



DEPARTMENT OF CHEMICAL & PROCESS ENGINEERING

**MODULES AVAILABLE TO CHEMICAL & PROCESS ENGINEERING INCOMING
EXCHANGE STUDENTS (ACADEMIC YEAR 2026/27)**

This document lists modules run by the Department of Chemical & Process Engineering which are suitable to be selected by incoming Chemical Engineering exchange students, for academic year 2026/27 onwards.

Specific questions about chemical engineering modules for incoming exchange students should be directed to the Chemical & Process Engineering Exchange Co-ordinator (chemeng-exchanges@strath.ac.uk). Please do not contact individual module registrars.

This document pertains only to incoming exchange students coming to the Department of Chemical & Process Engineering. These modules are generally not suitable for students without a substantial chemical engineering or closely related background.

Incoming exchange students to other Departments at Strathclyde may be able to take some Chemical Engineering classes, but this will be decided on an individual student basis and must be discussed with the Chemical & Process Engineering Exchange Co-ordinator before attempting to register on the module or attend classes.

Validity

This information is accurate as of the date in the footer but is subject to change with no notification. The latest version of this document will be the version published on the University's website. Further information can be obtained from the Department <https://www.strath.ac.uk/engineering/chemicalprocessengineering/> or from the Chemical & Process Engineering Exchange Co-ordinator.

Years of Study

Year 3 modules are suitable for incoming students who will be at an equivalent level at their home institution. Some modules may require appropriate prior study ("pre-requisites").

Year 4 modules are equivalent to final year Bachelor's (BSc/BEng) level and are suitable for students who will be at an equivalent level at their home institution or those who have appropriate prior study ("pre-requisites").

Year 5 modules are equivalent to Master's (MEng/MSc) level and are suitable for students who will be at an equivalent level at their home institution or those who have appropriate prior study ("pre-requisites").

CHEMICAL ENGINEERING MODULES FOR INCOMING EXCHANGE STUDENTS (ACADEMIC YEAR 2026/27)

Classes in lower years, particularly in Year 2, are at an introductory level which means they are typically not suitable for visiting students.

To minimise potential timetabling issues and to ensure students are studying modules at the appropriate level, incoming Chemical Engineering exchange students can only select combinations of Year 3 and 4 modules or Year 4 and 5 modules.

Structure

The Chemical Engineering undergraduate curriculum is such that taught modules in Years 4 and 5 only run in Semester 1 (September to December). Hence for exchanges in Semester 2 (January to April), the choice of chemical engineering taught modules is limited to Year 3. Furthermore, some Year 3 modules extend over both semesters, and thus are not suitable for incoming exchange students visiting for only one semester.

For sufficiently advanced students (final year Bachelor's or Master's) there is the option in Semester 2 of the full-semester group Year 4 design project worth 30 ECTS, which is a challenging group work task (see module information below for details), or the full-semester individual Year 5 project. Note that if either of these is chosen, no other modules should be selected for Semester 2 from either Chemical & Process Engineering or any other department: these projects are full-time with no allowance for taking other modules. For the Year 5 individual project, please note that only in-house projects offered by the Department are available for exchange students.

Students cannot select more than 30 ECTS per semester from the Chemical & Process Engineering curriculum (see module information below for classes' credit values).

Modules From Other Departments

Students may add some credits from another Department's curricula, subject to agreement by the relevant Department. Timetabling information can be found for specific classes at <http://www.strath.ac.uk/timetables/>. However please note that timetables are often not confirmed until near the beginning of the semester and that the Department is not responsible for setting timetables, as this is managed centrally by the University.

For information on classes available in other Departments and contact details, see the 'Guide to choosing classes' webpage for incoming exchange students: <https://www.strath.ac.uk/studywithus/studyabroad/comingtostrathclyde/academicinformation/guidetochoosingclasses/>

Please do not use the University's Class Catalogue to identify alternative classes (<https://pegasus.mis.strath.ac.uk/modulecatalogue/#/>). This catalogue is not always up to date and can include classes that are no longer running or that are not suitable for incoming exchange students. Therefore, it is advisable to contact lecturers of other Departments' classes or teaching co-ordinators of those Departments, to check arrangements.

On arrival all students should contact the Department office for final confirmation of their curricula and latest timetable information.

**CHEMICAL ENGINEERING MODULES FOR INCOMING EXCHANGE STUDENTS
(ACADEMIC YEAR 2026/27)**

ONE SEMESTER EXCHANGE - SEMESTER 1 (SEPTEMBER-DECEMBER) ONLY

The modules listed below are available for students visiting for **Semester 1 only**. Module registrars are listed in the module descriptions later in this document. Requests for further details of the module content and arrangements must be made through chemeng-exchanges@strath.ac.uk. Please do not contact the module registrars directly.

MODULE CODE	MODULE TITLE	ECTS
YEAR 3		
CP316	Reactors	5
CP325	Chemical Engineering Design and Advanced IT	5
CP328	Materials and Corrosion	5
CP329	Process Safety Practice	5
CP330	Ethics and Economics for Chemical Engineers	5
CP332	Chemical Process Design	5
YEAR 4		
CP405	Process Control and Environmental Technology	10
CP409	Advanced Separations and Problem Solving	10
CP414	Particle Technology and Advanced Reactors	10
18417	Chemical Engineering Project (Exchange)	10
YEAR 5		
CP523	Molecular Simulation in Chemical Engineering	5
CP527	Petroleum Engineering	5
CP533	Clean Combustion Technologies	5
CP537	Electrochemical Energy Devices	5
CP538	Environmental Engineering for Solving Industrial Challenges	5
CP541	Introduction to Hydrogen Engineering	5
CP542	Advanced Process Safety	5

**CHEMICAL ENGINEERING MODULES FOR INCOMING EXCHANGE STUDENTS
(ACADEMIC YEAR 2026/27)**

ONE SEMESTER EXCHANGE - SEMESTER 2 (JANUARY-APRIL) ONLY

The modules listed below are available for students visiting for **Semester 2 only**. Module registrars are listed in the module descriptions later in this document. Requests for further details of the module content and arrangements must be made through chemeng-exchanges@strath.ac.uk. Please do not contact the module registrars directly.

