Brazosport College

Syllabus for PTAC 1308 - Safety, Health and Environment I

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I. COURSE DESCRIPTION:

PTAC 1308 - Safety, Health, and Environment I CIP 4103010003

Development of knowledge and skills to reinforce the attitudes and behaviors required for safe and environmentally sound work habits. Emphasis on safety, health, and environmental issues in the performance of all job tasks and regulatory compliance issues. Course topics will be reinforced through plant scenarios performed at the Process Equipment Trainer.

Credit Hours: 3 (3 lecture, 0 lab)

Chad Abney	Om Chawla
Ron Colwell	Gregg Curry
Mark Mehl	Kenneth Resecker
Ed Smolen	Mark Stoltenberg
Gary Hicks	Jeff Detrick

A. Required skill level: College-level reading and writing.

II. COURSE OBJECTIVES

The following course objectives are from the textbook and are aligned with the North American Process Technology Alliance (NAPTA)

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Topic Name	Objectives	
Course	1. Explain the necessity of occupational safety regulations.	
Overview	2. Discuss industrial accidents and other events in the process	
	industries that have affected safety, health, and the environment.	
	3. Describe governmental agencies and regulations that address	
	safety, health, and environmental issues:	
	 Occupational Safety and Health Administration (OSHA) 	
	 Environmental Protection Agency (EPA) 	
	 Department of Transportation (DOT) 	
	 Nuclear Regulatory Commission (NRC) 	
	Department of Homeland Security (DHS)	
	Maritime Security (MARSEC)	
	 Federal Emergency Management Agency (FEMA). 	
	4. Discuss how individuals can have an impact on safety, health, and	
	environmental issues.	
	5. Describe good safety habits and safe work practices:	
	 Follow all procedures. 	
	 Using proper personal protective equipment (PPE) 	
	 Attend training and use documentation. 	
	 Perform housekeeping and sanitation. 	
	Handle materials properly	
Types of	1. Identify the main types of hazards to health, environment, and	
Hazards and	safety.	
their Effects	2. Explain the various routes of entry that chemical and biological	
	hazards use to enter the human body.	
	, and the second	
	3. Describe the short-term and long-term effects that hazards can	
	have on an individual's health and safety	
	4. Describe the short tame and large tame offsets that because an	
	4. Describe the short-term and long-term effects that hazards can	
	have on the environment	

Recognizing Chemical Hazards	1. Identify the various chemical hazards (gases, liquids, and particulates) found in the process industries and discuss potential effects such chemicals have on safety, health and the environment.
	2. Identify specific categories of hazardous chemicals used in the process industries and describe the potential health and environmental hazards posed by each
	3. Explain the purpose and function of labeling systems found in local process industries.
	4. Explain the purpose and components of Safety Data Sheets (SDS).
	5. Describe the primary governmental regulations relating to chemical hazards (labeling, storage, etc.).
Topic Name	Objectives
Recognizing Biological Hazards	 Identify potential biological hazards in the process industries and discuss their potential effects on safety, health and the environment. Micro-organisms (such as viruses and bacteria) Arthropods (arachnids and insects) Poisonous snakes Plant allergens and toxins
	 Protein allergens from vertebrate animals Describe how blood borne pathogens can affect the human body. Describe governmental regulations and industry guidelines that address biological hazards.
Equipment and Energy Hazards	 Discuss the equipment and energy hazards posed by certain activities performed in the process industries. Working with moving or rotating equipment Working with equipment that is pressurized, has extreme
	 temperatures, or emits radiation Working with energized equipment (powered by electricity or other power source) Describe governmental regulations and industry guidelines that
	address equipment and energy hazards.
Fire and Explosion Hazards	 Point out specific physical hazards present in the process industries and explain the potential safety, health and environmental hazards: Fire
	Upper explosive limits (UEL)Lower explosive limits (LEL)
Fire and	Boiling Liquid Expanding Vapor explosion (BLEVE)Explosions

