative methods of analysing media texts; Students will acquire specific skills in Critical Discourse Analysis and Corpus Analysis and multimodal discourse analysis.

CU4026 How to Read a Film: Introduction to Film Studies (Spring/3)

3 hours per week; 13 weeks/6th semester; 26L/13T; ECTS credits:6

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

CU4018 (History of European Cinema, 1960s to the present (Spring/4)

3 hours per week; 13 weeks/8th semester; 26L/13T; ECTS credits:6

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

CU4112 Cultural Studies 2: Language and Culture (Spring/1)

3 hours per week; 13 weeks/2nd semester; 26L; ECTS credits:6

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 Theory (Spring/3)

3 hours per week; 13 weeks/6th semester; 26L/13T; ECTS credits:6

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, Derrida, 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.

ENGLISH AS A FOREIGN LANGUAGE

TE4012 English as a Foreign Language Intermediate

TE4022 English as a Foreign Language Upper-Intermediate

TE4032 English as a Foreign Language Advanced

4 hours per week; 13 weeks/2nd semester; 39T/13LAB; ECTS credits:6

Placement test to determine level to be done on arrival

English language classes cover the four language skills of listening, speaking, reading, and writing in both general and academic English. Text books and authentic supplementary materials are used in class. Each level will also read a set novel. There are four hours of class each week: two of these are with the class teacher, and two are with trainee teachers, under supervision, doing their Masters in English Language Teaching.

EH4002 Critical Practice II : Renaissance Literature (Spring/2)

3 hours per week; 13 weeks/2nd Semester; 26L/13T; ECTS credits:6

This module introduces students to genre-based studies in poetry and drama, in this case, to significant ideas and key works from the English Renaissance. The period studied, from the Reformation to the Restoration, sees the introduction into England both of new philosophies, such as humanism, and new literary forms, such as the sonnet. Therefore, the module aims to place the literature in those cultural, social, and political contexts which inform and affect its interpretation, and, through an account of the poetic and dramatic developments of the period, to equip students with the skills to identify and critically analyse poetic forms and dramatic conventions.

EH4006 – Victorian Texts and Contexts (Spring/3)

3 hours per week; 13 weeks/6th Semester; 26L/13T; ECTS credits: 6

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

endeavour, students taking the module will be asked to participate in a group-based research project.

EH4008 – British Literature Since 1945 (Spring/4)

3 hours per week; 13 weeks/8th Semester; 26L/13T; ECTS credits: 6

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

EH4012 Restoration and Augustan Literature (Spring/2)

3 hours per week; 13 weeks/2nd Semester; 26L/13T; ECTS credits: 6

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.

EH4016 State of the Union: American Literature since 1890 (Spring/6)

3 hours per week; 13 weeks/6th semester; 26L/13T; ECTS credits: 6

This module follows on chronologically from EH4023 The New World: American Literature to 1890, covering the period from the closing of the frontier to the present day. Through a selection of texts reflecting the diverse voices of the literature, students explore the physical, cultural, and sociopolitical geographies of America. Reading accounts of the city and town, the urban and suburban, the road, the land, the reservation, or the South, students engage with questions of self and society, class and race, national identity, marginalisation, counterculturalism, and globalisation, as expressed within differing literary movements.

EH4018 – Contemporary Irish Literature (Spring/4)

3 hours per week; 13 weeks/8th Semester; 26L/13T; ECTS credits: 6

The period since 1980 has seen profound changes throughout the island of Ireland, particularly in the post-Robinson period. Drawing on the work of writers north and south, as well as those working within

both the diaspora and immigrant communities in Ireland, students will consider how these texts have constructed and deconstructed the cultural, social and political landscape of contemporary Ireland.

EH4026 - Colonial/Postcolonial Literature English (Spring/3)

3 hours per week; 13 weeks/6th Semester; 26L/13T; ECTS credits: 6

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

EH4036 Irish Literature: 1930-1990 (Spring/3)

3 hours per week; 13 weeks; 6th Semester; 26L/13T; ECTS credits: 6

This module will introduce students to a range of Irish literary work and cultural movements in the period 1930-1990. This was a period in which literary censorship was a controversial topic, and the threat posed by literary radicals to the stability of the new state(s) widely debated. Taking this as a starting point, the module will encourage students to interrogate the ways in which Irish literary culture challenged state censorship, how it evolved over the century, and what the impact of literary writing has been on dominant social and cultural formations on the island. Attending to innovations in style, structure, and genre in the period, the module will concentrate on formal as well as cultural experimentation.

EH4038 – Study of a Major Author (Spring/4)

3 hours per week; 13 weeks/8th Semester; 26L/13T; ECTS credits: 6

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

EH4125 Feminist Theory and Literary Texts (Spring/4)

3 hours per week; 13 weeks; 8th Semester; 26L/13T; ECTS credits: 6

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.

FR4142 French Language and Society 2: Introduction to French Studies 2 (Spring/1)

4 hours per week; 13 weeks/2nd semester; 13L/13T/26LAB; ECTS credits:6

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.

FR4146 French A5 (European Studies)* (Spring/3)

4 hours per week; 13 weeks/6th semester; 26L/26T; ECTS credits:6

In depth study of the Fifth Republic through analysis of a variety of texts from the period; intensive language activities include comprehension, linguistic analysis and translation. *Prerequisite FR4125*

FR4148 French Language & Society 6 Media/Current Issues (Spring/4)

4 hours per week; 13 weeks/8th semester; 26L/26T; ECTS credits:6

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 broadcasts or work of literature:

FR4242 French 2A (Applied Languages)* (Spring/1)

4 hours per week; 13 weeks/2nd semester; 26L/26T; ECTS credits:6

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.

