Module Descriptor

Title	Chemical Process Principles		
Session	2025/26	**Status**	Published
Code	ENGG09037	**SCQF Level**	9
Credit Points	20	**ECTS (European Credit Transfer Scheme)**	10
School	**Computing, Engineering and Physical Sciences**		
Module Co-ordinator	L Sun		

Summary of Module

This module is a general introduction to chemical processes.

Steady state mass and energy balances for processes involving chemical reactions are developed further and later applied to industrial processes including recycle, by-pass and purge streams.

Mass transfer describes equimolar counter diffusion, stagnant layer diffusion and convective mass transfer, and two- phase mass transfer with diffusivity measurement from experiment and diffusivity prediction from liquid phase activity coefficients and gas critical temperature and pressure.

Phase equilibrium revises Henry's and Raoult's Laws, examines the Clapeyron Clausius equation, the Antoine equation and psychrometric behaviour. Retrieve the phase equilibrium data from different sources: handbooks, experiments, databanks, and by simulation using software like Aspen.

The course will include practical activities, software application, and laboratory experiments.

In this module students will develop their UWS Graduate Attributes

(https://www.uws.ac.uk/current-students/your-graduate-attributes/). Universal: Academic attributes - critical thinking and analytical & inquiring mind; Work-Ready: Academic attributes - safe laboratory working; Successful: autonomous, driven and resilient.

Module Delivery Method	**On-Campus[1]**	**Hybrid[2]**	**Online[3]**	**Work -Based Learning[4]**

[1] Where contact hours are synchronous/ live and take place fully on campus. Campus-based learning is focused on providing an interactive learning experience supported by a range of digitally-enabled asynchronous learning opportunities including learning materials, resources, and opportunities provided via the virtual learning environment. On-campus contact hours will be clearly articulated to students.

[2] The module includes a combination of synchronous/ live on-campus and online learning events. These will be supported by a range of digitally-enabled asynchronous learning opportunities including learning materials, resources, and opportunities provided via the virtual learning environment. On-campus and online contact hours will be clearly articulated to students.

[3] Where all learning is solely delivered by web-based or internet-based technologies and the participants can engage in all learning activities through these means. All required contact hours will be clearly articulated to students.

[4] Learning activities where the main location for the learning experience is in the workplace. All required contact hours, whether online or on campus, will be clearly articulated to students

	☒	☐	☐	☐
Campuses for Module Delivery	☐ Ayr ☐ Dumfries	☐ Lanarkshire ☐ London ☒ Paisley	☐ Online / Distance Learning ☐ Other (specify)	

Terms for Module Delivery	Term 1	☒	Term 2	☐	Term 3	☐
Long-thin Delivery over more than one Term	Term 1 – Term 2	☐	Term 2 – Term 3	☐	Term 3 – Term 1	☐

Learning Outcomes	
L1	Demonstrate a broad and integrated knowledge of mass & energy balances and their relevance to the chemical process industries.
L2	Solve simple problems involving combined mass & energy balances for chemical processes.
L3	Solve problems involving mass transfer and phase equilibrium.
L4	N/A
L5	N/A

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 9** Understanding mass & energy balances as applicable to the chemical process industries.
Practice: Applied Knowledge and Understanding	**SCQF 9** Be able to use available experimental/ published data to solve simple mass & energy balances and mass transfer problems.
Generic Cognitive skills	**SCQF 9** Appreciate that economics and safety are secondary reasons for carrying out mass & energy balances in the chemical process industries.
Communication, ICT and Numeracy Skills	**SCQF 9** Demonstrate confidence in carrying out basic calculations relevant to chemical process industries.
Autonomy, Accountability and Working with Others	**SCQF 9** Collaborate with other students to produce laboratory reports/works visits reports.

Prerequisites	**Module Code** ENGG08022	**Module Title** Chemical Engineering Fundamentals
	Other or equivalent	
Co-requisites	**Module Code**	**Module Title**

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.

This module covers a wide variety of theoretical, conceptual and practical areas, which require a range of knowledge and skills to be displayed and exercised. Delivery of its syllabus content therefore involves a diversity of teaching and assessment methods suitable to the learning outcomes of the module; these include

formal lectures, structured tutorials (work closely integrated with the lecture material), laboratory exercises to develop practical skills and familiarisation with equipment and experimental techniques, completion and submission of written coursework making use of appropriate forms of IT and VLE, and independent study.