Students are reminded that CP407 or 18530 are full-time project-based modules. If students select one of these modules, they cannot select any taught modules from the Department of Chemical & Process Engineering or any other Department.

MODULE CODE	MODULE TITLE	ECTS
YEAR 3		
CP302	Mass Transfer and Separation Processes	10
CP315	Biochemical Engineering	5
CP331	Sustainability for Chemical Engineers	5
CP333	Chemical Process Simulation	5
YEAR 4		
CP407	Chemical Engineering Design	30
YEAR 5		
18530	Chemical Engineering Project	30

**CHEMICAL ENGINEERING MODULES FOR INCOMING EXCHANGE STUDENTS
(ACADEMIC YEAR 2026/27)**

TWO-SEMESTER (ALL YEAR) EXCHANGE ONLY

The modules listed below are available for students visiting on an all year, i.e. **Semesters 1 and 2**. Module registrars are listed in the module descriptions later in this document. Requests for further details of the module content and arrangements must be made through chemeng-exchanges@strath.ac.uk. Please do not contact the module registrars directly.

MODULE CODE	MODULE TITLE	ECTS	SEMESTER
YEAR 3			
CP316	Reactors	5	1
CP328	Materials and Corrosion	5	1
CP329	Process Safety Practice	5	1
CP305	Ethics, Sustainability and Economics	10	1 + 2
CP327	Chemical Engineering Design and Advanced IT	10	1 + 2
CP302	Mass Transfer and Separation Processes	10	2
CP315	Biochemical Engineering	5	2
YEAR 4			
CP405	Process Control and Environmental Technology	10	1
CP409	Advanced Separations and Problem Solving	10	1
CP414	Particle Technology and Advanced Reactors	10	1
18417	Chemical Engineering Project (Exchange)	10	1
CP407	Chemical Engineering Design	30	2
YEAR 5			
CP523	Molecular Simulation in Chemical Engineering	5	1
CP527	Petroleum Engineering	5	1
CP533	Clean Combustion Technologies	5	1
CP537	Electrochemical Energy Devices	5	1
CP538	Environmental Engineering for Solving Industrial Challenges	5	1
CP541	Introduction to Hydrogen Engineering	5	1
CP542	Advanced Process Safety	5	1
18530	Chemical Engineering Project	30	2

BRIEF MODULE DESCRIPTIONS

**CHEMICAL ENGINEERING MODULES FOR INCOMING EXCHANGE STUDENTS
(ACADEMIC YEAR 2026/27)**

Module Code	CP302	Year	3
Module Title	Mass Transfer and Separation Processes	Semester	2
Module Registrar	Dr Iain Burns (Separation Processes) Dr Stephen Lyth (Mass Transfer)	ECTS	10
Assessment	Examination and Coursework		
Syllabus	<ul style="list-style-type: none"> • Mass transfer: Students are expected to learn to calculate rates of mass transfer related to separation processes, including: diffusion in various simple geometries, diffusion with changing path-length, diffusion in solids and diffusion across a vapour-liquid interface. • Vapour-liquid separation processes: Students are expected to learn how to apply the principles of mass and energy balances, vapour-liquid equilibrium and mass transfer to understand the operation of separation processes including: distillation, adsorption and stripping in staged and continuous-contact columns as well as multi-stage evaporation. • Adsorption: Students are expected to learn about the thermodynamics of adsorbed phases, including binary mixtures, and ideal adsorbed solution theory. This will be used as the framework to learn about industrial adsorption processes under cyclic operation. 		
Learning Outcomes	<ul style="list-style-type: none"> • LO1: To employ the principles of mass transfer to solving quantitative problems in a chemical engineering context. • LO2: To solve quantitative problems concerning phase equilibrium and mass transfer in chemical engineering separation processes. • LO3: To apply mass and energy balances in the design of separation processes. • LO4: To solve quantitative problems concerning the role of adsorption in chemical engineering separation processes. 		
Pre-Requisites	<ul style="list-style-type: none"> • Chemical thermodynamics (in particular phase equilibria) • Heat transfer • Physical chemistry • Mass and energy balances • Engineering mathematics 		

**CHEMICAL ENGINEERING MODULES FOR INCOMING EXCHANGE STUDENTS
(ACADEMIC YEAR 2026/27)**

Module Code	CP303	Year	3
Module Title	Ethics, Sustainability and Economics	Semester	1 + 2
Module Registrar	Dr Mark Haw	ECTS	10
Assessment	Examination and Coursework		
Syllabus	<ul style="list-style-type: none"> • Understanding the nature of process design, the information, documentation and tasks required. • Extracting information about a process from design documentation (e.g. flow diagrams and stream tables). • Researching and obtaining appropriate physical property data from literature. • Carrying out process calculations based on design information (e.g. mass and energy balances) to assess the viability of a process. • Evaluating general process characteristics from the safety and environmental perspective. • Raising awareness of the environmental impact of a process. • Developing process flowsheets from block flow diagrams and subsequently developing process flow diagrams. • Identifying adequate unit operations and types of process equipment required for some common duties. • Preparing design documentation for a preliminary conceptual design of a process or a process unit according to design standards. • Synthesizing and communicating information about a process. • Skills to discuss technical ideas fluently with different audiences. • Using modelling and simulation packages (e.g. Aspen) to carry out different process calculations in a format that can be understood and used or modified by other engineers. 		
Learning Outcomes	<ul style="list-style-type: none"> • LO1: Extract and use information about a process presented in process diagrams. • LO2: Implement process calculations based on process diagram information (e.g. mass, heat and energy balances) to check whether a design is feasible. • LO3: Develop a preliminary process design and to size the main pieces of equipment, using computer packages where appropriate. • LO4: Present process design documentation in a concise and coherent manner and work collaboratively in teams. 		
Pre-Requisites	<ul style="list-style-type: none"> • Fundamentals of chemical engineering 		