Explosion Hazards (cont.)	 Detonation Describe governmental regulations and industry guidelines that address fire and explosion hazards.
Topic Name	Objectives
Pressure, Temperature and Radiation Hazards	 Recognize specific physical hazards present in the process industries and explain the potential safety, health and environmental hazards posed by this equipment: Vacuum High pressure Compressed gases Pressure vessels (runaway reactions) Recognize the hazards of heat and temperature in the working environment. Explain the effects of ionizing and non-ionizing radiation. Describe governmental regulations and industry guidelines that address pressure, temperature, and radiation hazards.
Hazardous Atmosphere and Respiratory Hazards	 Describe the effect of hazardous atmospheres on respiration. Name specific hazards associated with hazardous atmospheres, ventilation, and other respiratory-related issues. Describe governmental regulations and industry guidelines that address hazardous atmospheres and respiration hazards.
Working Area and Height Hazards	 Name specific hazards associated with work areas, such as the following: Working surfaces Means of egress Heights Confined spaces Describe governmental regulations and industry guidelines that address working surfaces, means of egress, height and confined space hazards.
Noise and Hearing Hazards	 Identify noise levels and specific hazards associated with noise generated in a process industry environment. Describe how these variables can impact hearing: Length of exposure Volume of noise Describe governmental regulations and industry guidelines that address noise and hearing protection.

Construction,	Name specific hazards associated with construction and
Maintenance	maintenance tasks in a process industry environment.
and Tool	2. Describe how hand and power tools can be hazards.
Hazards	3. Describe governmental regulations and industry guidelines that
	address construction, maintenance, and tool hazards.
Topic Name	Objectives
Vehicle and	1. Name specific hazards associated with vehicles and transportation
Transportation	used in the process industry environment:
Hazards	 Forklifts
	Powered platforms
	• Cranes
	• Trucks
	• Trains
	Watercraft
	Pipeline
	Helicopters
	Personal vehicle
	Bicycles and carts
	2. Describe governmental regulations and industry guidelines that
	address vehicle and transportation hazards.
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Natural	1. Name specific hazards associated with natural disasters that could
Disasters and	impact the process industries:
Inclement	• Hurricanes
Weather	 Tornados
	Floods, lightning, hail, rainstorms
	Extreme temperatures
	Earthquakes
	2. Describe how emergency preparedness plans address natural
	disasters.

Topic Name	Objectives
Physical Security and Cybersecurity	1. Identify physical and cybersecurity vulnerabilities in the process industries: • Terrorist organizations and hostile nation-states • Insiders • Criminal elements. 2. Describe the nature of threats to physical security and cybersecurity: • Terrorist threats and acts • Workplace violence • Criminal acts • Industrial espionage. 3. Describe the activities involved with maintaining physical security in these areas: • Access and perimeter • Site security plan • Protecting access badges • Transportation workers' identification credentials (TWIC) operations • Communications • Personnel 4. Describe the tasks associated with protecting electronic information through sound cybersecurity practices, including the following: • Password protection • Malicious software or malware. 5. Describe the government regulations that address physical security and cybersecurity.
Recognizing Ergonomic Hazards	 Name certain activities performed in the process industries and discuss the potential ergonomic hazards posed by these activities: Lifting and handling materials Working at heights Working in confined spaces Using repetitive motions Demonstrate proper lifting techniques. Demonstrate proper ergonomics for repetitive motions. Describe governmental regulations and industry guidelines that address ergonomic hazards.

Topic Name	Objectives
Recognizing Environmental Hazards	 Identify specific categories of hazardous chemicals used in the process industries. Identify the various factors that can lead to leaks, spills, and releases. Describe the potential dangers of leaks, spills, and releases in the environment and the community. 1Explain the EPA regulations that impact the process industries.
Introduction to Hazard Controls	 Describe the three major types of hazard controls: Engineering Administrative Personal Protective Equipment (PPE) Discuss why, when and how these controls are applied.
Engineering Controls: Alarms and Indicator Systems	 Describe the role of alarms in providing a warning of conditions that can lead to emergencies, leaks, spills and releases, and discuss the dangers of improper responses or failures of alarms. Identify various engineering controls, specifically alarm and indication systems, used by the process industries to minimize and/or eliminate threats to health, safety, and the environment. Fire Alarms and Detection Systems Toxic Gas Alarms and Detection Systems Process Alarms (high level, high pressure, deviation, etc.) Redundant Alarm and Shutdown Devices Automatic Shutdown Devices Interlocks Discuss actions required by process technicians when alarms occur.
Engineering Controls: Process Containment and Process Upset Controls	 Recognize various engineering controls, specifically process containment, and control systems, used by the process industries to minimize and/or eliminate threats to health, safety, and the environment. Describe various engineering controls, specifically process upset control systems, used by the process industries to minimize and/or eliminate threats to health, safety, and the environment. 19.3 List common process fluids used in the process industries and describe

