UNIVERSITY of BRADFORD

Module Descriptor

Mass Transfer Operations

Module Code:	CPE5004-B
Academic Year:	2018-19
Credit Rating:	20
School:	Department of Chemical Engineering
Subject Area:	Chemical and Process Engineering
FHEQ Level:	FHEQ Level 5
Module Leader:	Professor Hadj Benkreira

Additional Tutors:

Pre-requisites:

Co-requisites:

Contact Hours

Type	Hours
Lectures	48
Tutorials	18
Laboratory	6
Directed Study	126
Examinations DO NOT USE	2

Availability Periods

Occurrence	Location/Period
BDA	University of Bradford / Academic Year (Sept - May)

Module Aims

To introduce the basic principles of chemical engineering separation processes and mass transfer and then proceed to study the design and operation of separation processes units operation such as distillation, gas-liquid absorption and stripping, liquid-liquid extraction, adsorption and crystallisation.

Outline Syllabus

Distillation (binary and multi-component). Calculation of number of plates, column height and diameter, heat transfer in condenser and reboiler.
Crystallisation; application, theory, basic principles, super-saturation effects.
Gas absorption including application, different types of equipment in industry, process design of a column to find the height and diameter of the column, required solvent flow rate.
Liquid-liquid extraction, solvent selection, ternary diagrams, counter-current and cross current operation, calculations to find minimum required solvent, process efficiency.
Gas-solid adsorption including application, equipment, Longmuir theory and basic design.

Module Learning Outcomes

On successful completion of this module, students will be able to...

1 Develop understanding of the physical phenomena, theoretical concepts and design aspects of mass transfer in separation processes, including distillation, gas-liquid absorption, gas-solid adsorption, liquid-liquid extraction and crystallisation.

2 analyse the important separation processes of distillation, gas absorption, adsorption, liquid-liquid extraction and crystallisation;
carry out design calculations of the above processes;
understand through the practical laboratory work carried out the operation of the above processes.

3 experience problem solving techniques having wider application;
apply simplifying assumptions to complex problems in order to gain useful design information individually and in a team;
manage time to meet deadlines;
communicate (written and verbal) outcome of practical work.

Learning, Teaching and Assessment Strategy

Lectures, tutorials and laboratory experiments. Learning outcomes assessment will be by formal examination (70%) and course work (30%). The formal exam, worth 70%, is of 2.0hr duration and taken at the end of semester 2. It will of course cover S1 and S2 learning. The coursework consists of two critical reports of the laboratory experiments on Distillation and Gas Absorption. The reports will include design and operation elements. The coursework is worth 30% and you will have two weeks to complete each report. Summative peer evaluation will be taken into account when calculating the individual mark for the coursework.

Mode of Assessment

Type	Method	Description	Length	Weighting	Final Assess'
Summative	Examination - closed book	Examination - closed book	2 hours	70%	No

Summative	Coursework	2 written reports (15% each) Moderated by peer review	0 hours	30%	Yes

Legacy Code (if applicable)

ENG2312L

Reading List

To view Reading List, please go to **rebus:list**.