

# **COURSE SPECIFICATION**

## **(( Basic Principle of Chemical Engineering I ))**

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	Basic Principle of Chemical Engineering I CE.141
4. Programme(s) to which it contributes	First stage
5. Modes of Attendance offered	Full
6. Semester/Year	2 semester/year
7. Number of hours tuition (total)	Theory (3Hr/week)
8. Date of production/revision of this Specification	30/5/2016
9. Aims of the Course	<ul style="list-style-type: none"><li>• The aims of the course provide a deep knowledge , wide scope and improved understanding of the mechanisms in heat balance as well as a better insight into analytical and empirical methods applied in analysis of material balance related problems .</li><li>• The students should gain knowledge to apply the material balance in engineering problems .</li></ul>

## **10• Learning Outcomes, Teaching ,Learning and Assessment Method**

### **A- Knowledge and Understanding**

- A1-The terminology associated with material balances , concepts , and units .
- A2- General knowledge of systems of units .
- A3 – General knowledge of chemical engineering (physical and chemical principles) .
- A4 – Concepts and expression of stoichiometry .
- A5 – Concepts of material balances .
- A6 – Concept of ideal and real gases .
- A7- Vapor pressure and saturation of gases .

### **B. Subject-specific skills**

- B1 –Application of material balances in the absence of chemical reactions .
- B2- Application of material balances in processes that include reactions .
- B3- Application of ideal and real gas law .
- B4- Application of unsteady state material balances .

### **Teaching and Learning Methods**

- . Lectures, tutorials , Example classes , and Weekly homework problems .

### **Assessment methods**

- Quizzes , Weekly homework , Homework problemes , Partial test ( Oral questions : Multiple choice , Alternative response ) , Midterm exam , and Final exam .

### **C. Thinking Skills**

- C1- An ability to apply effective, creative and innovative solutions, both independently and cooperatively, to current and future problems.
- C2- Communicate effectively and logically, both orally and in writing;
- C3. An ability of scientific analysis for energy balance problems and evaluate their solutions.
- C4. Work in teams with the ability to use modern sources (PC, references).

### **Teaching and Learning Methods**

- Lectures, tutorials , Example classes , and Weekly homework problems .

### **Assessment methods**

- Quizzes , Weekly homework , Homework problemes , Partial test ( Oral questions : Multiple choice , Alternative response ) , Midterm exam , and Final exam .

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

- D1- apply mathematical skills to practical problems;  
 D2-communicate effectively, both orally and in writing;  
 D3-manage time and modern resources (PC, references);  
 D4- work in teams;  
 D5- be creative, particularly in mathematical analysis and solution of problems;  
 D6- extract information from published sources.

## 11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
<b>1<sup>st</sup> semester</b>					
1	3	Ability to characterize and specify of chemical processes .	Introduction to chemical eng. and generalized chemical process and PFD .	Lectures, tutorials, example classes, practical applications	partial test (oral questions :- multiple choice, alternative response), open questions that have a definite answer, or do not have a definite answer
2	3				
3	3	Ability to characterize and specify of system of units .	Explain the meaning of system of units and conversion factors .	Lectures, tutorials, example classes, practical applications	partial test (oral questions :- multiple choice, alternative response), Quiz, open questions that have a definite answer, or do not have a definite answer
4	3				
5	3	Ability to characterize and specify the dimensional consistency .	Explain the meaning of dimensional consistency and precision and significant figures.	Lectures, tutorials, example classes, practical applications	partial test (oral questions :- multiple choice, alternative response), open questions that have a definite answer, or do not have a definite answer
6	3				
7	3	Ability to characterize and specify the temperature , pressure , and the mole unit .	Define the temperature and units .	Lectures, tutorials, example classes, practical applications	partial test (oral questions :- multiple choice, alternative response), Quiz, open questions that have a definite answer, or do not have a definite answer
8	3		Define the pressure and units .		
9	3		Define the mole and units .		