FR4246 French Language Culture & Society 4 (Spring/3)

4 hours per week; 13 weeks/6th semester; 13L/39T; ECTS credits:6

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

FR4248 French Language Culture & Society 6 (Spring/4)

4 hours per week; 13 weeks/8th semester; 13L/39T; ECTS credits:6

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:

FR4622 Literature & Culture Twentieth-Century (Spring/1)

3 hours per week; 13 weeks/2nd semester; 13L/26T; ECTS credits:6

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

FR4626 French Literature and Culture 4 19th Century Art (Spring/3)

3 hours per week; 13 weeks/6th semester; 13L/26T; ECTS credits:6

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 2A * (Spring/1)

4 hours per week; 13 weeks/2nd semester; 26L/26T; ECTS credits:6

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

FR4924 French for Business 4A* (Spring/2)

4 hours per week; 13 weeks/4th semester; 26L/26T; ECTS credits:6

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.

FR4928 French for Business 8A* (Spring/4)

4 hours per week; 13 weeks/8th semester; 26L/26T; ECTS credits:6

This module entitled "La politique et la société" 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*

GA4012 Celtic Civilisation: Continuity and Change

3 hours per week, 13 weeks/ semester; 26L/13T; ECTS credits: 6

This module will give an overview of the socio-cultural context of Early Irish literature and culture, as well as Celtic Mythology and Customs, including the following: representations of Celtic Deities in the Classical commentaries and in vernacular sources; Celtic Mythology in early written sources; an overview of Early Irish festivals and customs and the survival of same in modern Irish folklore; Celtic Cosmology – including representations of the otherworld(s) in Early Irish literature and in Modern Folklore; interpretation of historical, literary and folklore sources pertaining to the social, cultural and religious customs and worldview of the Celts.

GA4105 Irish Folklore 1 (Spring/2)

3 hours per week; 13 weeks/6th Semester; 26L/13T; ECTS credits: 6

4 hours per week; 13 weeks/4th Semester; 26L/26T; ECTS credits:6
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* (Spring/3)

5 hours per week; 13 weeks/6th semester; 26L/39T; ECTS credits:6

This module repeats the language content of GA4115 (Autumn Semester) for students who join UL in the Spring semester. A second group within the module take a continuation course in communicative Irish building on their first semester module, 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].

GE4142 German Language and Society 2: Introduction to German Studies II (Spring/1)

4 hours per week; 13 weeks/2nd semester; 13L/13T/26LAB; ECTS credits:6

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

GE4146 Germany past and present (Spring/3)

4 hours per week; 13 weeks/6th semester; 13L/39T; ECTS credits:6

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.

GE4148 Issues and debates in the German speaking countries today (Spring/4)

4 hours per week; 13 weeks/8th semester; 13L/39T; ECTS credits:6

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.

GE4212 German for beginners 2 (Spring/1)

6 hours per week; 13 weeks/2nd semester; 13L/52T/13L; ECTS credits: 6

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 (Applied Languages) (Spring/1)

2 hours per week; 13 weeks/2nd semester; 13L/13T; ECTS credits:6

Lecture: Postwar German-speaking countries; society and institutions; regional/social variations and developments in the German language; political geography; trends in postwar German culture and economy
Tutorial work: one hour textwork 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.

GE4246 German language, culture and society 4 (Spring/3)

4 hours per week; 13 weeks/6th semester; 13L/39T; ECTS credits:6

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

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

GE4248 German language, culture and society 6 (Spring/4)

4 hours per week; 13 weeks/8th semester; 13L/39T; ECTS credits:6

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: analysis & writing of project proposals, evaluations, etc.; Translation theory and practice: advertising, commercial and 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.

GE4626 19th Century German Literature (Spring/3)

3 hours per week; 13 weeks/6th semester; 26L/13T; ECTS credits:6

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.

GE4818 – German Language and Literature 2 (Spring/4)

3 hours per week; 13 weeks/8th semester; 26L/13T; ECTS credits:6

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

GE4922 German for Business 2A (Spring/1)

4 hours per week; 13 weeks/2nd semester; 26L/26T; ECTS credits:6

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 4A (Spring/1)

4 hours per week; 13 weeks/4th semester; 26L/26T; ECTS credits:6

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 CV's 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 (Spring/4)

4 hours per week; 13 weeks/8th semester; 26L/26T; ECTS credits:6

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

GY4018 Historical Cultural Geography of Modern Ireland (Spring/4)

3 hours per week; 13 weeks/8th semester; 26L/13T; ECTS credits:6

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.

GY4902 Biogeography

GY4912 Reading the Irish Cultural Landscape

HI4032 Capitalism and Industrial Society, 1450-1900

3 hours per week; 13 weeks/3rd semester; 26L/13T; ECTS credits: 6

Agriculture, power and printing; a European *mentalité*? feudalism, craft and capitalist production; navigation, a world economy, mercantilism; demography 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 may be restricted on this module*

HI4068 IRELAND AND THE WIDER WORLD, 1919-73 (Spring/4)

3 hours per week; 13 weeks/8th semester; 26L/13T; ECTS credits: 6

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

HI4081 EARLY MODERN IRELAND (Spring/1)

3 hours per week; 13 weeks/2nd semester; 26L/13T; ECTS credits: 6

Defining Ireland – Anglo-Irish and Gaelic lordships; the Nine Years’ War and the Flight of the Earls, 1593-1607; the Thirty Years’ War, 1618-48; ‘matters of Grace and Bounty’ – Wentworth and Charles I;

crisis and rebellion in the British kingdoms, 1637-53; a catholic King and protestant kingdoms: ‘Glorious’ Revolution and Williamite conflict.

HI4082 Europe: Society and Governance (Spring/2)

3 hours per week; 13 weeks; 26L/13T; ECTS credits: 6

War, revolution, restoration 1914-24; democracy/dictatorship and war 1924-44; American money and reconstruction; decadent decade? depression and sobriety; political mobilisation and violence; authority restored; conservatism/fascism/Stalinism; the twenty-year crisis: international relations; the Nazi new order and total war; Holocaust; reconstruction and Cold War; 1945: Europe’s ‘zero hour’? re-establishing order: the European economy and culture; the ‘second sex’: youth, political protest and cultural revolt; the post-post war society and state; rebuilding the European house: Thatcher and Gorbachev; race, ethnicity, and memory; after the Wall: the return of ‘Europe’.

HI4102 Ireland: Revolution and Independence, 1898-1968 (Spring/2)

3 hours per week; 13 weeks/3rd semester; 26L/13T; ECTS credits: 6

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.