**CHEMICAL ENGINEERING MODULES FOR INCOMING EXCHANGE STUDENTS
(ACADEMIC YEAR 2026/27)**

Module Code	CP315	Year	3
Module Title	Biochemical Engineering	Semester	2
Module Registrar	Dr Victoria Outram	ECTS	5
Assessment	Examination and Coursework		
Syllabus	<ul style="list-style-type: none"> • Microbiology; • Biochemistry; • Enzyme kinetics; • Enzymatic reactions in batch and continuous reactors; • Growth kinetics; • Batch, fed-batch and continuous fermentation. 		
Learning Outcomes	<ul style="list-style-type: none"> • LO1: In the context of biochemical engineering, understand: a) the basics of bioprocess engineering; and b) the relevant microorganisms, biological processes, and groups of biochemical substances (microbiology and biochemistry). • LO2: Produce simple models for enzyme kinetics and their use in reactor design and analysis. • LO3: Perform simple analysis of batch, fed-batch and continuous fermenters. 		
Pre-Requisites	<ul style="list-style-type: none"> • None 		

Module Code	CP316	Year	3
Module Title	Reactors	Semester	1
Module Registrar	Dr Vitor Magueijo	ECTS	5
Assessment	Examination and Coursework		
Syllabus	<ul style="list-style-type: none"> • Chemical equilibria and the role of equilibria in designing reactors (and controlling reactions) • Reaction kinetics and complex reactions such as reversible, series and parallel reactions, rate limiting step • Stoichiometry and its role in understanding limiting reactant and conversion • Ideal reactors - batch, plug flow and continuous stirred tank reactors • Design considerations for single reactors/reactions, operating points and considerations for optimisation • Design of multiple reactors, continuous reactors with recycle, and reactors in series, • Design consideration for multiple reactions – series and parallel reactions, selectivity and yield as performance indicators 		
Learning Outcomes	<ul style="list-style-type: none"> • LO1: Understand the basis of chemical reactor design in terms of mass balances, kinetics, energy balances and stoichiometry. • LO2: Performance equations for different types of reactors – batch, flow – continuous stirred tank, plug flow reactors • LO3: Know how to consider multiple reactions (parallel and series reactions) operating series in the design and analysis of reactors. • LO4: Know how to consider multiple reactors operating series in the design and analysis of reactors. 		
Pre-Requisites	<ul style="list-style-type: none"> • Engineering mathematics • Fundamentals and principles of chemistry • Chemical thermodynamics 		

**CHEMICAL ENGINEERING MODULES FOR INCOMING EXCHANGE STUDENTS
(ACADEMIC YEAR 2026/27)**

Module Code	CP327	Year	3
Module Title	Chemical Engineering Design and Advanced IT	Semester	1 + 2
Module Registrar	Dr Kaska Sypek	ECTS	10
Assessment	Coursework		
Syllabus	<ul style="list-style-type: none"> • Understanding the nature of process design, the information, documentation and tasks required. • Extracting information about a process from design documentation (e.g. flow diagrams and stream tables). • Researching and obtaining appropriate physical property data from literature. • Carrying out process calculations based on design information (e.g. mass and energy balances) to assess the viability of a process. • Evaluating general process characteristics from the safety and environmental perspective. • Raising awareness of the environmental impact of a process. • Developing process flowsheets from block flow diagrams and subsequently developing process flow diagrams. • Identifying adequate unit operations and types of process equipment required for some common duties. • Preparing design documentation for a preliminary conceptual design of a process or a process unit according to design standards. • Synthesizing and communicating information about a process. • Skills to discuss technical ideas fluently with different audiences. • Using modelling and simulation packages (e.g. Aspen) to carry out different process calculations in a format that can be understood and used or modified by other engineers. 		
Learning Outcomes	<ul style="list-style-type: none"> • LO1: Extract and use information about a process presented in process diagrams. • LO2: Implement process calculations based on process diagram information (e.g. mass, heat and energy balances) to check whether a design is feasible. • LO3: Develop a preliminary process design and to size the main pieces of equipment, using computer packages where appropriate. • LO4: Present process design documentation in a concise and coherent manner and work collaboratively in teams. 		
Pre-Requisites	<ul style="list-style-type: none"> • Fundamentals of chemical engineering 		

