

NATIONALLY HARMONIZED CHEMICAL ENGINEERING UG PROGRAM				
Course Code	ChEg4191			
Course Name	Chemical Engineering Apparatus Design			
Degree Program	B.Sc. in Chemical Engineering			
Module Name	Core			
Module Coordinator	N.N.			
Lecturer	N.N.			
Instructor's contact information	Office Phone E-mail Office hour			
ECTS Credits	6			
Students work load (per week)	Lecture	Tutorial	Laboratory or Practice	Home study
	3	3	0	5
Students work load(per semester)	48hrs	48hrs	0	80hrs
Mode of delivery	Parallel(per semester)			
Course Objectives & Competences to be Acquired	The course aims to introduce the students with the design principles, procedures and design of chemical process equipment. Upon completion of the course,students can • Design different process equipments and the piping systems with appropriate design codes and standards. • Select appropriate materials for the design of process equipments			
Course Description/Course Contents	1. Mechanical Design 1.1 Introduction 1.2 General design consideration: Pressure vessel 1.3 Design of Thin walled vessel under Internal pressure 1.4 Design of vessel subjected to external pressure 1.5 Design of vessel support 1.6 Design of tanks 2. Heat Exchangers			

	2.1 Introduction 2.2 Basic design procedure & Theory 2.3 Shell and tube exchangers 2.3.1 Construction details 2.3.2 General Design Considerations 2.3.3 Mechanical Design of Heat Exchanger Tube plates 2.4 Plate and frame heat exchanger 2.5 Coil heat exchanger 2.6 Jacketed heat exchanger 3. Separation Columns 3.1 Plate Column Design 3.1.1 Selection of Plate Type 3.1.2 Plate construction 3.1.3 Plate Hydraulic Design-Plate Diameter, Areas, Hole size, Pitch, Flow Arrangement, Pressure drop & Down comer Design 3.2 Packed Column Design - Type of Packing 4. Design of fluid storage and transfer equipment; 4.1 pressure and non-pressure vessels 5. Design of solid handling devices 6. Piping Systems 6.1 Design Conditions, Loads, and Stresses 6.2 Material Selection 6.3 Fittings 6.4 Flanges 6.5 Gaskets 6.6 Nozzles 7. Design of basic chemical engineering equipments - Evaporator, Condenser, Boiler, Dryers, Crystallization units, Extraction unit 8. Reactor design 8.1 Stirred tank reactors 8.2 tubular reactor 9. Mechanical operations 9.1 Filtration 9.2 Centrifuge 9.3 Decanters and clarifiers 9.4 Mixers 9.5 Fixed and Fluidized bed
Pre-requisites	ChEg4151
Semester	Year 4, Semester II
Status of Course	Compulsory

Teaching & Learning Methods	Lecture, tutorial , project work
Assessment/Evaluation	Continuous Assessment.....50% • Assignments.....15% • Quizzes.....10% • Tests.....15% • Project.....10% End term exam.....50%
Course Policy	Attendance: As per harmonized academic policy Assessments: students are supposed to handle all assessments on time. Cheating/plagiarism: it is strictly forbidden and any misconduct is accountable per the students' code of conduct. Also, please do not chew gum, eat, listen to recorders or CD players, wear sunglasses, or talk about personal problems. Please be sure to turn off pagers and cell phones before class and exam sessions
Literature	Text • Coulson & Richardson's, Chemical Engineering, Vol.6, Butterworth- Heinemann, 5th edition References • Sadik Kakac, Heat Exchangers Selection, Rating and Thermal Design, CRC Press, 2nd edition • British Standards: BS3274(Tubular exchanger for general purpose) BS3606 (Specification for steel tubes for heat exchangers), BS 5500(Unified fusion welded pressure vessels) • Perry's Chemical Engineers' Handbook, McGraw-Hill, 6th edition. • Chuse, R, Pressure vessels : the ASME code simplified, (McGrawHill), 6th edition
Approval Section	Module team