HI4132 Warfare and Diplomacy: Europe in the Seventeenth Century (Spring/1)

3 hours per week; 13 weeks/3rd semester; 26L/13T; ECTS credits: 6

This module offers students an overview of the political, social and economic history of continental Europe during the seventeenth century. It is intended as a spring-semester module to compliment the autumn-semester module on sixteenth-century Europe, thus providing first-years with a more gentle introduction to the early modern period than has hitherto been on offer.

Syllabus:

The Thirty Years War and the military revolution, mercenaries and siege warfare; developments in congress diplomacy at Westphalia, the Pyrenees, Nijmegen and Utrecht-Rastatt; the structure of state building - Cardinal Richelieu and fiscal terrorism; rebellion, civil war and Frondes - the general crisis of the mid-seventeenth century; Dutch economic primacy and world trade; credit systems, deficit-finance, the development of state-funded debt and the stock exchange; the emergence of capital cities - Madrid, Vienna and Turin; court society and the world of the minister-favourite; the decline of Spain; France in the age of Louis XIV; the emergence of absolutist states from the

1660s; aristocratic constitutionalism in Sweden, Denmark and Poland-Lithuania; Austrian expansion into the Hungarian plain; the partition of the Spanish Monarchy in 1713-14.

HI4148 HISTORY OF MODERN AUSTRALIA (Spring/4)

3 hours per week; 13 weeks/8th semester; 26L/13T; ECTS credits: 6

‘Terra Nullius’ and the choice of Botany Bay; the French reconnaissance; hulks and prison ships; convictism; Aborigines; the ‘Irish Plots’ of 1800 and Castle Hill revolt of 1804; Governors Bligh, Macquarie, Darling and Bourke; the Bigge Report; ‘Black War’; Anti-Transportation League; Gold, Squatters; the ‘Kelly Outbreak’, new colonies; Federation; ANZAC and Australia during the First World War.

JA4212 Japanese Language, Culture and Society 2 (Spring/1)

6 hours per week; 39L/39T; 2nd semester; ECTS credits: 6

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

JA4246 – Japanese Language, Culture and Society 4 (Spring/3)

6 hours per week; 13 weeks/6th semester; 26L/39T/13LAB; ECTS credits: 6

Listening practice concentrating on authentic Japanese; speaking exercises using various levels of formal and informal Japanese; using language with the correct nuances of regret etc. Speaking to a group on various topics. Reading authentic and near-authentic material on Japanese life and culture as well as news stories. Writing memos, faxes, e-mails, descriptions and summaries. Use of a further 120 kanji to bring the total up to 500 characters. Translating short passages of various levels from Japanese to English. *Prerequisite JA4213*

JA4248 – Japanese Language, Culture and Society 6 (Spring/4)

6 hours per week; 13 weeks/8th semester; 26L/39T/13LAB; ECTS credits: 6

Listening practice using authentic materials. Further practice in the use of polite language. Vocabulary consolidation; presentations, practice for interviews. Reading practice of authentic news stories, and authentic passages relating to Japanese society and modern literature. Translation of authentic passages, literary or business-related. Writing of summaries, descriptions, letters, and passages expressing opinions. Study of a further 200 kanji, to bring the total up to 750 characters.

JA4912 Japanese for Business 2 (Spring/1)

6 hours per week; 13 weeks/2nd semester; 26L/39T/13LAB; ECTS credits:6

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 (Spring/2)

6 hours per week; 13 weeks/4th semester; 26L/39T/13LAB; ECTS credits:6

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)

JA4918 Japanese for Business 8 (Spring/4)

6 hours per week; 13 weeks/8th semester; 26L/39T/13LAB; ECTS credits:6

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.

JM4004 Magazine Journalism (Spring/2)

3 hours per week; 13 weeks/4th semester; 26L/13L; ECTS credits:6

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

Availability: 4-5 places

* Decision on acceptance to be made by lecturer

JM4007 Advanced Practical Journalism (Spring/4)

3 hours per week; 13 weeks/1st semester; 26L/13T; ECTS credits:6

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

Availability: 4-5 places (not guaranteed)

* Decision on acceptance to be made by lecturer

JM4012 Journalistic Writing 2 (Spring/1)

3 hours per week; 13 weeks/2nd semester; 26L/13L; ECTS credits:6

Students will extend their knowledge of different journalistic forms, including short features, profiles of each other and visiting speakers, vox pops, and reviews of music, clubs or bars. They will be encouraged to reflect on and analyze each other's and professional work through a course web forum. Regular news writing workshops will continue, including one on a breaking news exercise and a wrap story exercise. They will be helped to begin writing for student publications, and will be encouraged to write their own blogs. Assessment will be by the production of a portfolio of work completed during the course, and a final timed examination.

Availability: 6 -8 places

* Decision on acceptance to be made by lecturer

JM4014 Feature writing (Spring/2)

3 hours per week; 13 weeks/4th semester; 26L/13L; ECTS credits:6

Students will learn how to generate ideas for features, pitch feature ideas at mock feature conferences, research using printed and web sources and face to face and telephone interviews, develop their ideas for specific target publications, and write lively material. They will work on feature structure and writing standfirsts. They will produce publishable features of different kinds, including an interview/profile, colour writing or reportage and an analytical researched feature. They will be encouraged and helped to get work published either in a student or professional publication, or on their own websites.

Assessment will be by coursework: production of a portfolio of work completed during the course, and contributions to class discussions.

Availability: 4-5 places

* Decision on acceptance to be made by lecturer

JM4022 Introduction to Social Media (Spring/1)

hours per week; 13 weeks/2nd semester; 26L/13L; ECTS credits:6

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

Availability: 6-8 places

* Decision on acceptance to be made by lecturer

JM4028 Current Issues in Irish Media (Spring/4)

3 hours per week; 13 weeks/8th semester; 26L/13L; ECTS credits:6

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

Availability: 4-5 places

* Decision on acceptance to be made by lecturer

JM4032 Sub-Editing and Design 2 (Spring/1)

3 hours per week; 13 weeks/1st semester; 26L/13L; ECTS credits:6

Students will use a stylebook to understand intermediate elements of text editing, proofreading and sub-editing. They will further develop their desktop publishing techniques, analysing the elements of type; writing headlines and stand firsts; editing and handling pictures and developing their skills in layout and proof reading. The module will introduce students to intermediate practices of both sub-editing and design. Students will design pages in a wide variety of styles for magazines and newspapers, using news and feature copy, and using their own photographs and other illustrations. Students will also use specialist software to develop a news website. Assessment will be through sub-editing assignments, a portfolio of designs and the creation of their own website.

