هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

T-104
2022

# Course Specification

| | |
|---|---|
| Course Title: | **Introduction to Chemical Engineering** |
| Course Code: | **111 CHET** |
| Program: | **Chemical Engineering Technology** |
| Department: | **Chemical Engineering Technology** |
| College: | **CAIT** |
| Institution: | **JAZAN UNIVERSITY** |
| **Version:** | **V2022** |
| **Last Revision Date:** | **30 Mar 2024** |

# Table of Contents:

# A. General information about the course:

| Course Identification | | | | | |
|---|---|---|---|---|---|
| 1. Credit hours: | | | | | |
| 2. Course type | | | | | |
| a. | University ☐ | College ☐ | Department☒ | Track☐ | Others☐ |
| b. | Required ☒ | Elective☐ | | | |
| 3. Level/year at which this course is offered:3 | | | | | |
| 4. Course general Description<br>This course is an introductory course dealing with the fundamental concepts, calculations and processing technology employed in the chemical process industry. The calculations cover basic physical and chemical concepts, stoichiometry of chemical reactions, mixtures of fluids and combustion of fuels, in addition to simple material and energy balance concepts applied to process units. This course will also cover the introduction to process instrumentation lines, pump and valve symbols, vessel symbols, heat and mass transfer equipment, type of equipments, types of storage vessels and their shapes, valves, gauges, pipes and color codes, insulation. Typical chemical processing industries are also dealt with. Laboratory sessions are mainly devoted to formal calculations consolidating the principles and concepts outlined with some experimental exercises where appropriate. | | | | | |
| 5. Pre-requirements for this course (if any):<br>General Chemistry | | | | | |
| 6. Co- requirements for this course (if any): | | | | | |
| 7. Course Main Objective(s)<br>The objectives of this course are: (1) Providing students with an opportunity to identify different types of chemical engineering instruments in their respective laboratories. (2) Provide principles and operating conditions of the Chemical Instruments among others, introduce students to the practical use of Chemical Instruments for chemical technology. | | | | | |

## 1. Teaching mode (**mark all that apply)**

| No | Mode of Instruction | Contact Hours | Percentage |
|---|---|---|---|
| 1. | Traditional classroom | 56 | 100 |
| 2. | E-learning | 0 | 0 |
| 3. | Hybrid<br>• Traditional classroom<br>• E-learning | 0 | 0 |
| 4. | Distance learning | 0 | 0 |

## 2. Contact Hours (based on the academic semester)

| No | Activity | Contact Hours |
|---|---|---|
| 1. | Lectures | 28 |
| 2. | Laboratory/Studio | 28 |
| 3. | Field | 0 |
| 4. | Tutorial | 0 |
| 5. | Others (specify) | NA |
| | Total | 56 |

## B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

| Code | Course Learning Outcomes | Code of CLOs aligned with program | Teaching Strategies | Assessment Methods |
|---|---|---|---|---|
| 1.0 | Knowledge and understanding | | | |
| 1.1 | Identify chemical engineering knowledge requirements, industry standards, and best practice in chemical work settings; | K1.3 | Lecture, tutorial, active learning | Quizzes, Assignments, exams, and SSR |
| 1.2 | | | | |
| … | | | | |
| 2.0 | Skills | | | |
| 2.1 | Utilize modern chemical engineering instruments in a chemical process; | S1.2 | Lecture, tutorial, active learning | Quizzes, Assignments, exams, and SSR |
| 2.2 | Calculate parameters in material balances and chemical processes around simple systems; | S2.1 | Lecture, tutorial, active learning | Quizzes, Assignments, exams |
| 2.3 | Identify the strategies needed to solve chemical engineering stoichiometry problems; | S4.3 | Lecture, tutorial, active learning | Quizzes, Assignments, exams |
| 3.0 | Values, autonomy, and responsibility | | | |
| 3.1 | Function effectively in the classroom; | V1.1 | Assignments | Marks are given according to participating in classroom |

| Code | Course Learning Outcomes | Code of CLOs aligned with program | Teaching Strategies | Assessment Methods |
|---|---|---|---|---|
| 3.2 | Integrate safety and competent in a work laboratory setting. | V2.1 | Assignments | Marks are given according to participating in classroom |
| ... | | | | |

## C. Course Content

| No | List of Topics | Contact Hours |
|---|---|---|
| 1. | **Introduction to basic of chemical engineering, terminologies, units, notations, instruments, and uses. Illustrate the objectives of the course for the students.** | 9 |
| 2. | calculations cover basic physical and chemical concepts | 9 |
| 3. | **Chemical conversions and Factors** | 5 |
| 4. | stoichiometry of chemical reactions | 8 |
| 5. | mixtures of fluids and combustion of fuels | 9 |
| 6. | simple material and energy balance concepts applied to process units | 5 |
| 7. | Introduction to Process variables | 6 |
| 8. | Revision | 3 |
| 9. | Selected Topics | SSR |
| | **Practice** | 2 |
| Total | | 56 |

## D. Students Assessment Activities

| No | Assessment Activities * | Assessment timing (in week no) | Percentage of Total Assessment Score |
|---|---|---|---|
| 1. | Quizzes | Week 3 till Week 12 | 10% |
| 2. | Class Activity | Week 1 till Week 12 | 10% |

| No | Assessment Activities * | Assessment timing (in week no) | Percentage of Total Assessment Score |
|---|---|---|---|
| 3. | Laboratory | All weeks | 10% |
| 4. | Midterm | Week 7 | 20% |
| 5. | SSR/Presentation | Last week | 10% |
| 6. | Final Term Exam | As scheduled | 40% |

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

# E. Learning Resources and Facilities

## 1. References and Learning Resources

| | |
|---|---|
| Essential References | Lecture notes (PPT) and hardcopies of some sections from "*Textbooks*<br>1- Basic Principles and Calculations in Chemical Engineering, *by David M. Himmelblau and James B Riggs, seventh Edition, 2004*<br>2- Introduction To Chemical Engineering Paperback – 1 July 2017 by Salil Ghosal, Shyamal Sanyal, Siddhartha Datta.<br>3- S. Pushpavanam, **Introduction to Chemical Engineering, 2nd edition**, Wiley 2012". |
| Supportive References | |
| Electronic Materials | https://sites.google.com/site/santhirajupilli/lecture-notes_jazan-university/chet-111-introduction-to-chemical-engg<br>https://www.academia.edu/38381987/Introduction_to_chemical_engineering<br>https://nptel.ac.in/courses |
| Other Learning Materials | |

## 2. Required Facilities and equipment

| Items | Resources |
|---|---|
| facilities<br>(Classrooms, laboratories, exhibition rooms, simulation rooms, etc.) | Classroom and Laboratory |
| Technology equipment<br>(projector, smart board, software) | Computer and projector |
| Other equipment<br>(depending on the nature of the specialty) | Not utilized |

# F. Assessment of Course Quality

| Assessment Areas/Issues | Assessor | Assessment Methods |
|---|---|---|
| Effectiveness of teaching | Institution | Online Direct Survey |
| Effectiveness of students assessment | Course Coordinator | Indirect |
| Quality of learning resources | Course Coordinator | Indirect |
| The extent to which CLOs have been achieved | Course Coordinator | Excel Sheet-Direct |
| Other | | |

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)

Assessment Methods (Direct, Indirect)

## G. Specification Approval Data

| | |
|---|---|
| COUNCIL /COMMITTEE | CHEMICAL ENGINEERING TECHNOLOGY |
| REFERENCE NO. | CAITCET24012 |
| DATE | 17/04/2024 |