University of the West of Scotland

Module Descriptor

Session: 2023/24

Title of Module: Chemical Engineering Fundamentals			
Code: ENGG08022	**SCQF Level: 8 (Scottish Credit and Qualifications Framework)**	**Credit Points: 20**	**ECTS: (European Credit Transfer Scheme) 10**
School:	School of Computing, Engineering and Physical Sciences		
Module Co-ordinator:	Cristina Rodriguez		

Summary of Module

The module discusses process material and energy streams covering raw materials and their preparation, outlining the different operations involved and the separation of products and treatment of unreacted feed and by-products as well as introducing the concepts of “recycle”, “purge” and “by-pass”. Representative mass and energy balances are used for illustration.

The presentation of process data in the form of flowsheets will be introduced PFD explained with examples and the students will be acquainted with the graphical symbols used for equipment. The equipment that forms the building blocks of any process will be introduced. This will cover process equipment such as distillation columns, reactors, heat exchangers, pumps, etc.

Other process related equipment such as utilities (steam boilers, furnaces, cooling towers, etc.) are also discussed with related mass and energy balances.

The effect of the process industry on the environment, and awareness of mitigating actions that could be taken throughout the process life cycle will be introduced. This will cover the concept of designing for less waste, treatment of generated waste, minimisation of energy requirements, etc.

Module Delivery Method

Face-To-Face	**Blended**	**Fully Online**	**HybridC**	**Hybrid 0**	**Work-Based Learning**
☒	☐	☐	☐	☐	☐

See Guidance Note for details.

Campus(es) for Module Delivery

The module will **normally** be offered on the following campuses / or by Distance/Online Learning: (Provided viable student numbers permit) (tick as appropriate)						
Paisley:	Ayr:	Dumfries:	Lanarkshire:	London:	Distance/Online Learning:	Other:
☒	☐	☐	☐	☐	☐	Add name

Term(s) for Module Delivery					
(Provided viable student numbers permit).					
Term 1	☒	Term 2	☐	Term 3	☐

Learning Outcomes: (maximum of 5 statements) **These should take cognisance of the SCQF level descriptors and be at the appropriate level for the module.** At the end of this module the student will be able to:	
L1	Students should be able to understand the basic concepts of a chemical process and its components including the solution of mass and energy balances.
L2	Develop the skill to differentiate between the different types of operations and, with the assistance of published data, make the proper choices to the type of equipment to use for each type of operation, be they long-established technologies or innovative ones
L3	Develop the ability to read and interpret a process flow diagram as well as producing one if the relevant information is provided.
L4	Understand the commercial, economic and social context of engineering processes

Employability Skills and Personal Development Planning (PDP) Skills	
SCQF Headings	During completion of this module, there will be an opportunity to achieve core skills in:
Knowledge and Understanding (K and U)	SCQF Level **8** Demonstrate a broad knowledge and understanding of the main areas of basic process equipment in the chemical and manufacturing sectors. Demonstrate an understanding of a selection of the principal concepts and terminology of the process industry
Practice: Applied Knowledge and Understanding	SCQF Level **8** Use graphical skills and techniques peculiar to the chemical and process industries
Generic Cognitive skills	SCQF Level **8**

	The ability to assess diagrams and provide relevant interpretation. The ability to understand process safety, environmental and economic information and draw appropriate conclusions.	
Communication, ICT and Numeracy Skills	SCQF Level **8** Use a range of graphical software to communicate data in understandable format. Carry out information retrieval on a process for a report.	
Autonomy, Accountability and Working with others	SCQF Level **8** Take some responsibility for own safety and that of others during work visits. The ability to operate in a team and to divide responsibilities within the group. Work under guidance with qualified practitioners.	
Pre-requisites:	Before undertaking this module the student should have undertaken the following:	
	Module Code: ENGG07004	**Module Title:** Technical Communications
	Other:	Appropriate mathematics and chemistry background or similar prior learning.
Co-requisites	**Module Code:**	**Module Title:**

*Indicates that module descriptor is not published.

Learning and Teaching	
In line with current learning and teaching principles, a 20-credit module includes 200 learning hours, normally including a minimum of 36 contact hours and maximum of 48 contact hours.	
Learning Activities During completion of this module, the learning activities undertaken to achieve the module learning outcomes are stated below:	**Student Learning Hours** (Normally totalling 200 hours): (Note: Learning hours include both contact hours and hours spent on other learning activities)
Lecture/Core Content Delivery	12
Tutorial/Synchronous Support Activity	24
Independent Study	164
	200 Hours Total
****Indicative Resources: (eg. Core text, journals, internet access)**	

The following materials form essential underpinning for the module content and ultimately for the learning outcomes:

Geankoplis C J, A H Hersel and D H Lepek, Transport Processes and Separation Process Principles, Prentice Hall, 5th Edition 2018.

D M Himmelblau and J Riggs, Basic Principles and Calculations in Chemical Engineering, Prentice-Hall, 8th, Edition, 2011

Richard M. Felder, Felder's Elementary Principles of Chemical Processes, Wiley, revised 4th Edition, 2016.

(**N.B. Although reading lists should include current publications, students are advised (particularly for material marked with an asterisk*) to wait until the start of session for confirmation of the most up-to-date material)

Attendance and Engagement Requirements

In line with the Student Attendance and Engagement Procedure: Students are academically engaged if they are regularly attending and participating in timetabled on-campus and online teaching sessions, asynchronous online learning activities, course-related learning resources, and complete assessments and submit these on time.

Equality and Diversity

The University's Equality, Diversity and Human Rights Procedure can be accessed at the following link: UWS Equality, Diversity and Human Rights Code.

(N.B. Every effort will be made by the University to accommodate any equality and diversity issues brought to the attention of the School)

Supplemental Information

Divisional Programme Board	Engineering
Assessment Results (Pass/Fail)	Yes ☐No ☒
School Assessment Board	Engineering
Moderator	Mojtaba Mirzaeian
External Examiner	R. Ocone
Accreditation Details	This module is part of the BEng(Hons) Chemical Engineering programme accredited by the IChemE.

Changes/Version Number	4.0 Updated module summary

Assessment: (also refer to Assessment Outcomes Grids below)
Assessment for the module includes both formative and summative assessment. Formative assessment is provided during lectures in the form of class exercise problems, during tutorial sessions and as part of the preparation for written submissions. Summative assessment will be based on the following:
Assessment 1 - final written exam worth 70% of the final mark
Assessment 2 - report worth 20% of the final mark
Assessment 3 - presentation worth 10% of the final mark
(N.B. (i) **Assessment Outcomes Grids** for the module (one for each component) can be found below which clearly demonstrate how the learning outcomes of the module will be assessed. (ii) An **indicative schedule** listing approximate times within the academic calendar when assessment is likely to feature will be provided within the Student Module Handbook.)

Assessment Outcome Grids (See Guidance Note)

Component 1						
Assessment Type (Footnote B.)	**Learning Outcome (1)**	**Learning Outcome (2)**	**Learning Outcome (3)**	**Learning Outcome (4)**	**Weighting (%) of Assessment Element**	**Timetabled Contact Hours**
Unseen open book	X	X	X	X	70	2

Component 2						
Assessment Type (Footnote B.)	**Learning Outcome (1)**	**Learning Outcome (2)**	**Learning Outcome (3)**	**Learning Outcome (4)**	**Weighting (%) of Assessment Element**	**Timetabled Contact Hours**
Case study	X		X	X	20	0
Presentation	X		X	X	10	2
Combined Total for All Components					**100%**	**4 hours**