Availability: 4-5 places (not guaranteed)

* Decision on acceptance to be made by lecturer

LA4002 Jurisprudence (Spring/1)

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.

LA4008 – Company and Partnership Law (Spring/4)

3 hours per week; 13 weeks/8th semester; 26L/13T; ECTS credits:6

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

LA4012 Comparative Legal Systems* (Spring/1)

3 hours per week; 13 weeks/2nd semester; 26L/13T; ECTS credits:6

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 (Spring/1)

3 hours per week; 13 weeks/2nd semester; 26L/13T; ECTS credits:6

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.

LA4032 – Criminal Procedure (Spring/1)

3 hours per week; 13 weeks/2nd semester; 26L/13T; ECTS credits:6

Criminal Justice Models, Adversarial System, Jury Trials, Due Process, Classifications of Crime, Delay, An Garda Siochana, The Irish Courts/ Prisons, Police Powers, Stop and Search, Arrest & Detention, Questioning and Legal Representation, Bail, Prosecutions & Trial Procedure, Initiating Court Proceedings, Indictments, Arraignments and Pleas, Evidence & the Jury, the Special Criminal Court, Principles of Sentencing, Sentencing Options, Appeals, Miscarriages of Justice.

LA4035 Labour Law (Spring/3)

3 hours per week; 13 weeks/5th semester; 26L/13T; ECTS credits:6

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.

LA4038 Family Law (Spring/4)

3 hours per week; 13 weeks/8th semester; 26L/13T; ECTS credits:6

On successful completion of this module, students will be able to: - Identify the differing concepts of the family unit both at constitutional and legislative levels. - Specify the criteria for creating the marital relationship and the necessary consents and mental elements and the protections and obligations owed within the marriage relationship. - Outline the key ways in which a marriage may be dissolved or terminated and the consequences of such dissolution or termination. - Differentiate between the rights of married and unmarried parents and their children. - Distinguish remedies available during a subsisting marriage compared with those arising on the dissolution or termination of such marriage. - Critique the treatments of the family unit within the Irish legal system.

LA4042 – Administrative Law (Spring/1)

3 hours per week; 13 weeks/2nd semester; 26L/13T; ECTS credits:6

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

LA4044 – Law of the European Union 2 (Spring/2)

3 hours per week; 13 weeks/4th semester; 26L/13T; ECTS credits:6

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

LA4048 – Advanced Lawyering 2 (Spring/4)

3 hours per week; 13 weeks/8th semester; 26L/13T; ECTS credits:6

Section A. Working in small groups with a dedicated faculty advisor, students will complete study and participation in the topics outlined in Section A of Advanced Lawyering I, dealing with such issues as the PIAB and Commercial Court, including collaborative law, mediation and arbitration. Section B. Students will continue with their selection from Advanced Lawyering I: Business Law Clinic; e-Journal; Research Article; Conveyancing Problem; Moot Trial; ADR process

LA4052 – Introduction to Lawyering 2 (Spring/1)

3 hours per week; 13 weeks/1st semester; 26L/13T; ECTS credits:6

The objective of this module is to ensure that upon successful completion, students have begun to deal with core issues in the practice of law including logical reasoning, questioning, option generation, problem solving, oral argument and advocacy, together with client interviewing. The syllabus will focus extensively on self-directed learning and active exercises. In addition, students will be expected to explore the role of ethics and professional responsibility in the legal system, paying particular attention to comparative approaches.

LA4082 Law of Evidence (Spring/1)

3 hours per week; 13 weeks/1st semester; 26L/13T; ECTS credits:6

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

Learning Outcomes:

On successful completion of this module, a student will be able to: Differentiate between key concepts in the Law of Evidence: facts at issue; relevant facts; admissibility of evidence and weight of evidence; hearsay and original evidence; Describe the principles relating to the burden of proof, the standard of proof and reversal of burdens of proof; Explain the law and principles relating to witness testimony, challenging the credibility of the witness and corroboration rules. Outline the Rule Against Hearsay and the reforms to aspects of the Rule; Analyse the exclusionary rules relating to illegally obtained and unconstitutionally obtained evidence; Appraise the law relating to the testimony of the accused in a criminal trial: similar fact evidence; bad character evidence; right to silence; confession evidence; Apply the rules and principles to scenarios so as to demonstrate the possibilities for conviction or acquittal.

LA4122 Contract Law 2 (Spring/1)

3 hours per week; 13 weeks/2nd semester; 26L/13T; ECTS credits:6

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; rescission; assignment of contract obligations; agency; quasi-contracts.

LA4222 Criminal Law 2* (Spring/1)

3 hours per week; 13 weeks/2nd semester; 26L/13T; ECTS credits:6

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.

LA4320 Law of Torts 2* (Spring/1)

3 hours per week; 13 weeks/2nd Semester; 26L/13T; ECTS credits:6

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.

LA4440 Constitutional Law 2 (Spring/1)

3 hours per week; 13 weeks/2nd Semester; 26L/13T; ECTS credits:6

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

LA4540 COMPANY LAW 2 (Spring/)

3 hours per week; 13 weeks/2nd semester; 26L/13T; ECTS credits:6

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

LA4620 Land Law 2 (Spring/4)

3 hours per week; 13 weeks/8th Semester; 26L/13T; ECTS credits:6

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.

LA4892 – Equity and Trusts 2

The trust, classification of trusts, express, implied, resulting, constructive and charitable trusts. The requirements of a trust, the constitution of trusts. General principles relating to trustees, their obligations and duties, powers of trustees, variations in a trust, fiduciary responsibilities of trustees. Breach of trust and remedies thereof.