10	3	Ability to characterize the compositions of mixtures and concentrations of solutions .	Explain the meaning of compositions of mixtures .	Lectures, tutorials, example classes, practical applications	partial test (oral questions :- multiple choice, alternative response), open questions that have a definite answer, or do not have a definite answer
11	3		Explain the meaning of concentrations of solutions .		
12	3	Ability to characterize the basis of calculations and concepts and expressions of stoichiometry.	Apply the basis of calculations .	Lectures, tutorials, example classes, practical applications	partial test (oral questions :- multiple choice, alternative response), Quiz, open questions that have a definite answer, or do not have a definite answer
13	3		Apply the concepts and expressions of stoichiometry .		
14	3	Ability to characterize and specify the chemical reactions calculation .	Explain the meaning of chemical reactions calculation .	Lectures, tutorials, example classes, practical applications	partial test (oral questions :- multiple choice, alternative response), Quiz, open questions that have a definite answer, or do not have a definite answer
15	3		Explain the meaning of principles of material balance .		
<b>2<sup>nd</sup> semester</b>					
16	3	Ability to characterize and specify the material balance on single unit and multiple unit processes.	Write down each of the terms in the material balance on single unit processes .	Lectures, tutorials, example classes, practical applications	partial test (oral questions :- multiple choice, alternative response), Quiz, open questions that have a definite answer, or do not have a definite answer
17	3		Write down each of the terms in the material balance on multiple unit processes .		
18	3	Ability to characterize and specify the material balances with chemical reaction and combustion processes .	Distinguish between material balances with and without chemical reaction .	Lectures, tutorials, example classes, practical applications	partial test (oral questions :- multiple choice, alternative response), open questions that have a definite answer, or do not have a definite answer
19	3		Explain the meaning of the introduction to fuel and combustion processes.		

20	3		Combustion calculation		
21	3	Ability to characterize and specify the material balance with recycle stream .	Apply the material balance with recycle stream.	Lectures, tutorials, example classes, practical applications	partial test (oral questions :- multiple choice, alternative response), Quiz, open questions that have a definite answer, or do not have a definite answer
22	3	Ability to characterize and specify the material balance with bypass and purge stream .	Define and understand bypass and purge stream and apply the material balance with bypass and purge stream.	Lectures, tutorials, example classes, practical applications	partial test (oral questions :- multiple choice, alternative response), open questions that have a definite answer, or do not have a definite answer
23	3	Ability to characterize and specify the ideal gas .	Define and understand ideal gas and ideal gas law and their equation .	Lectures, tutorials, example classes, practical applications	partial test (oral questions :- multiple choice, alternative response), open questions that have a definite answer, or do not have a definite answer
24	3	Ability to characterize and specify the mixture of ideal gas .	Explain the meaning of principles of ideal gases mixtures .	Lectures, tutorials, example classes, practical applications	partial test (oral questions :- multiple choice, alternative response), Quiz, open questions that have a definite answer, or do not have a definite answer
25	3		Explain the meaning of principles of the critical state and critical constants .		
26	3	Ability to characterize and specify the compressibility factor .	Explain the meaning of the equations of state ( Van der Waals equation .	Lectures, tutorials, example classes, practical applications	partial test (oral questions :- multiple choice, alternative response), open questions that have a definite answer, or do not have a definite answer
27	3		Explain the meaning of the law of corresponding state and compressibility factor .		
28	3	Ability to characterize and specify the real gas .	Explain the meaning of the mixture of real gas .	Lectures, tutorials, example classes, practical applications	partial test (oral questions :- multiple choice, alternative response), Quiz, open questions that have a definite answer, or do not have a definite answer
29	3		Explain the meaning of the vapor pressure .		
30	3		Explain the meaning of the saturation of gases .		

<b>12. Infrastructure</b>	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	<ul style="list-style-type: none"> <li>○ <b>Lecturers</b></li> <li>○ <b>D.M.Himmelblau and J.B.Riggs ,Basic Principles and Calculations in Chemical Engineering ,7<sup>th</sup> Edition , 2004 .</b></li> <li>○ <b>R.M.Felder and R.W.Rousseau ,Elementary Principles of Chemical Processes ,3<sup>rd</sup> Edition ,2005 .</b></li> </ul>
Special requirements (include for example workshops, periodicals, IT software, websites)	websites
Community-based facilities (include for example, guest Lectures, internship, field	field trips
<b>13. Admissions</b>	
Pre-requisites	Non ( first class )
Minimum number of students	Non
Maximum number of students	Non