Chemical Process Safety

ECH 4714, Class #11347, Section 4997
Class Periods: MWF, Period 8 (3:00 PM - 3:50 PM)
Location: LAR 330
Academic Term: Fall 2025

Instructor:
Name: VJ Tocco
Email Address: vjtocco@ufl.edu (preferred mode of contact)
Office Hours: TBD, but tentatively W 12-1 PM and R 1-2 PM. Please check the home page of Canvas to see final office hour times.
Office: Black Hall 322

Course Description
3 credit hours. Laboratory and process safety analysis which emphasizes prevention and mitigation. Application of chemical engineering principles to assessing hazards and risk. Integrated with ECH 4224L.

Course Pre-Requisites / Co-Requisites
Prerequisites: ECH 3101 (Process Thermodynamics), ECH 3203 (Fluid and Solid Operations) and ECH 3223 (Energy Transfer Operations)

Course Objectives
Upon completion of this course, a student should be able to:

1. Articulate the importance of Chemical Process Safety and a strong safety culture.
2. Locate information relevant to Chemical Process Safety.
3. Apply the correct theory/equations and perform calculations in the context of Chemical Process Safety.
4. Identify, analyze, and suggest mitigations for hazards associated with Chemical Processes.

Materials and Supply Fees
N/A

Relation to Program Outcomes (ABET):

Outcome	Coverage*
1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics	High
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors	Medium
3. An ability to communicate effectively with a range of audiences	
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts	High
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives	
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions	
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies	High

Required Textbooks and Software

- Title: Chemical Process Safety: Fundamentals with Applications

- Authors: Daniel A. Crowl and Joseph F. Louvar
- Prentice-Hall, Upper Saddle River, NJ, 2011, 4th edition (2019)
- ISBN-13: 9780134857848 (4th Ed)

We will also utilize the Chemical Reactivity Worksheet to identify incompatible chemicals. Version 4 of this software is available for free from AIChE:
https://www.aiche.org/ccps/resources/downloadinstall

Recommended Materials

As the course represents the synthesis of chemical engineering courses taken to date as applied to chemical process safety (e.g., material and energy balances, transport phenomena, fluid and solids operations, and thermodynamics), students are advised to refer to textbooks, notes and material covered in those classes as needed.

Course Schedule (tentative)

Week 1:	Laboratory safety, safety definitions, Chapter 1
Week 2:	Major accidents, toxicology, probit correlations, Chapters 1-2
Week 3-4:	Industrial hygiene, evaluation of exposure, ventilation calculations, Chapter 3
Week 4-5:	Source models, liquid flow, Chapter 4
Week 6:	Source models, flow of gases, flashing liquids, Chapter 4
Week 7:	Dispersion models, toxic effect criteria, Chapter 5
Week 8:	Fires and explosions, Chapter 6
Week 9:	Estimating blast damage, preventing fires, Chapters 6-7
Week 10:	Inerting, Chapter 7
Week 11:	Chemical reactivity hazards, Chapter 8
Week 12:	Relief and relief sizing, Chapters 9-10
Week 13:	Hazard identification, Chapter 11, Risk assessment, Chapter 12
Week 14:	Review/Catch-up

Attendance Policy, Class Expectations, and Make-Up Policy

Attendance will not be officially monitored or graded, but in-person attendance is expected, and some in-class activities may be evaluated for credit. If you are unable to attend class due to an illness, conflict, or emergency, you are expected to notify your instructor in advance.

Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies. Click here to read the university attendance policies:
https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/

In the case of an illness or excused absence during an exam, one comprehensive make-up exam will be offered at the end of the semester, provided that adequate proof/documentation is presented in writing. Make-up work for extended excused absences will be considered on a case-by-case basis in a manner that is fair for you and your classmates. Excused absences must be consistent with university policies in the undergraduate catalog and require appropriate documentation.

Evaluation of Grades

Assignment	Date (tentative)	Total Points	Percentage of Final Grade
Quiz 1	W, Sept 17	100	15%
Exam 1	W, Sept 24	100	15%
Quiz 2	W, Oct 15	100	15%
Exam 2	W, Oct 22	100	15%
Quiz 3	W, Nov 19	100	15%
Exam 3	W, Dec 3	100	15%
Homework/In Class Activities	Throughout	Variable	10%
			100%

Quizzes and Exams:
Quizzes and Exams will be given in-person during class time (time limit: 50 minutes).

Quizzes are closed-book, closed-note assessments which will focus on qualitative aspects of Chemical Process Safety (no calculators or other aids).

Exams are open-book, open-note assessments which will focus on quantitative aspects of Chemical Process Safety. During exams, you are permitted to use any model of scientific calculator except those with communication abilities. However, you may **not** reference any solutions to worked problems that were not performed by you.

Homework

Homework assignments will be due approximately every two weeks. They will include a mix of qualitative and quantitative aspects, and may also require completion of SAChE certificates. These modules may be accessed free of charge for student members of AIChE (full instructions/details will be provided in class).

Late Homework Submission
A penalty-free grace period of 24 hours beyond the posted deadline will be granted for homework assignments, provided that a reason is given as a comment on the assignment in Canvas. No other late work will be accepted, except for extenuating circumstances, which must be communicated and approved in writing in advance of the original deadline.

Grading Policy
Percentage scores map to the following letter grades:

Percent	Grade	Grade Points
93.4 - 100	A	4.00
90.0 - 93.3	A-	3.67
86.7 - 89.9	B+	3.33
83.4 - 86.6	B	3.00
80.0 - 83.3	B-	2.67
76.7 - 79.9	C+	2.33
73.4 - 76.6	C	2.00
70.0 - 73.3	C-	1.67
66.7 - 69.9	D+	1.33
63.4 - 66.6	D	1.00
60.0 - 63.3	D-	0.67
0 - 59.9	E	0.00

More information on UF grading policy may be found at:
https:/ / catalog.ufl.edu/ugrad/ current/regulations/info/grades.aspx

Academic Policies & Resources
To support consistent and accessible communication of university-wide student resources, instructors must include this link to academic policies and campus resources: https://go.ufl.edu/syllabuspolicies. Instructor-specific guidelines for courses must accommodate these policies.

Commitment to a Positive Learning Environment
The Herbert Wertheim College of Engineering values varied perspectives and lived experiences within our community and is committed to supporting the University's core values.

If you feel like your performance in class is being impacted, please contact your instructor or any of the following:
• Your academic advisor or Undergraduate Coordinator
• HWCOE Human Resources, 352-392-0904, student-support-hr@eng.ufl.edu
• Pam Dickrell, Associate Dean of Student Affairs, 352-392-2177, pld@ufl.edu