LA4918 Company Law (Spring/4)

3 hours per week; 13 weeks/8th Semester; 26L/13T; ECTS credits:6

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 (Spring/1)

3 hours per week; 13 weeks/2nd semester; 26L/13T; ECTS credits:6

Elements of a valid contract: offer, acceptance, consideration, formality, 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* (Spring/1)

3 hours per week; 13 weeks/2nd semester; 26L/13T; ECTS credits:6

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

MD4002 Practicum 1A (Spring/1) 5 hours per week: 13 weeks/1st semester/ ECTS credits 6

Development of the student's primary performance interest, whether instrumental, vocal or dance. Students will be encouraged to engage in a dynamic self-critical process conducive to development and related to the principle of 'reflective practice' Keyboard skills and Ear Notation and Theory. [Dancers: Body Awareness and Movement Technique 1, Introduction to Modern Dance; Yoga; and Technique classes]. Occasional Master classes

MD4012 Practicum 1B - Secondary Performance Interest and Practical Ensemble (Music and Dance) (Spring/1) 5 hours per week: 13 weeks/1st semester/ ECTS credits 6

To broaden the base of performance skills of the students to include other instrumental, vocal and dance aspects of the tradition. To

develop skills involved in ensemble work. Weekly Song and weekly Dance class.

MD4022 - Introduction to Traditional Music and Dance Studies 2
4 hours per week: 13 weeks/2nd semester/ ECTS credits 6 (Spring/1)

This module introduces students to traditional music and dance studies, giving an overview of some of the important features of these music, song and dance traditions. Areas addressed in this module include

1. Instrumental style
2. Irish language song and sean-nós style
3. Historical and current trends in Irish (and Scottish) dancing,
4. Historical collections of Irish music
5. Irish music and Dance in America

MD4024 - Irish Traditional Music and Dance Studies 2
3-4 hours per week: 13 weeks/4th semester/ ECTS credits 6 (Spring/2)

In this module, as in Traditional Music and Dance Studies 1 and 3, students will follow three streams of study concerning instrumental music, song and dance, with an emphasis on Style & Representation. The key areas to be covered will be; English Language Song – History and Representation: Analysis of style in the Irish Dance Music Tradition; and Documentation and Development of Irish Dance.

MD4026 Irish Traditional Music and Dance Studies 3
4 hours per week: 13 weeks/6th semester/ ECTS credits 6 (Spring/3)

To provide a deeper understanding of Irish traditional music song and dance forms and practices by applying critical and cultural theory to Irish Music and Dance Studies.

MD4032 – Introduction to Western Art Music and Dance / An Introduction to Dance History

4 hours per week: 13 weeks/2nd semester/ ECTS credits 6 (Spring 2)

History of Western Art Music and Dance. The aim of this module is to provide an understanding of art music and dance that will not only be especially helpful in primary and second level teaching contexts but will also introduce students to crucial musico-historical concepts and terminology that they will deploy elsewhere

MD4034- Introduction to Community Music & Dance & Music & Dance Education

3 hours per week: 13 weeks/4th semester/ ECTS credits 6

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

MD4036 - Ethnomusicology / Ethnochoreology Theory and Practice / Digital Media Technology

3 hours per week: 13 weeks/8th semester/ ECTS credits 6 (Spring 4)

To introduce students to the important contextualising disciplines of ethnomusicology and ethnochoreology and to some fieldworking methods used in these two research areas.

Digital audio and visual technologies associated with music and dance performance, with a focus on professional audio and video recording and editing software.

MD4038 – Music, Dance and Human Behaviour

3 hours per week: 13 weeks/8th semester/ ECTS credits 6 (Spring 4)

This is a module designed to help music and dance students to develop their knowledge of human interactions and responses to the media of dance and music.

PA4011 The Civil and Public Service (Spring/1)

3 hours per week; 13 weeks/2nd semester; 26L/13T; ECTS credits:6

Major functions of the modern democratic state; the Irish state at independence; growth of the public sector; the constitutional and legal position of the public service; the structure of the public service; the civil service within the wider public service; 'ministerial responsibility', civil service culture and accountability; the structure of government departments; the profession of government - recruitment and promotion; the civil service and the policy process; coordination of public policy and administration; civil service reform.

PA4018 The Public Policy Process (Spring/2 or 3)

3 hours per week; 13 weeks/4th or 6th semester; 26L/13T; ECTS credits:6

We study public policy because we want to know why particular decisions are made or not made. Public policy is important because the scope of the state encompasses almost all aspects of our daily lives. It involves everything from building roads to providing education and health care services, regulating business activity and influencing climate change talks. Although the main subject is the decisions and actions taken by governments (at all levels), many other actors – including international bodies like the European Union, UN and the World Bank, businesses, trade unions, community groups, religious leaders, journalists, celebrity activists etc. – can play key roles in setting policy agendas, formulating and marketing proposals, implementing decisions, and stirring up public support and/or

indignation for the outcomes. Part one of the course introduces key policy actors that set policy agendas, formulate proposals, broker decisions and implement public policy. It also focuses on key concepts – power and accountability – in the public policy process. Part two presents different stages in the policy cycle – agenda setting, formulation, decision making and implementation. Part three presents selected cases (e.g. health, environment, fiscal) and theories (rational choice, advocacy coalition framework, policy transfer) used to interpret policy decisions.

PA4038 Public Administration in Democratic States (Spring/4)

6 hours per week; 13 weeks/8th semester; 26L/13T; ECTS credits:6

The purpose of this module is to help students understand some of the contemporary issues facing systems of public administration in democratic states. The module will enable students to locate the role and nature of public administration more firmly within different understandings of democracy and of the state and will explore the degree to which it is equipped to cope with the needs of a more complex, informed and demanding society. The modules will also encourage student directed learning about systems of public administration in a number of developed democracies.

PO4004 Global Political Economy (Spring/2)

3 hours per week; 13 weeks/4th semester; 26L/13T; ECTS credits:6

This module is a second year undergraduate course that introduces the main themes and approaches to the study of the Global Political Economy. By the end of the course students should:

- 1) Understand the historical and theoretical roots of the study of IPE/GPE
- 2) Identify and evaluate the structures and practices of the global political economy
- 3) Understand and identify the various themes and debates that have emerged within the global political economy.