**CHEMICAL ENGINEERING MODULES FOR INCOMING EXCHANGE STUDENTS
(ACADEMIC YEAR 2026/27)**

Module Code	CP328	Year	3
Module Title	Materials and Corrosion	Semester	1
Module Registrar	Dr Ed Brightman	ECTS	5
Assessment	Examination		
Syllabus	<ul style="list-style-type: none"> • Basic material properties, use of material property charts in design and other material selection criteria. • Basic solid mechanics (stress, strain relationships) and application to design of thin-walled pressure vessels and fuel cell stacks. • Pressure vessel codes and standards. • Thermal properties of materials and their relationship to the design of thermal insulation and heat exchanger design. • Introduction to corrosion, basic definitions, cost and types of corrosion. • Electrochemical reactions, potentials and the Nernst equation. • Thermodynamics of electrochemical reactions. • Construction and analysis of Pourbaix diagrams and their use to rationalise corrosion behaviour. • Uniform, galvanic and stress corrosion and concentration cells. • Aspects of corrosion protection and control. • Measurement of corrosion rates and selection of materials for corrosion resistance. 		
Learning Outcomes	<ul style="list-style-type: none"> • LO1: Understand basic material properties, mechanics and their importance in chemical engineering design. Selection of appropriate materials based on their mechanical, electrical and thermal properties. Understand some basic concepts related to material degradation and failure. • LO2: Understand the thermodynamic and kinetics basis for the corrosion of metals in aqueous solution and to use this information to select appropriate materials for chemical processing. Understand the various types of corrosion and some basic methods by which they can be mitigated or prevented. 		
Pre-Requisites	<ul style="list-style-type: none"> • Chemical principles and fundamentals of chemistry 		

**CHEMICAL ENGINEERING MODULES FOR INCOMING EXCHANGE STUDENTS
(ACADEMIC YEAR 2026/27)**

Module Code	CP329	Year	3
Module Title	Process Safety Practice	Semester	1
Module Registrar	Mr Gregor Colville	ECTS	5
Assessment	Examination and Coursework		
Syllabus	<ul style="list-style-type: none"> • Risk Based Process Safety: Commitment to Process Safety • Risk Based Process Safety: Managing Risk • Risk Based Process Safety: Learning from Experience • Industrial hygiene • Flammability and explosions • Fire prevention • Chemical reactivity • Relief sizing • Reliability • Source and dispersion models 		
Learning Outcomes	<ul style="list-style-type: none"> • LO1: Identify and analyse risk-based process safety practices in chemical process plant design and operations. • LO2: Apply appropriate tools and techniques used in designing a safe process, and propose appropriate risk mitigations. • LO3: Apply appropriate tools and techniques used to evaluate process safety hazards and their impact. 		
Pre-Requisites	<ul style="list-style-type: none"> • Fundamentals of process safety 		

**CHEMICAL ENGINEERING MODULES FOR INCOMING EXCHANGE STUDENTS
(ACADEMIC YEAR 2026/27)**

Module Code	CP330	Year	3
Module Title	Ethics and Economics for Chemical Engineers	Semester	1
Module Registrar	Dr Mark Haw	ECTS	5
Assessment	Examination and Coursework		
Syllabus	<p>Ethical dimensions to engineering problem solving and decisions; trust and why ethics are important; professionalism; codes of conduct and obligations to the public; ethical frameworks; psychological aspects of decision making; all with reference to case studies in engineering ethics.</p> <p>Decision-making at project scale: fundamental economics, market understanding, price and demand, cost estimation, discounted cash flow and project evaluation, risk.</p> <p>Sustainable, ethical, socially responsible industrial development and larger scale strategic decisions: the major global challenges, 'free market' models and failures, innovation, capturing and understanding the core value of product/businesses/institution. Ultimate economic and engineering challenge of creating a decarbonised economy, industry and viable sustainable society.</p>		
Learning Outcomes	<ul style="list-style-type: none"> • LO1 Understand the nature and benefits of ethics-based professional responsibility and begin to develop a professional ethical identity to carry forward in working life. • LO2 Have a basic understanding of economic fundamentals, common economic models and strategy, introductory business practice, and wider economic challenges especially in the context of climate and social problems. • LO3 Understand and be able to apply cost estimation and economic methods to project evaluation, using them alongside other strategic factors, to demonstrate good decision-making in project-scale engineering. 		
Pre-Requisites	<ul style="list-style-type: none"> • Fundamentals of chemical engineering 		

**CHEMICAL ENGINEERING MODULES FOR INCOMING EXCHANGE STUDENTS
(ACADEMIC YEAR 2026/27)**

Module Code	CP331	Year	3
Module Title	Sustainability for Chemical Engineers	Semester	2
Module Registrar	Dr Mark Haw	ECTS	5
Assessment	Examination and Coursework		
Syllabus	<ul style="list-style-type: none"> • History and global context of sustainable development and Sustainable Development Goals; • The critical challenges of decarbonisation as route to mitigation of climate change. • Energy-related sustainability and its grounding in thermodynamics; • Material-related sustainability and an introduction to 'whole process' approaches such as life cycle assessment and circular economy; • Larger scale strategic decisions: how sustainable, ethical, socially responsible and economically viable principles combine in industrial development to meet the engineering challenge of creating a decarbonised economy, industry and society. 		
Learning Outcomes	<ul style="list-style-type: none"> • LO1 Understand and develop a critical appreciation of: the historical and global context of sustainable development; the role of sustainable chemical engineering in mitigating/tackling climate change and the challenges of the shift to a decarbonised economy. • LO2 Understand and be able to apply through examples, the key underlying thermodynamic and material principles of sustainable chemical engineering. • LO3 Understand the sustainability drivers for larger scale strategic decisions related to chemical engineering, with a particular focus on the overriding challenge of decarbonisation. 		
Pre-Requisites	<ul style="list-style-type: none"> • Fundamentals of chemical engineering 		

