

TEMPLATE FOR COURSE SPECIFICATION (Petroleum Refining Eng)

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Teaching Institution	University of Technology
2. University Department/Centre	Chemical Engineering Department
3. Course title/code	Petroleum Refining/ CE.448-R
4. Programme(s) to which it contributes	Non
5. Modes of Attendance offered	Fall
6. Semester/Year	2 semester/year
7. Number of hours tuition (total)	3
8. Date of production/revision of this Specification	
9. Aims of the Course : Summary of the main learning outcomes for students enrolled in the course.	
1. Being familiar with composition of petroleum, origin and formation of petroleum, evaluation of petroleum ,thermal properties of petroleum, fractions , important product properties, test methods and type of refineries.	
2. Understanding Introduction to Processing : Stabilization, Dehydration, heating of and Fractionation Of Petroleum, and design techniques of some equipments	
3. Understanding the finising processes, conversion processes: Thermal Cracking, Catalytic Cracking, Catalytic Reforming,and Alkylolation, Isomerization. Products Blending,lub. Oil production and design techniques of some equipments	
4. Provide practice for petroleum, and products Evaluation.	

10• Learning Outcomes, Teaching ,Learning and Assessment Method

A- Knowledge and Understanding

- A1. To familiarize the students with the crude oil properties and fuel product quality.
- A2. To provide an overview of the type of petroleum refinery and the processes employed to convert crude oil and intermediate streams into finished products.
- A3. General principles of design techniques of some equipment used in refinery : heating of crude oil and distillation column.
- A4. Understanding the fundamentals of each refining process .
- A5. Provide a way to meet product demands and specification

B. Subject-specific skills

- B1. The ability to evaluate the crude oil .
- B2. The ability to design some equipment used in petroleum refinery .
- B3. The ability to provides major insights the main processes used in petroleum refinery.

Teaching and Learning Methods

Lectures, Tutorials , Example Classes , Informal and formal teamwork , Weekly homework problems, Conduct experiments in lab.

Assessment methods

Midterm exams , Final exam , Quizzes, Weekly homework, Team and homework problems , partial test (Oral questions :- multiple choice ,alternative response), Open questions that have a definite answer , or do not have a definite answer

C. Thinking Skills : the students should be able to:

- C1. Perform complete mass and energy balances for some chemical engineering plants used in refinery .
- C2. Apply the principles of separation processes and process thermodynamics to systems
- C3. Characterization and analyses the crude oil to select the appropriate processes.
- C4. Combined the principles of chemical engineering including thermodynamics; mass and energy balance; transport processes; separation processes, and mechanical unit operations.

Teaching and Learning Methods

Lectures, Tutorials , Example Classes , Informal and formal teamwork , Weekly homework problems, Practical Applications

Assessment methods

Midterm exams , Final exam , Quizzes, Weekly homework, Team and homework problems , partial test (Oral questions :- multiple choice ,alternative response), Open questions that have a definite answer , or do not have a definite answer

D. General and Transferable Skills (other skills relevant to employability and personal development).

D1. Work together in same-discipline teams to solve engineering problems.

D2. Speed intuitive, predictability and evaluate information and ideas in the handling of the petroleum refinery

11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1st semester					
1	3	To provide an overview of the petroleum refinery	Introduction: History and Development of Refining Processes, Kinds of Refineries	Lectures,	Midterm exams , final exam , partial test (oral questions :- multiple choice
2	3	To familiarize the students with the crude oil Composition	Composition of petroleum	Lectures, practical applications and team work	Midterm exams , final exam , partial test (oral questions :- multiple choice ,alternative response), open questions
3	3	Evaluate the crude oil, to familiarize the students with the crude oil properties and Characterization and analyses the crude oil	Evaluation of Oil Stocks:L1 Classification of Crude oil	Lectures, tutorials , example classes , practical applications, home work, and team work	Midterm exams , final exam , partial test (oral questions :- multiple choice), open questions, and home work
4	3	Evaluate the crude oil, to familiarize the students with the crude oil properties and Characterization and analyses the crude oil	Evaluation of Oil Stocks:L2 Characterization of crude oil . Physical properties	Lectures, tutorials , example classes , practical applications, home work, and team work	Midterm exams , final exam , partial test (oral questions :- multiple choice ,alternative response), open questions and home work
5	3	Evaluate the crude oil. Crude oil; analysis and characterization distillation, Crude Assay and analyses the crude oil .Work together in same-discipline teams to solve engineering problems.	Evaluation of Oil Stocks:L3 Crude oil; analysis and distillation, Crude Assay ASTM , TBP distillations evaluation of crude oil properties.	Lectures, tutorials , example classes , practical applications home work, and team work	Midterm exams , final exam , partial test (oral questions,alternative response), open questions and home work, team work