PO4008 African Politics: Development and Democracy (Spring/4)

3 hours per week; 13 weeks/8th semester; 26L/13T; ECTS credits:6

This module will supply an introduction to major political trends in contemporary Africa. Against a brief historical review of African state institutions since the advent of colonialism the course will explore successive efforts to modernise predominantly peasant economies, using Tanzanian experience as a case study. Discussion of the very rapid expansion of African cities (in certain cases tenfold over the last two decades) will complete the background against which the subsequent parts of the course will explore contemporary African politics.

PO4013 Government and Politics of Ireland (Spring/2)

3 hours per week; 13 weeks/4th semester; 26L/13T; ECTS credits:6

This course is designed to build on and develop the knowledge gained in earlier politics modules by examining the politics and society of a single country in more depth. This module reviews the developmental trajectory of the Irish state, from its historical foundations and the legacies of colonialism, to contemporary politics and the collapse of the Celtic Tiger. Throughout the module an attempt will be made to outline key political, economic, institutional and cultural traits which may be described and explained as essentially Irish patterns of politics and policy making.

PO4015 Government and Politics of the EU (Spring/2)

3 hours per week; 13 weeks/4th semester; 26L/13T; ECTS credits:6

This module aims to develop students' understanding of the way the European Union works and how its policies and powers affect their lives as citizens. As a result, the module has two objectives. First, to give students a solid understanding of the history, institutions, decision-making processes and major policies of the European Union. Second, to equip students with an appreciation of the principal issues and controversies which currently face the European Union.

PO4022 Modern European Political Thought (Spring/1)

3 hours per week; 13 weeks/2nd semester; 26L/13T; ECTS credits:6

This module will introduce you to some of the main authors and themes of the western tradition of political thought. We will concentrate on seven major political thinkers: Hobbes, Locke, Rousseau, Wollstonecraft, Bentham, Mill and Marx. A number of important questions will be explored: Why do some persons have the right to rule over others? Why should citizens obey the law? How far is government compatible with the liberty of the individual? What makes for a just law? What rights do individuals have against the state?

In the language of political theory these are questions about authority, obligation, legitimacy, justice, liberty, equality, autonomy and consent. Such issues have been examined by political thinkers from earliest times who have addressed them in different ways and offered conflicting solutions to each. We study these seven political theorists because they have explored these questions with exceptional insight and thoroughness.

PO4030 Theories of Distributive Justice (Spring/1)

3 hours per week; 13 weeks/2nd semester; 26L/13T; ECTS credits:6

This module will examine the main theories of distributive or social justice in contemporary political theory. Distributive justice is about the fair distribution of burdens and benefits in a society and this issue is at the forefront of political debates, especially since the onset of the financial crisis that affects many developed countries. The module

will essentially ask whether the welfare state is justified and how extensive it should be, whether an unconditional basic income should be guaranteed and what level of inequality and/or poverty is acceptable in a just society.

PO4032 Russian Politics (Spring/1)

3 hours per week; 13 weeks/2nd semester; 26L/13T; ECTS credits:6

The purpose of this module is to help students explore issues in Russian political development over the last century according to their interests. Students have free choice of which topics they study so that the learning outcomes of the module will be individualized. In addition to the knowledge gained by students about the USSR and Russia, this module will help students to develop their analytical and research skills. All students, however, will have to search out information on contemporary Russia in their own time and will learn how to locate information in the library and on the WWW, will learn how to judge the merits of different information sources, will learn how to construct arguments from primary materials that they have and how to relate such materials to existing academic literatures. They will also have to learn how to interpret academic literature in changing circumstances, to relate it to a developing polity and judge it against change.

PO4048 Issues in World Politics (Spring/4)

3 hours per week; 13 weeks/8th semester; 26L/13T; ECTS credits:6

This module focuses on the causes, dynamics, and effects of political conflicts. Its purpose is to familiarise students with important theories and debates pertaining to political conflicts through active discussions of a wide range of literature. The module begins with a discussion of recent trends in the frequency of violent political conflicts. It then undertakes an in-depth overview of important theories – operating on the individual, group, state, and international levels of analysis – purporting to explain the outbreak of wars. Following this, the final section of the module examines a range of theories and debates pertaining to other forms of political conflict, such as genocide and other gross violations of human rights, and efforts to forcibly spread democracy to an ever-greater number of states around the world. By the end of the module, students should be able to understand not only why a number of historic political conflicts occurred, but also how to utilize a range of theories to understand current and future political conflicts.

PO4102 Methods and Research in Political Science (Spring/2)

3 hours per week; 13 weeks/3rd semester; 26L/13T; ECTS credits:6

This module introduces students to quantitative methods and research in Political Science. It covers the definition, operationalisation, and measurement of variables; the development of theory and the formulation of hypotheses; the role of research design and statistical control in making claims about causality; as well as the use of

bivariate and multivariate statistical methods to assess hypothesised relationships between variables. The module also provides a thorough introduction to the application of quantitative methods through the statistical software package SPSS.

PO4108 Multiculturalism and Political Theory (Spring/4)

3 hours per week; 13 weeks/ 8th semester; 26L/13T; ECTS 6

This module examines recent debates about citizenship, pluralism and cultural diversity, from the perspective of political theory. During the course we will critically evaluate a range of alternative justifications for multicultural political policies, and explore how they relate to other important political concepts, such as democracy, freedom, equality, justice, pluralism and respect. To that end, we will explore some of the various rights claims and policy proposals that have been called for by (and on behalf of) minority cultural communities, and investigate how these measures challenge traditional political theories and the practices of existing liberal-democracies. Upon completion of the module you should be able to critically evaluate the various justifications that have been offered for minority cultural rights, and understand a range of arguments for and against multiculturalism. Furthermore, you should have a deeper grasp of some important political concepts, including freedom, equality, justice, respect, recognition, toleration, and identity.