**CHEMICAL ENGINEERING MODULES FOR INCOMING EXCHANGE STUDENTS
(ACADEMIC YEAR 2026/27)**

Module Code	CP332	Year	3
Module Title	Chemical Engineering Design	Semester	1
Module Registrar	Dr Kaska Sypek	ECTS	5
Assessment	Coursework		
Syllabus	<ul style="list-style-type: none"> • Understanding the nature of process design, the information, documentation and tasks required. • Extracting information about a process from design documentation (e.g. flow diagrams and stream tables). • Researching and obtaining appropriate physical property data and thermodynamics models from literature. • Carrying out process calculations based on design information (e.g. mass and energy balances) to assess the viability of a process. • Evaluating general process characteristics from the safety, environmental and economic perspectives. • Raising awareness of the environmental impact of a process. • Developing process flowsheets from block flow diagrams and subsequently developing process flow diagrams. • Identifying appropriate unit operations and types of process equipment required for some common duties. • Preparing design documentation for a preliminary conceptual design of a process or a process unit according to design standards. • Synthesising and communicating information about a process. • Skills to discuss technical ideas fluently with different audiences. 		
Learning Outcomes	<ul style="list-style-type: none"> • LO1 Source and evaluate information required for process design from process diagrams and other sources. • LO2 Perform process calculations based on process diagrams and other information (e.g. thermodynamics, mass, heat and energy balances) to evaluate whether a design is feasible. • LO3 Develop process designs, size the main pieces of equipment and perform preliminary synthesis and integration. • LO4 Present process design documentation in a concise and coherent manner and work collaboratively in teams. 		
Pre-Requisites	<ul style="list-style-type: none"> • Understanding of core chemical engineering principles such as mass and energy balances and thermodynamics. Understanding of unit operations and core process equipment and of basic design principles such as process diagrams. 		

**CHEMICAL ENGINEERING MODULES FOR INCOMING EXCHANGE STUDENTS
(ACADEMIC YEAR 2026/27)**

Module Code	CP333	Year	3
Module Title	Chemical Engineering Simulation	Semester	2
Module Registrar	Dr Vassilis Inglezakis	ECTS	5
Assessment	Coursework		
Syllabus	<ul style="list-style-type: none"> • Understanding the application of simulation modelling in process design, the information, documentation and tasks required. • Extracting information about a process from design documentation (e.g. flow diagrams and stream tables). • Researching and obtaining appropriate physical property data and thermodynamics models from simulation package databases. • Translating block and process flow diagrams into simulation models. • Selecting appropriate unit operations and process equipment for a process in the simulation software. • Using simulation software to perform process calculations based on design information to assess the viability of individual unit operations and the overall process. • Preparing design documentation for a preliminary conceptual design of an individual unit operation and overall process based on simulation model outputs. • Synthesising and communicating information from simulation model outputs fluently with different audiences. 		
Learning Outcomes	<ul style="list-style-type: none"> • LO1 Translate process diagrams into simulation models. • LO2 Perform simulation calculations based on process diagrams and other information (e.g. thermodynamics, mass, heat and energy balances) to evaluate whether a design is feasible. • LO3 Use simulation software to size the main pieces of equipment, and to synthesis and integrate these into models of the process plant. • LO4 Communicate simulation results in a concise and coherent manner and work collaboratively in teams. 		
Pre-Requisites	<ul style="list-style-type: none"> • Understanding of core chemical engineering principles such as mass and energy balances and thermodynamics. Understanding of unit operations and core process equipment and of basic design principles such as process diagrams. 		

**CHEMICAL ENGINEERING MODULES FOR INCOMING EXCHANGE STUDENTS
(ACADEMIC YEAR 2026/27)**

Module Code	18417	Year	4
Module Title	Chemical Engineering Project	Semester	1
Module Registrar	Dr Javier Cardona	ECTS	10
Assessment	Coursework		
Syllabus	<ul style="list-style-type: none"> • The module project is an individual research project that will be based within the Department of Chemical & Process Engineering. • The scope of the project will provide the student with the opportunity to implement chemical engineering technical skills and knowledge and identify how and where the value of their work undertaken impacts an organisation's research activities. 		
Learning Outcomes	<ul style="list-style-type: none"> • LO1: Gain experience in extending themselves with open-ended work, in contrast to the more reactive type of work involved in taught classes, labs, and design classes. • LO2: Gain professional engineering experience and/or research experience. • LO3: Gain experience in project management and communication skills, setting targets, time management, monitoring, critically evaluating processes, communicating interim, and final outcomes both verbally and by written report/thesis. 		
Pre-Requisites	<ul style="list-style-type: none"> • Students selecting this module are expected to be in the final year of their Bachelor's (BSc/BEng) studies. 		

**CHEMICAL ENGINEERING MODULES FOR INCOMING EXCHANGE STUDENTS
(ACADEMIC YEAR 2026/27)**

Module Code	CP405	Year	4
Module Title	Process Control and Environmental Technology	Semester	1
Module Registrar	Dr Iain Burns (Process Control) Dr Vitor Mageijo (Environmental Technology)	ECTS	10
Assessment	Examination and Coursework		
Syllabus	<ul style="list-style-type: none"> • Process Control: Instruments used in basic measurements, control system structures and communications; Basics of process dynamics, including the representation of systems with transfer functions; Analysis of control systems and the design of control systems for complete plants. • Environmental Technology: Basic concepts and their specific application in an environmental context; legislation, pollution prevention and source reduction. • Wastewater treatment (general overview, wastewater characteristics, preliminary and primary treatment, principles of biological treatment, final solids removal); Waste gas treatment (general overview, waste gas characteristics, removal of particulate matter, removal of VOCs, SO_x and NO_x). 		
Learning Outcomes	<ul style="list-style-type: none"> • LO1: (Control): Formulate and describe strategies for control of relatively simple chemical process plants. • LO2: (Control): Analyse simple dynamic systems and the effects of applying control systems to them. • LO3: (Environmental Technology): Recognise the effect of pollution on the environment and have a basic knowledge of ways of measuring pollutant levels, of pollution control strategies, of environmental legislation and of relevant technical documents. • LO4. (Environmental Technology): Have an in-depth knowledge of pollution treatment methods, including the design wastewater treatment plants and the sizing of waste gas treatment units. 		
Pre-Requisites	<ul style="list-style-type: none"> • Knowledge of process design, unit operations and biochemical reaction engineering would be beneficial. 		