6	3	Evaluate the crude oil. Characterization and analyses the crude oil. Work together in same-teams to solve engineering problems.	Evaluation of Oil Stocks:L4 API gravity various average boiling points and mid percent corves. Evaluation of properties of crude oil and its fractions. Design concept of crude oil distillation column design.	Lectures, tutorials , example classes , practical applications and home work, team work	Midterm exams , final exam , partial test (oral questions :- multiple choice ,), home work, and team work
7	3	Understanding the fundamentals of the process and Combined the principles of chemical engineering	Dehydration and desalting of crude.	Lectures, practical applications	Midterm exams , final exam, partial test (oral questions), open questions
8	3	Understanding the design techniques of this equipement and the ability to design its	Furnace design : Introduction	Lectures,	Midterm exams , final exam ,partial , and open questions
9	3	Understanding the design techniques Of this equipement and the ability to design its	Furnace design: heat transfer in furnace and methods of calculations .	Lectures, tutorials , example classes , and home work	Midterm exams , final exam ,partial test (oral questions :- multiple choice ,alternative response), open questions and home work
10	3	Understanding the fundamentals of the process and combined the principles of chemical engineering	Fractionation Of Petroleum	Lectures, tutorials , example classes ,	Midterm exams , final exam , partial test (oral questions ,alternative response), open questions
11	3	Perform complete mass and energy balances	Fractionation Towers: Material and Energy Balances	Lectures, tutorials , example classes , and home work	Midterm exams , final exam , partial test (oral questions), open questions and home work
12	3	Understanding the design techniques of this equipement and the ability to design its	Fractionation Towers: Reflux Temperature Distribution in Fractionation Tower	Lectures, tutorials , example classes , and home work	Midterm exams , final exam , partial test (oral questions :- multiple choice ,alternative response), open questions and home work
13	3	Understanding the design techniques of this equipement and the ability to design its	Fractionation Towers: Tower Diameter	Lectures, tutorials , example classes , and home work	Midterm exams , final exam , partial test (oral questions :- multiple choice), open questions and home work

14	3	Provide an overview of the petroleum refinery and the processes employed to convert crude oil and intermediate streams into finished products. used the website for information	The Petroleum Refinery, Refinery Products :L1	Lectures, Web site	Midterm exams , final exam , partial test (oral questions :- multiple choice ,alternative response), open questions
15	3	Provide an overview of the petroleum refinery and the processes employed to convert crude oil and intermediate streams into finished products.	The Petroleum Refinery, Refinery Products:L2	Lectures, Web site	Midterm exams , final exam , partial test (oral questions :- multiple choice ,alternative response), open questions
2nd semester					
16	3	Understanding the fundamentals of the process and combined the principles of chemical engineering and	Treating Processes: Removal of Acid Gases	Lectures, tutorials , example classes , Practical Applications	Midterm exams , final exam , partial test (oral questions :- multiple choice)
17	3	Understanding the fundamentals of the process and combined the principles of chemical	Treating Processes: Sweetening Processes	Lectures, tutorials , example classes , practical applications	Midterm exams , final exam , partial test (oral questions,alternative response), open questions
18	3	Understanding the fundamentals of the process and combined the principles of chemical engineering and	Treating Processes: Improvement in Performance and Storage Stability	Lectures, example classes , practical applications	Midterm exams , final exam , partial test (oral questions :- multiple choice)
19	3	Understanding the fundamentals of the process and ability to provides major insights the process , and the ability to design its	Thermal cracking :L1: Coking and Thermal process, Delayed Coking, Types properties and use of petroleum coke, Delayed coking operation, Effect of process variables	Lectures, tutorials , example classes ,	Midterm exams , final exam , partial test (oral questions :- multiple choice ,alternative response), open questions
20	3	Understanding the fundamentals of the process and evaluate scientific and engineering information and ability to provides major insights the process , and the ability to design its	Thermal cracking :L2:Visbreaking	Lectures, tutorials , example classes ,	Midterm exams , final exam , partial test (oral questions :- multiple choice ,alternative response), open questions