PO4118 Ireland and EU Membership (Spring/3 or 4)

3 hours per week; 13 weeks/6th or 8th semester; 26L/13T; ECTS 6

This module examines how Europeanisation has affected Irish policy-making and implementation and how over time Ireland maximised the policy opportunities arising from membership of the EU while preserving embedded patterns of political behaviour. The module focuses on the interplay of European, domestic and global factors as the explanation for changing patterns of governance in Ireland.

The course content explores historical and contemporary interpretations of the relationship between Ireland the European Union, including the road to the EEC, current attitudes and discourse surrounding EU membership, and the impact of the EU on the political system. The impact of Europe on several policy domains is examined, including economic policy, foreign policy, regional development, agricultural and rural policy, environmental policy, language policy and social policy issues. Europeanisation as a broker of change between Northern and Southern Ireland is also explored.

SO4002 Gender: Sociological Perspectives (Spring/1)

3 hours per week; 13 weeks/ 2nd semester; 26L/13T; ECTS 6

This module equips students with a critical understanding of key concepts in gender studies and feminist thought and how these are informed by, and inform, sociological enquiry. It offers an introduction to the main sociological perspectives on gender; key debates in

feminist theory; debates in the study of masculinity; and perspectives on substantive topics such as work and care in the context of these frameworks. The module also examines the operation of gender divisions across national and transnational social contexts and their articulation with other major social divisions such as class, sexuality, ethnicity and race.

SO4008 – Sociology of Media Audiences (Spring/4)

3 hours per week; 13weeks/ 8th semester; 26L/13T; ECTS 6

Working from a sociological perspective, this module will document the changing theoretical and methodological paradigms that the study of media audiences has gone through and the impact that these frameworks have had on the nature of research produced and knowledge acquired about the composition and abilities of media audiences in an increasingly media saturated society. The impact of such processes as globalisation, politics and the public sphere, the rise of popular entertainment, the internet and the recent explosion of new media products (e.g. online/offline gaming, Facebook, MySpace, Twitter, and YouTube), and the study of media fans will be discussed. Overall it is hoped that students will become more reflexive about their media usage and develop a new level of understanding about the role that media consumption has on their daily lives.

SO4032 Introduction to Sociology 2 (Spring/1)

3 hours per week; 13weeks/ 2nd semester; 26L/13T; ECTS 6

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 oriented 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.

SO4036 – Contemporary Sociological Theory (Spring/3)

3 hours per week; 13weeks/ 4th semester; 26L/13T; ECTS 6

This module aims to broaden and deepen students engagement with and understanding of the development of sociology as a discipline following on from their introduction to the sociological classics. It introduces students to a selection of modern and contemporary theories as a way of understanding how sociological theory has developed to reflect changing social and intellectual contexts. The course will identify the extent to which the selected theories build on key classical presuppositions or offer more radical departures in terms of the key analytical debates within sociology. As a way of elucidating

these issues, substantive topics will be discussed in relation to the different theoretical perspectives. The range of theoretical perspectives will encompass the following: social constructionism (Berger and Luckmann); the sociology of the everyday (e.g. Goffman, Blumer); critical theory (e.g. Foucault, Habermas, Feminist Theory and theories of late/post-modernity; theories of rationality (Rational Choice/Rational Action theory); and the theory of social practice (Bourdieu).

SO4046 Quantitative Methods for Social (Spring/3)

3 hours per week; 13 weeks/6th semester; 26L/13T; ECTS credits:6

This module considers quantitative research in relation to sociology. This module aims to develop students knowledge gained in SO4053 to increase and deepen their understanding of and facility with quantitative research methods; particularly to develop their facility in the analysis of quantitative data. The primary objective of the course is to ensure that students are able to understand and use basic quantitative methods. The course begins by reviewing the role of quantitative methods in sociology, with consideration of the theoretical implications of the method and of the sorts of research it permits. It then moves on to a practical core, introducing basic techniques for data collection, processing, presentation and statistical analysis. The lectures run in parallel with lab sessions, in which students use SPSS and other relevant software.

SO4078 Inequality and Social Exclusion (Spring/4)

3 hours per week; 13 weeks/8th semester; 26L/13T; ECTS credits:6

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.

SO4088 – Sociology of Globalisation (Spring/4)

3 hours per week; 13weeks/ 8th semester; 26L/13T; ECTS 6

The aim of this course is to provide a comprehensive introduction to the various discourses of globalisation. It will explore some of the key meanings, history and differing theoretical perspectives and interpretations of globalisation in contemporary research, and will identify main policy issues related to economic, cultural and political globalisation. The focus will be the development of transnational communities and cultures including emergent new forms of worldwide political protest; the challenge for trade unions; culture and the 'global' and 'local' divide; the possibilities for a future global society or culture; the inter-meshing of local-global interests and identities; the inequalities and social exclusion generated by economic globalisation; and the extent to which sociology, like other disciplines, needs to re-think many of its central concepts, debates and theoretical approaches

in the light of globalisation processes. The analysis and discussion will be illustrated with international and Irish case studies.

SO4108 - Sociological Approaches to Gender and Multiculturalism (Spring/4)

3 hours per week; 13weeks/ 8th semester; 26L/13T; ECTS 6

The syllabus will include theories that account for multiculturalism as a top-down response to cultural difference which produces a reification of 'culture' and gender. It will also examine theories that identify multiculturalism as a new way forward to a 'politics of recognition' and progressive gender politics. Examples of gendered cultural practices that raise critical questions for the effectiveness of multiculturalism, such as polygamy, forced marriage, female genital mutilation, unequal access to health care, education and rights of ownership will be examined. The course will consider how multiculturalism is reshaping the public spheres and civil societies of the West with particular implications for women and for gender relations. The module will be driven by questions relating to the relationships between gender, cultural diversity and global capitalism; how multicultural approaches to social cohesiveness reconceive belonging in gendered ways; and how gender relations affect and are affected by multicultural strategies for negotiating difference

SO4118 – Sociology of Gender and Popular Culture

3 hours per week; 13weeks/ 8th semester; 26L/13T; ECTS 6

This module explores the twin themes of bodies and sexualities in the spaces of contemporary Western culture. Utilising a range of popular cultural forms, sites and events which are most accessible; television, cinema, magazines; households, shops and workplaces; and popular understandings of medicine, science and technology; the module involves students in a series of critical engagements. The module addresses a number of issues; why the subjects of sexualities and the body become the focus of so much interest across a broad range of disciplines; How we can de-naturalise and problematise normative gender categories by setting gendered identities in cultural contexts; What important contributions have been made to the field by recent work on masculinities; How the practices of everyday life can be interrogated to yield insights about the relationships between the body, gendered identities and prevailing cultural norms.