Learning Activities During completion of this module, the learning activities undertaken to achieve the module learning outcomes are stated below:	**Student Learning Hours** (Note: Learning hours include both contact hours and hours spent on other learning activities)
Lecture / Core Content Delivery	24
Tutorial / Synchronous Support Activity	12
Laboratory / Practical Demonstration / Workshop	12
Independent Study	152
n/a	0
n/a	0
TOTAL	200

Indicative Resources

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

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

R. Felder and R. Rousseau (2016) Elementary Principles of Chemical Processes, Wiley (New York; Chichester), 4th Edition.

D.M. Himmelblau (2022) Basic Principles and Calculations in Chemical Engineering, Prentice-Hall International, 9th Edition.

Regina M. Murphy (2007) Introduction to Chemical Processes: Principles, Analysis and Synthesis, McGraw-Hill, 1st Edition.

K.A. Solen and J.N. Harb (2005) Introduction to Chemical Processes-Fundamentals and Design,McGraw-Hill, 4th Edition.

(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.

For the purposes of this module, academic engagement equates to the following:

The School of Computing, Engineering and Physical Sciences considers attendance and engagement to mean a commitment to attending, and engaging in, timetabled sessions. You will scan your attendance via the scanners each time you are on-campus and you will login to the VLE several times per week. Where you are unable to attend a timetabled learning session due to illness or other circumstance, you should notify the Programme Leader that you cannot attend. Across the School an 80% attendance threshold is set. If you fall below this, you will be referred to the Student Success Team to see how we can best support your studies.

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. Aligned with the University's commitment to equality and diversity, this module supports equality of opportunity for students from all backgrounds and learning needs. Using the VLE, material will be presented electronically in formats that allow flexible access and manipulation of content. This module complies with University regulations and guidance on inclusive learning and teaching practice. This module has lab-based teaching and as such you are advised to speak to the Module Co-ordinator to ensure that specialist assistive equipment, support provision and adjustment to assessment practice can be put in place, in accordance with the University's policies and regulations.
(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 Physical Sciences**
Overall Assessment Results	☐ **Pass / Fail** ☒ **Graded**
Module Eligible for Compensation	☐ **Yes** ☒ **No** **If this module is eligible for compensation, there may be cases where compensation is not permitted due to programme accreditation requirements. Please check the associated programme specification for details.**
School Assessment Board	Engineering
Moderator	A Durrant
External Examiner	P Weston
Accreditation Details	This module is part of the BEng (Hons) Chemical Engineering programme accredited by the IChemE.
Module Appears in CPD catalogue	☐ **Yes** ☒ **No**
Changes / Version Number	4.1 External Examiner updated- Peter Weston Attendance and Engagement Requirement updated Equality and Diversity updated

Assessment (also refer to Assessment Outcomes Grids below)
Assessment 1
Unseen Closed Book Class Test worth 70% of the final mark
Assessment 2
Continuous assessment worth 30% of the final mark, including: (i) laboratory reports worth 25% of the final mark (ii) an assignment worth 5% of the final mark
Assessment 3
(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.)

Component 1							
Assessment Type	**LO1**	**LO2**	**LO3**	**LO4**	**LO5**	**Weighting of Assessment Element (%)**	**Timetabled Contact Hours**
Unseen Closed Book Class Test	☒	☒	☒	☐	☐	70	2

Component 2							
Assessment Type	**LO1**	**LO2**	**LO3**	**LO4**	**LO5**	**Weighting of Assessment Element (%)**	**Timetabled Contact Hours**
laboratory reports assignment	☒	☒	☒	☐	☐	30	0

Component 3							
Assessment Type	**LO1**	**LO2**	**LO3**	**LO4**	**LO5**	**Weighting of Assessment Element (%)**	**Timetabled Contact Hours**
	☐	☐	☐	☐	☐		
Combined total for all components						100%	2 hours

Change Control

What	**When**	**Who**
External Examiner updated- Peter Weston. Attendance and Engagement Requirement updated. Equality and Diversity updated.	March 2025	L Sun

Updated Indicatives Resources.		