**CHEMICAL ENGINEERING MODULES FOR INCOMING EXCHANGE STUDENTS
(ACADEMIC YEAR 2026/27)**

Module Code	CP407	Year	4
Module Title	Chemical Engineering Design	Semester	2
Module Registrar	Dr Mark Heslop	ECTS	30
Assessment	Coursework		
Syllabus	<p>The module will be run with student assigned to teams, each advised by academic staff, consisting of 5 to 7 members. It will be mainly student driven, with weekly feedback meetings between the teams and their advisors.</p> <p>Key delivered elements of the module will include:</p> <ul style="list-style-type: none"> • Kick-off presentation: Presentation given to students in week 0 to present the design brief and expectations of the module. • HAZOP lecture: A lecture will be delivered by expert practitioners on the details of HAZOP analysis. • Writing skills lecture and workshop: A lecture and workshops will be held to develop the students' writing skills. <p>Key elements of assessment include:</p> <ul style="list-style-type: none"> • Two major group reports • An individual design report • A group presentation • A group HAZOP study 		
Learning Outcomes	<ul style="list-style-type: none"> • LO1: Apply and adapt chemical engineering knowledge, design methodologies, and problem-solving skills in unfamiliar situations to perform both scoping and detailed studies to generate innovative processes, systems, and products to fulfill industrial or societal needs. This includes identifying the objectives and context of the requirements with respect to business, technical, sustainable development, safety, health & environmental issues, and appreciation of public perception concerns. • LO2: Demonstrate the management and collaboration skills necessary to work within a team, planning, prioritizing and organizing activities, as well as effectively dealing with the challenges of working with peers, to meet deadlines. • LO3: Demonstrate the ability to communicate and present the outcomes and rationale of the design clearly, concisely, and effectively, with the appropriate amount of detail and explain and defend chosen design options and decisions. • LO4: Demonstrate skills to research, critically evaluate, and work with technical information that may be incomplete or uncertain, quantify the effect of this on the design and, where appropriate, use theory to mitigate deficiencies. 		
Pre-Requisites	<ul style="list-style-type: none"> • Students selecting this module are expected to be in the final year of their Bachelor's (BSc/BEng) or Master's (MEng) studies. • Students are expected to have completed all or the majority of the chemical engineering curriculum at their home institution. 		

**CHEMICAL ENGINEERING MODULES FOR INCOMING EXCHANGE STUDENTS
(ACADEMIC YEAR 2026/27)**

Module Code	CP409	Year	4
Module Title	Advanced Separations and Problem Solving	Semester	1
Module Registrar	Dr Paul Mulhearn (Problem Solving) Dr Javier Cardona (Advanced Separations)	ECTS	10
Assessment	Examination and Coursework		
Syllabus	<ul style="list-style-type: none"> • Membrane processes: concentration polarisation, ultrafiltration, reverse osmosis, gas separation, membrane modules and membrane systems/cascades. • Multi-component distillation: relative volatility, binary systems, multi-component bubble point, dew point and flash distillation, key components, analysis of multi-component distillation column. • Drying: psychometry, drying rate, analysis of dryers (batch and continuous). • Problem formulation: Engineering estimation, dimensional analysis, differential balances. • Numerical methods: iterative methods, finite difference method, software tools. 		
Learning Outcomes	<ul style="list-style-type: none"> • LO1: Appreciate the principles of fractional distillation involving more than two components. • LO2: Appreciate basic principles and applications of membrane technology. • LO3: Appreciate basic principles and applications of drying technology. • LO4: Apply physical principles (e.g. mass/energy balances, thermodynamics, chemical kinetics, and transport phenomena) to formulate mathematical models of unit operations. • LO5: Apply numerical methods and software to solve coupled algebraic and differential equations. 		
Pre-Requisites	<ul style="list-style-type: none"> • Binary distillation • Separation principles and mass transfer 		

**CHEMICAL ENGINEERING MODULES FOR INCOMING EXCHANGE STUDENTS
(ACADEMIC YEAR 2026/27)**

Module Code	CP414	Year	4
Module Title	Particle Technology and Advanced Reactors	Semester	1
Module Registrar	Prof. Jan Sefcik (Particle Technology) Prof. Sudipta Roy (Advanced Reactors)	ECTS	10
Assessment	Examination and Coursework		
Syllabus	<ul style="list-style-type: none"> • Particle Technology: Industrial relevance and commercial applications of particulate systems. Classification and characterisation of particulate systems. Particle formation processes. Precipitation and crystallization. Design of batch and continuous crystallization processes. Product formulation. • Advanced Reactors: Multiphase reactors. Flow and mixing in reactors. Residence time distributions. Heterogeneous reaction kinetics. Enzymatic reaction kinetics. Heat and mass transport limitations in chemical reactors. Reaction and diffusion. 		
Learning Outcomes	<ul style="list-style-type: none"> • LO1: Demonstrate an appreciation of the main applications of, and the market for, products based on particulate systems and a basic understanding of key physical and chemical processes and relevant equipment involved in industrial particle formation operations. • LO2: Understand the characteristics of particles relevant for their industrial processing and the corresponding characterisation methods, and be able to carry out calculations relating to design of particle formation processes. • LO3: Demonstrate an appreciation of the nature of non-ideal and multiphase chemical reactors and major examples in industrial applications including consequences for their design and operations. • LO4: Understand the key physical concepts underlying flow and mixing, transport limitations in chemical reactors as well as enzymatic, heterogeneous and multiphase reacting systems. 		
Pre-Requisites	<ul style="list-style-type: none"> • See description of module CP316 		