21	3	Understanding the fundamentals of each refining process and ability to provides major insights the process , and the ability to design its	Catalytic cracking, Cracking reactions, Zeolite catalysts, process variables , Cracking Feedstocks and reactors, Effect, FCC Cracking, Catalyst coking and regeneration,	Lectures, tutorials , example classes , home work and team work	Midterm exams , final exam , partial test (oral questions :- multiple choice), and home work
22	3	Understanding the fundamentals of the process and evaluate scientific and engineering information and ability to provides major insights the process , and the ability to design its	Catalytic Reforming , Objective and application of catalytic reforming process, reforming catalyst , Reformer feed, Reforming reactor design, Continuous and semi regenerative process.	Lectures, tutorials , example classes , home work and team work	Midterm exams , final exam , partial test (oral questions :- multiple choice ,alternative response), open questions and home work
23	3	Understanding the fundamentals of each refining process and combined the principles of chemical engineering	Hydrotreating and Hydrocracking Objectives. Hydro cracking Reactions, Hydro cracking feedstocks, Modes of Hydro cracking , Effects of process variables Hydro treating process and catalysts	Lectures,	Midterm exams , final exam , partial test (multiple choice ,alternative response), open questions
24	3	Understanding the fundamentals of each refining process process and combined the principles of chemical engineering	Isomerization: Isomerization process, Reactions, Effects of process variables,	Lectures,	Midterm exams , final exam , partial test (oral questions :- multiple choice ,alternative response), open questions
25	3	Understanding the fundamentals of each refining process and combined the principles of chemical engineering	Alkylation and Polymerization : Alkylation process, Feedstocks, reactions, products, catalysts and effect of process Variables. Polymerization: Objectives, process, Reactions, catalysts and effect of process variables	Lectures,	Midterm exams , final exam , partial test (oral questions :- multiple choice ,alternative response), open questions
26	3	Allocate the available blending components in such a way to meet product demands and specification at the least cost	Product blending :Introduction	Lectures, tutorials , example classes , practical applications and home work	Midterm exams , final exam , partial test (oral questions, alternative response), open questions and home work
27	3	Allocate the available blending components in such a way to meet product demands and specification at the least cost	Product blending :octane no. and RVP blend , other properties	Lectures, tutorials , example classes , practical applications and home work	Midterm exams , final exam , partial test (multiple choice ,alternative response), and home work
28	3	Understanding the fundamentals of this process, the	Lube oil manufacturing: L1: Lube oil processing,	Lectures, practical applications	Midterm exams , final exam , partial test (oral questions :- multiple choice

		principles of separation processes			,alternative response), open questions
29	3	Understanding the fundamentals of each this process, the principles of separation processes	Lube oil manufacturing: L2: propane deasphalting,	Lectures,	Midterm exams , final exam , partial test (oral questions), open questions
30	3	Understanding the fundamentals of this process, the principles of separation processes	Lube oil manufacturing: L3:,Dewaxing , Viscosity index improvent from solvent Extraction.	Lectures,	Midterm exams , final exam , partial test (oral questions :- multiple choice ,alternative response), open questions

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	<ul style="list-style-type: none"> ○ Lecturers 1) Petroleum Refining, Technology and Economics, JAMES A. GARY & GLENN E.HANDWERK" 4th Edition , Marcel Dekker ,Inc (2001) 2) Petroleum Refinery Engineering, W. L. Nelson, 4th Edition (McGraw- Hill Book Company, New York, (1958) ○ Other support books :- 1) Modern Petroleum Refining Processes B.K. Bhaskara Rao , 3rd Edition, Oxford & IBH Publishing Company Pvt. Ltd. New Delhi (1988). 2) Petroleum and gas field processing"H. K. Abdel-Aal and Mohamed eggour" MARCELD DEKKER,Inc (2003)
Special requirements (include for example workshops, periodicals, IT software, websites)	websites
Community-based facilities (include for example, guest Lectures , internship , field studies)	field trips

13. Admissions	
Pre-requisites	Before undertaking this module the student should have undertaken the following: Chemistry of petroleum CE142. Properties of petroleum products CE244
Minimum number of students	Non
Maximum number of students	Non