

Module Details	
Module Title	Chemical Engineering Design Project
Module Code	CPE6007-D
Academic Year	2020/1
Credits	40
School	Department of Chemical Engineering
Subject Area	Chemical and Process Engineering
FHEQ Level	FHEQ Level 6
Pre-requisites	N/A
Co-requisites	N/A

Contact Hours	
Type	Hours
Independent Study	352
Tutorials	24
Online Tutorials (Synchronous)	24

Availability	
Occurrence	Location / Period
BDA	University of Bradford / Academic Year

Module Aims
The design of this module is based on CDIO concept and is built upon Stage 1 (Design, Build, Test) and Stage 2 (Chemistry for Engineers) and Stage 3 (Process Design) modules. The students will require to demonstrate their ability to organise themselves in a project engineering team and to carry out a substantial Chemical Engineering process design from the preliminary stage to detailed design. To be aware of the financial, environmental and technical aspects associated with a major design project. Apply the skills acquired from all previous modules.

Outline Syllabus

Team Work (11 weeks): Process appreciation; Preliminary process flow diagrams; Initial material and energy balances; Presentation in week 5 and an initial report. Final process flow diagram and revised material and energy balances, including any revisions that may ensue from the oral presentations and/or possible plant visits. Individual Work (7 weeks): Chemical Engineering Design: (i) Specification of all plant items including a statement of duty, a preliminary recommendation of type of equipment, an estimate of services required and materials of construction. (ii) Complete design calculations on specified items of equipment. (iii) Approximated design calculations on specified equipment items. Special Task (5 weeks): each student will complete one special task allocated by the tutor. (a) An engineering flow diagram. (b) Plant layout drawings. (c) Capital and manufacturing cost estimates. (d) Plant commissioning and normal plant operation. (e) Mechanical engineering design of one plant item. (f) Process integration study. Group work on hazard and operability study (1 week): This study of a section of the plant specified by the tutor may lead to proposals for modifying the flow sheet and/or procedures for the commissioning and normal operations.

Learning Outcomes

Outcome Number	Description
01	Translate the range of knowledge into a single practical Chemical Engineering design application
01	Translate the range of knowledge into a single practical Chemical Engineering design application
02	Design a chemical processing plant given the specifications. Evaluate equipment performance, environmental impact and process safety.
03	Work effectively as part of a design team
4	Organising and manage a design project
04	Organising and manage a design project
5	Select the most appropriate process based on available data
05	Select the most appropriate process based on available data
6	Write a detailed design report
06	Write a detailed design report
7	Communicate effectively in a team
07	Communicate effectively in a team

Learning, Teaching and Assessment Strategy

2 hour scheduled weekly tutorial for 24 weeks. Total 48 contact hours. Group centred work with one academic supervisor for each group of approximately 6 students.

Oral presentation, Group report and Individual report. Assessment by group and individual reports. Individual mark of the group component will be based on peer review by the students and supervisor's input.

Report (Group contribution): (i) carry out market analysis of the product to be made (ii) analyse alternative processes (including health & safety aspects) to make the product (iii) decide the location of the plant (demonstrate understanding of engineering ethics, child labour etc.) (iii) conceive the design of the process (flowsheet) (iv) implement the design by (a) carrying out the full mass and energy balances on the selected process flowsheet (d) carrying out detailed HAZOP analysis of the process

Report (Individual Contribution): (i) carry out full chemical engineering design calculations of one or more unit operations (ii) operate the plant by carrying out (a) mechanical engineering design (b) detailed financial calculations including capital, operating, labour costs, cash flows, rate of return (c) overall health & safety of the designed process.

Assessment of the report will be based on all components of CDIO.

Mode of Assessment

Type	Method	Description	Length	Weighting
Summative	Presentation	On preliminary calculations on the design project. Details in the Handbook.	05 mins	10%
Summative	Coursework	Individual Report (4500 words)	N/A	55%
Summative	Coursework	Group Report	N/A	35%
Referral	Coursework	Individual Report: Demonstrate the knowledge captured in the group report by critical evaluation of the report with some	N/A	45%
Referral	Coursework	Individual Report on Design Task and Special Task	N/A	55%

Reading List

To access the reading list for this module, please visit <https://bradford.rl.talis.com/index.html>

Please note:

This module descriptor has been published in advance of the academic year to which it applies. Every effort has been made to ensure that the information is accurate at the time of publication, but minor changes may occur given the interval between publishing and commencement of teaching. Upon commencement of the module, students will receive a handbook with further detail about the module and any changes will be discussed and/or communicated at this point.

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