
Course Prefix/No.:	CHM 275
Course Title:	Introduction to Industrial Chemical Processes
Lec HRS/WEEK	2.0
Lab HRS/WEEK	3.0
Credit HRS/SEMESTER:	3.0

COURSE DESCRIPTION

This course introduces the student to skills required for working in chemical manufacturing industry. Skills included: chemical processing equipment, safety and management of chemical and laboratory processes, and analytical laboratory techniques.

COURSE COMPETENCIES/PERFORMANCE OBJECTIVES

Upon Successful Completion of this course students should be able to:

Module 1: Reducing, Reusing, Recycling and Solid Waste

- Define and differentiate between renewable and nonrenewable “green” resources
- Describe the environmental advantages of recycling
- Describe current solid waste practices and environmental impact
- Evaluate the advantages and disadvantages of using recycled materials to produce products consumed locally
- Describe and differentiate renewable and nonrenewable energy resources
- Describe the chemistry of ethanol production
- Explain the chemistry of fats and lipids
- Explain the chemistry and thermodynamics of biodiesel

Module 2: Analysis of Chemical Raw Materials and Products

- Describe wet (laboratory bench) chemistry methods used to test specific raw materials and products
- Explain the concepts of spectroscopy, gas chromatography, and other analytical methods
- Explain advantages and disadvantages of various GC detectors including the types of samples analyzed by GC and selection of appropriate detector
- Explain the concept of high pressure liquid chromatography (HPLC)
- Explain the advantages and disadvantages of various HPLC detectors
- Explain the types of sample analyzed by HPLC and selection of appropriate detector
- Describe the relationship between molecular structure and absorption of infrared radiation
- Describe the ability to setup, calibrate and analyze samples by IR
- Describe how to perform web qualitative IR analysis and interpret the spectra with comparison to a known compound
- Demonstrate how to perform chemical analysis of raw materials and final products of a chemical manufacturing process

Module 3: Chemical Manufacturing

- Demonstrate how to set up the equipment to produce biodiesel, ethanol, paper, and/or other materials

- Demonstrate how to separate, filter, heat exchange, operate reactors, and/or other chemical process equipment
- Demonstrate how to handle raw and finished materials, including measuring and delivering the chemical ingredients and products of a chemical manufacturing process through the use of a batch sheets, measuring devices, and/or other methods
- Demonstrate how to collect and package the chemical product from a chemical manufacturing process
- Demonstrate how to manage the logistics and accounting of materials and costs, including income net and other plant economics
- Demonstrate the use of chemical management software for plant economics and materials tracking

Module 4: Quality Control (QC)

- Explain the importance of quality control in a production environment as it relates to tracking of raw materials and finished products
- Describe the types of tracking tools used in quality control, including, but not limited to tracking batches
- Describe the importance of internationally standardized methodologies such as ASTM

Module 5: Industrial and laboratory safety, hazardous materials management, DOT

- Describe and demonstrate safe work practices in industrial and laboratory environments
- Identify and demonstrate the proper use of personal protective equipment (PPE)
- Explain the importance of Material Safety Data Sheets (MSDS) in industrial and laboratory environments
- Describe RCRA and how it relates to industrial and laboratory wastes
- Describe the classification, handling, storage and disposal of hazardous wastes
- Prepare a hazardous waste shipping manifest for transport of a hazardous waste to comply with DOT

MINIMAL STANDARDS

Minimal standards of performance for receiving one hour of semester credit from York Technical College are indicated by achieving 60% average on all evaluation and 70% average for this course to transfer to other programs.

COURSE REQUIREMENTS

Attendance Policy

Students are responsible for attending meetings in the course until they have completed all course requirements. Students are responsible for all material covered and for all assignments made in all classes. Students who are absent from a course more than 10% of the total contact hours assigned may be withdrawn in accordance with the attendance policy of York Technical College. See Attached Instructor's Individual Policy for more information.

Withdrawal from the Course

Student may withdraw from a course after the drop/add period until midterm with a grade of "W" (withdrawn). To withdraw from a course, the student should notify his/her instructor to initiate an electronic withdrawal. Students who withdraw after midterm may receive a "W" at the discretion of the instructor if performance has been satisfactory to the point of withdrawal. Otherwise, such withdrawals will receive a grade of "WF."

Student Conduct

Students are expected to conform to all standards of conduct as specified in the York Technical College Handbook and Catalog. Students found guilty of academic dishonesty such as cheating or plagiarism will be given a grade of zero and may be subject to further disciplinary action.

EVALUATION STRATEGIES/GRADING

Grades will be determined as described below:

Modules 1-5 (Competency check sheets, participation, and/or quizzes)	75% of course grade
Final Exam	25% of course grade

Grading Scale:

A	90-100
B	80-89
C	70-79
D	60-69
F	Below 60

A statement of your instructor's additional requirements and/or policy will be provided.

PREREQUISITES: EVT 254, CHM 101 or CHM 110.

CO-REQUISITE: CHM 105 or CHM 110

Disability statement: Any student who feels s/he may need an accommodation based on the impact of a disability should contact the Special Resources Office (SRO) at 803-327-8007 in the 300 area of Student Services. The SRO coordinates reasonable accommodations for students with documented disabilities.