



# THE FEDERAL UNIVERSITY OF TECHNOLOGY, AKURE

## Department of Chemistry

### CHE 313 – Introduction to Industrial Chemistry

#### COURSE PARTICULARS

**Course Code:** CHE 313

**Course Title:** Introduction to Industrial Chemistry

**No. of Units:** 2

**Course Duration:** Two hours of Lecture per week for 15 weeks.

**Status:** Compulsory

**Course Email Address:** -che313@gmail.com

**Course Webpage:** -<http://www.fwt.futa.edu.ng/courseschedule.php?coursecode=CHE%20313>

**Prerequisite:** CHE 101 and 102

#### COURSE INSTRUCTORS

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and

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#### COURSE DESCRIPTION

As undergraduates of Industrial Chemistry, this course provides you with the knowledge of the basic foundational concepts in industrial processing. Away from the traditional branches: Organic, Inorganic, Physical, and Analytical Chemistry; this course introduces you to the actual operations in chemical industries and provides knowledge of the key areas such as raw materials sourcing and processing (with emphasis on crude oil and coal), intermediates and conversion of chemical materials to final products. It teaches important concepts such as optimisation, mass balance and energy balance which are very crucial to the processing of materials in the chemical industries. The course will test your ability to analyse critically and to solve mathematical problems, and in return, you would be rewarded with skills which will distinguish you from pure

and theoretical chemists! Ultimately, the course will prepare you for your future role as a chemist in the Industrial sense.

## COURSE OBJECTIVES

The objectives of this course are to:

- Introduce the students to industrial processing principles as applicable to chemical and allied industries.
- Provide the students with the knowledge of how raw materials are sourced for various chemical industries and how these materials are processed.
- Teach the students the important concepts of material and energy balances, pilot plant and model scale-ups, and process optimisation.

## COURSE LEARNING OUTCOMES / COMPETENCIES

Upon successful completion of this course, the student will:

*(Knowledge based)*

- Appreciate better their future roles as chemists in Industrial establishments
- Be able to explain the origin of raw materials used in the chemical and allied industries
- Have a good understanding of how chemical raw materials are processed into finished products.
- Know areas in chemical industries where their roles interface with those of chemical engineers.
- Be able to solve simple mathematical problems relating to mass and energy balances.
- Be able to solve simple optimisation problems- a skill needed for efficient utilisation of resources in chemical industries

*(Skills)*

## GRADING SYSTEM FOR THE COURSE

This course will be graded as follows:

Assignment	5%
Class Attendance	5%
Test	30%
<u>Final Examination</u>	<u>60%</u>
<b><u>TOTAL</u></b>	<b><u>100%</u></b>

## GENERAL INSTRUCTIONS

**Attendance:** It is expected that every student will be in class for the lectures. Attendance records will be kept and used to determine each person's qualification to sit for the final examination. In case of illness or other unavoidable cause of absence, the student must communicate as soon as possible to any of the instructors, indicating the reason for the absence.

**Academic Integrity:** Violations of academic integrity, including dishonesty in assignments, examinations, or other academic performances are prohibited. You are not allowed to make copies of another person's work and submit it as your own; that is plagiarism. All cases of academic dishonesty will be reported to the University Management for appropriate sanctions in accordance with the guidelines for handling students' misconduct as spelt out in the Students' Handbook.

**Assignments and Group Work:** Students are expected to submit assignments as scheduled. Failure to submit an assignment as and when due will earn you zero for that assignment. Only under extenuating circumstances, for which a student has notified any of the instructors in advance, will late submission of assignments be permitted.

**Code of Conduct in Lecture Rooms:** Students should turn off their cell phones during lectures. Students are prohibited from engaging in other activities (such as texting, watching videos, *etc.*) during lectures. Food and drinks are not permitted in the lecture room.

## READING LIST

<sup>1</sup>Himmelblau, D.M. Basic principles and calculations in Chemical Engineering

<sup>1</sup>Thompson, E.V and Ceckler, W.H. Introduction to Chemical Engineering.

<sup>1</sup>Sinnot, R.K. Chemical Engineering.

### **Legend**

1- Available in the University Library.

## COURSE OUTLINE

Week	Topic	Remarks
1	Review of application of chemistry in the chemical and allied industries	Student will appreciate the role of Chemistry in chemical and allied industry
2 & 3	Sources of chemical raw materials and energy. Renewable and non-renewable sources.	Some emphasis will be laid on Petroleum, Coal, and wood.
4 -6	Material balance principles	Many real –life cases in the industry will be examined through worked examples.
7 - 9	Energy balance principles	Many real –life cases in the industry will be examined through worked examples.
<b>MID-SEMESTER TEST</b>		
10 - 12	Process optimisation. Different techniques of optimising process systems will be taught	Simple optimisation problems will be solved e.g. the cylindrical vessels
13 & 14	Pilot plants and model scale up principles	
15	Revision of the key concepts taught in the course	
16	Revision	
17-18	Examination	