SO4158 Sociology of Higher Education (Spring/4)

3 hours per week; 13weeks/ 8th semester; 26L/13T; ECTS 6

This module aims to provide students with an understanding of the sociology of Higher Education internationally and the processes impacting on it, including globalisation, massification; managerialism and masculinisation. It will locate these changes in the context of changing paradigms of Higher Education in Ireland and its nature and purpose. Policies related to Higher Education will be explored in the context of its relationship with the state, the economy and the paradox of gender. The relationship between students social class position; state's encouragement of access policies and its perceived elite/non-elite character. Issues related to managerialism versus collegiality; career paths; organisational culture; leadership styles; the gendering of academic and senior management in Irish Universities and internationally; the factors explaining such variation will be explored. Similarities and differences between academic and senior management in Universities and other types of higher education institutions. The future of Higher Education.

SO4178 – The Sociology of the Body (Spring/4)

3 hours per week; 13 weeks/ 8th semester; 26L/13T; ECTS 6

The module begins by introducing students to social theory on the body and highlights the case for embodying social theory. Sociology is the main disciplinary approach taken for exploring bodies as the source, location and medium of society, but we will first underscore the socially constructed character of the body with reference to broader socio-cultural changes and anthropological research. Attention then focuses on some key themes and debates in late modernity, such as medicalisation, risk, identity, the significance of biology, consumption and gender. More specific substantive lectures will explore themes such as: the obesity debate; disordered eating; cosmetic surgery; sport, physical activity and fitness; bodybuilding and drug-taking; tattooing; piercing; working bodies; sexualities; virtual bodies and cultures of technological embodiment (cyborgs); ageing; disability, chronic illness and healthcare; and, the body as a research instrument.

SO4208 Sociology of Love and its Dark side (Spring/4)

3 hours per week; 13 weeks/ 8th semester; 26L/13T; ECTS 6

The module explores a number of key themes: Trends in family formation and their competing theories; classifications and functions of the family especially in relation to Ireland, past and present; love, sex and courtship, exploring issues of partner choice; marriage and cohabitation, addressing the effects of cohabitation on both nuptiality and fertility; lone-parenting, various

paths into and problems faced; separation and divorce, exploring trends across social groups and their correlates; re-marriage and stepfamilies with a particular focus on growing up in a step-family; work and families, analysing power relations within the family in terms of gender roles and housework by discussing a range of contemporary studies of the domestic division of labour especially the impact of increasing male unemployment, the crisis of masculinity, the new man, dual burden/triple shift and the relationship between home and work; the family, state and social policy; the role of social policy and the declining family.

SP4002 Introduction to Latin American Culture/s (Spring/1)

3 hours per week; 13 weeks/2nd semester; 13L/26T; ECTS credits:6

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.

SP4132 Spanish 2 (European Studies) Beg* 2-1-0 (Spring/1)

3 hours per week; 13 weeks/2nd semester; 26L/13T; ECTS credits:6

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 A2 (European Studies)* (Spring/1)

3 hours per week; 13 weeks/2nd semester; 26L/13T; ECTS credits:6

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 Modern and Contemporary Spain (Spring/3)

3 hours per week; 13 weeks/6th semester; 26L/13T; ECTS credits:6

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 Media and Current Issues in the Spanish Speaking (Spring/4)

3 hours per week; 13 weeks/8th semester; 26L/13T; ECTS credits:6

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 for Beginners 2 *(Applied Languages) (Spring/1)

3 hours per week; 13 weeks/2nd semester; 26L/13T; ECTS credits:6

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 (Applied Languages)

SP4242 Spanish 2A (Applied Languages)* (Spring/1)

3 hours per week; 13 weeks/2nd semester; 26L/13T; ECTS credits:6

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 (Spring/3)

3 hours per week; 13 weeks/6th semester; 13L/26T/13Lab; ECTS credits:6

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 democracy.

SP4248 Spanish Language, Culture and Society 6 (Spring/4)

3 hours per week; 13 weeks/8th semester; 13L/26T/13Lab; ECTS credits:6

Advanced Spanish grammar is practiced and text analysis and production continued, students tackle legal translation, further deepen their knowledge of translation theory and practice consecutive interpreting, through debate and discussions, students perfect their spoken Spanish and prepare for the oral examination as well as gain an insight into current Hispanic controversial issues including nationalisms, the welfare state, terrorism, racism and discrimination and religion.

SP4628 womends Narratives of Resistance (Spring/4)

3 hours per week; 13 weeks/8th semester; 13L/26T/13Lab; ECTS credits:6

The module will concentrate on the exploration of women's narratives of resistance to power in different textual modes, from testimony to

literature, in order to study the different ways in which women have experienced and represented the oppression/repression of dissidence in colonial, neo-colonial and authoritarian regimes in Latin America and Spain

TW4116: Workplace issues in professional and technical communication

3 hours per week; 13 weeks/6th semester; 13L/26T/13Lab; ECTS credits:6

Ethical issues in professional communication; codes of practice; legal issues (consumer protection, patent, copyright, trademarks, trade secrets).

Writing for new media; blogging; web design; information design for special needs; trends in technical communication.

Web design: Dreamweaver and other web design tools.

TW4118: Content development and information management

3 hours per week; 13 weeks/8th semester; 13L/26T/13Lab; ECTS credits:6

This module has two strands: documentation management and instructional design. The documentation management strand covers: managing complex documentation projects, tools for project management, quality, developing a style guide, editing and indexing, the review process. The instructional design strand covers: learning theories, needs assessment, audience analysis, objective analysis, media specifications, course design, performance assessment, and delivery systems.