**CHEMICAL ENGINEERING MODULES FOR INCOMING EXCHANGE STUDENTS
(ACADEMIC YEAR 2026/27)**

Module Code	CP523	Year	5
Module Title	Molecular Simulation in Chemical Engineering	Semester	1
Module Registrar	Dr Miguel Jorge	ECTS	5
Assessment	Examination and Coursework		
Syllabus	<ul style="list-style-type: none"> • Introduction to molecular simulations, including typical molecular simulation conventions, such as periodic boundary conditions, pair potentials, potential and kinetic energy, local 'microscopic' density, and equilibration. • An introduction to molecular dynamics simulation including the 'Velocity Verlet' integration algorithm, simulation thermostats, and how to set-up an MD simulation. • Molecular modelling, including; when to use classical models of molecules (as opposed to quantum simulations), typical force-fields used for simulating molecules. • Fundamental concepts in statistical mechanics including; microstates and the fundamental postulate of statistical mechanics, the definition of entropy and free energy, the Boltzmann weight, standard ensembles and ensemble averages, the link and difference between statistical mechanics and thermodynamics, the Maxwell-Boltzmann velocity distribution, partition functions and their relation to free energies. • How to use Etomica molecular dynamics applets. • Fundamental aspects relevant to the etomica applet applications, including thermodynamic aspects of adsorption, interfacial tension and surfactant adsorption. • Data analysis, especially analysis of time-series and statistical error, including; ensemble averages, standard deviation, block averages, correlation in data, standard error, propagation of error, linear regression • The role of entropy in 'driving' chemical engineering processes 		
Learning Outcomes	<ul style="list-style-type: none"> • LO1: Understand the connection between the molecular scale and the process scale and how particular chemical engineering processes operate at a molecular scale • LO2: Understand the importance of entropy in chemical engineering, and its role in statistical mechanics and thermodynamics • LO3: Understand how typical molecular simulations work • LO4: Be able to take measurements from molecular simulations, and analyse and report data and technical ideas in written and oral communications 		
Pre-Requisites	<ul style="list-style-type: none"> • None 		

**CHEMICAL ENGINEERING MODULES FOR INCOMING EXCHANGE STUDENTS
(ACADEMIC YEAR 2026/27)**

Module Code	CP527	Year	5
Module Title	Petroleum Engineering	Semester	1
Module Registrar	Mr Gregor Colville	ECTS	5
Assessment	Examination and Coursework		
Syllabus	<p>This module aims to provide students with an understanding of hydrocarbon production processes from the reservoir through to a well. As petroleum engineering covers a very broad range of interdependent topics, this module focuses on introducing students to the fundamental concepts of reservoir engineering and well performance that underpin the production of hydrocarbons from subsurface reservoirs. The module will cover the following:</p> <ul style="list-style-type: none"> • Introduction to petroleum reservoir engineering and applications in the energy transition • Hydrocarbon phase behaviour and fluid properties • Production mechanisms and material balance • Fluid flow through porous media • Introduction to well test analysis • Well inflow performance • Well vertical lift performance 		
Learning Outcomes	<ul style="list-style-type: none"> • LO1: Understand the properties and phase behaviour of hydrocarbon fluids. • LO2: Understand how reservoir and well performance influence hydrocarbon production. LO3: Understand how advanced topics such as flow through porous media and well test analysis are important for reservoir development. • LO4: Understand how core petroleum engineering concepts can be applied to the energy transition. 		
Pre-Requisites	<ul style="list-style-type: none"> • Chemical Thermodynamics • Fluid Mechanics • Engineering Mathematics • Equation-Based Problem Solving 		

**CHEMICAL ENGINEERING MODULES FOR INCOMING EXCHANGE STUDENTS
(ACADEMIC YEAR 2026/27)**

Module Code	CP533	Year	5
Module Title	Clean Combustion Technologies	Semester	1
Module Registrar	Dr Jun Li	ECTS	5
Assessment	Examination and Coursework		
Syllabus	<ul style="list-style-type: none"> • Combustion chemistry • Gaseous fuel combustion & flames • Solid fuel combustion • Gasification & Syngas upgrading • Pollutant Emissions • Combustion in boilers • Advanced combustion technologies. 		
Learning Outcomes	<ul style="list-style-type: none"> • LO1: Calculate key parameters of gaseous flames and analyse solid fuel combustion processes • LO2: Analyse the mechanism of pollutants formation along with combustion process control methods • LO3: Evaluate the advantages and disadvantages of combustion technologies 		
Pre-Requisites	<ul style="list-style-type: none"> • Reaction engineering • Chemical principles and fundamentals of chemistry 		

Module Code	CP537	Year	5
Module Title	Electrochemical Energy Devices	Semester	1
Module Registrar	Dr Ed Brightman	ECTS	5
Assessment	Examination and Coursework		
Syllabus	<ul style="list-style-type: none"> • Thermodynamics - equilibrium electrochemistry, galvanic cells and the Nernst equation • Kinetics - Faraday's Law and current-voltage relationship • Energy devices - overview of different battery, fuel cell and electrolysis technologies, including commercial/industrial applications and their place in the energy landscape • Device design, diagnostic methods and modelling • Technoeconomic aspects of the hydrogen economy and grid scale energy storage 		
Learning Outcomes	<ul style="list-style-type: none"> • LO1: Describe the main devices for electrochemical energy conversion and their uses in industries, transport and energy systems. • LO2: Describe the half-cell reactions involved in fuel cells, electrolysers and redox flow batteries • LO3: Understand basic diagnostic tools used in electrochemical device development 		
Pre-Requisites	<ul style="list-style-type: none"> • Chemical principles and fundamentals of chemistry • Chemical thermodynamics • Materials (especially corrosion) 		

**CHEMICAL ENGINEERING MODULES FOR INCOMING EXCHANGE STUDENTS
(ACADEMIC YEAR 2026/27)**

Module Code	CP538	Year	5
Module Title	Environmental Engineering for Solving Industrial Challenges	Semester	1
Module Registrar	Prof. Kate Dobson	ECTS	5
Assessment	Examination and Coursework		
Syllabus	<ul style="list-style-type: none"> • An Introduction to Environmental Engineering for Solving Industrial Challenges • Environmental Legislation • Circular Economy • Resource Efficiency • Pollution Control Technologies 		
Learning Outcomes	<ul style="list-style-type: none"> • LO1: Understand and describe the main environmental and legislative issues for chemical engineers working in the industrial sector. • LO2: Understand the role of resource efficiency and the circular economy in making the industrial sector more sustainable. • LO3: Understand and describe the main environmental technologies used for pollution control (and the scientific and engineering principles used) to reduce the environmental impact from contaminants arising from industrial activity in the air, land and water. 		
Pre-Requisites	<ul style="list-style-type: none"> • None 		

**CHEMICAL ENGINEERING MODULES FOR INCOMING EXCHANGE STUDENTS
(ACADEMIC YEAR 2026/27)**

Module Code	CP541	Year	5
Module Title	Introduction to Hydrogen Engineering	Semester	1
Module Registrar	Dr Dragos Neagu	ECTS	5
Assessment	Coursework		
Syllabus	<ul style="list-style-type: none"> • Introduction to hydrogen technologies, their role in the energy transition, and basic safety considerations • Driving factors, national and global targets, and the impact of achieving these targets • Hydrogen production technologies, including conventional, renewable, low-carbon, and emerging methods • Hydrogen storage and distribution, including physical and chemical storage methods and infrastructure • Hydrogen utilization and applications, including combustion, industrial uses, and fuel cells • Hydrogen safety, regulations, and policies • Techno-economic analysis, lifecycle assessment, and business aspects of hydrogen technologies • Hydrogen systems, data, and AI for informed decision-making • Hydrogen jobs, social impact, and the role of global political and policy context • Case studies and industry perspectives on hydrogen technologies 		
Learning Outcomes	<ul style="list-style-type: none"> • LO1: Evaluate the role of hydrogen in the transition to a sustainable energy future, its potential to decarbonise various sectors, contribution to various SDGs and its cross-disciplinary and collaborative scope. • LO2: Understand the technology basics of hydrogen production, storage, distribution, and utilisation and develop awareness of global and national context, targets and business opportunities. • LO3: Analyse the techno-economic, lifecycle and systems-level facets of hydrogen technologies and the use of datadriven approaches and AI for decision making. • LO4: Evaluate hydrogen technologies challenges and opportunities, their social, economic impact, regulations, and safety considerations, and propose strategies for integration in relevant industries and applications. 		
Pre-Requisites	<ul style="list-style-type: none"> • None 		

**CHEMICAL ENGINEERING MODULES FOR INCOMING EXCHANGE STUDENTS
(ACADEMIC YEAR 2026/27)**

Module Code	CP542	Year	5
Module Title	Advanced Process Safety	Semester	1
Module Registrar	Mr Gregor Colville	ECTS	5
Assessment	Examination and Coursework		
Syllabus	<ul style="list-style-type: none"> • Risk Analysis: Layer of Protection Analysis (LOPA) • Risk Analysis: Other Methods • Asset Integrity and Reliability • Managing Asset Integrity • Human Factors in Process Safety 		
Learning Outcomes	<ul style="list-style-type: none"> • LO1: Evaluate safety risks of a process plant using advanced risk analysis techniques, and propose and justify appropriate measure to reduce risk. • LO2: Evaluate the integrity and reliability of process equipment, and justify and propose approaches to manage the integrity of process plant and infrastructure. • LO3: Analyse process safety incidents and evaluate how human factors contributed towards them, and propose and justify interventions to enhance the safety performance of a process plant. 		
Pre-Requisites	<ul style="list-style-type: none"> • Awareness of process safety including HAZOP • Awareness of process design 		

Module Code	18530	Year	5
Module Title	Chemical Engineering Project	Semester	2
Module Registrar	Dr Javier Cardona	ECTS	30
Assessment	Coursework		
Syllabus	<ul style="list-style-type: none"> • The module project is an individual research project that will be based within the Department of Chemical & Process Engineering. • The scope of the project will provide the student with the opportunity to implement chemical engineering technical skills and knowledge and identify how and where the value of their work undertaken impacts an organisation's research activities. 		
Learning Outcomes	<ul style="list-style-type: none"> • LO1: Gain experience in extending themselves with open-ended work, in contrast to the more reactive type of work involved in taught classes, labs, and design classes. • LO2: Gain professional engineering experience and/or research experience. • LO3: Gain experience in project management and communication skills, setting targets, time management, monitoring, critically evaluating processes, communicating interim, and final outcomes both verbally and by written report/thesis. 		
Pre-Requisites	<ul style="list-style-type: none"> • Students selecting this module are expected to be in the final year of their Master's (MEng) studies. 		