Topic Name	Objectives
Administrative Controls: Programs and Practices	 Describe and discuss various administrative controls, used by the process industries, to eliminate and/or minimize threats to safety, health, and environment including housekeeping and permits in auditing. 20.2 Produce a site safety inspection and/or audit to identify potential workplace hazards. 20.3 Complete a safe work observation and provide feedback to coworkers on safe and potentially unsafe work practices. 20.4 Discuss the impact of government regulations and industry organization guidelines.
Permitting Systems	 Describe the function and purpose of permitting systems found in local plants. 21.2 Use locks, tags, and blinds to isolate a piece of equipment. 21.3 Complete a job safety analysis and complete a safe work permit to ensure the work environment is safe prior to beginning a job. 21.4 Describe government regulations and industry guidelines that address permitting.
Topic Name	Objectives
Personal Protective Equipment and First Aid	 Describe basic first aid procedures and responses. Discuss the selection, function, and proper use of Personal Protective Equipment (PPE) in the process industries: Respiratory protection Eye protection Hearing protection Head protection Hand protection Foot protection Skin protection Obscribe the levels of protection PPE. Describe governmental regulations and industry guidelines that address medical and first aid responses and PPE:

Topic Name	Objectives
Monitoring Equipment	 Explain the function and purpose of testing equipment found in local plants: LEL/O₂ meters Gas detection equipment Personal monitoring devices (exposure, radiation, noise) Detector tubes Describe industry guidelines and governmental regulations that address usage and permitting of monitoring equipment.
Fire, Rescue, and Emergency Response	 24.1 Explain the function and purpose of fire, rescue, and emergency response equipment typically found in the process industries: Emergency Response Fires (different types) Spills Rescue / retrieval Escape Chemical exposure Gas release Demonstrate the proper selection and use of fire and rescue equipment. 24.3 Demonstrate the correct use of chemical and gas exposure equipment.

III. STUDENT LEARNING OUTCOMES

OUTCOME	METHOD OF ASSESSMENT
Describe the components of a typical plant safety	These outcomes will be assessed by the score
and environmental program and the role of a	on the course exams (one exam per 6
process technician in relation to safety, health,	chapters) and, also the final exam
and the environment; identify the functionality of	
safety, health, and environmental equipment	
used.	
Recognize and identify the various types of	These outcomes will be assessed by the score
Safety, Health and Environmental hazards in a	on the course exams (one exam per 6
plant environment and discuss the consequences	chapters) and, also the final exam
of these hazards.	
Demonstrate knowledge of the various types of	These outcomes will be assessed by the score
hazard controls (administrative, engineering,	on the course exams (one exam per 6
personal protective equipment) and discuss	chapters) and, also the final exam
methods of applying these controls.	

OUTCOME	METHOD OF ASSESSMENT
Identify the fourteen elements of PSM (Process	These outcomes will be assessed by the score
Safety Management) and discuss how they work	on the course exams (one exam per 6
together for the safety of plant personnel.	chapters) and, also the final exam
Discuss how to respond to various types of	These outcomes will be assessed by the score
emergencies (fires, spills, vapor releases, natural	on the course exams (one exam per 6
disasters, etc.).	chapters) and, also the final exam
Discuss the vulnerabilities, risks and threats	These outcomes will be assessed by the score
associated with the process industries (terroristic,	on the course exams (one exam per 6
cybersecurity, workplace violence, suspicious	chapters) and, also the final exam
activities, etc.).	

IV. TEXTBOOK OR COURSE MATERIAL INFORMATION

A. Textbook

1. Safety Health & Environment, NAPTA, 2nd Edition, Pearson Publisher, 2020. ISBN: 978-0-13-557249-8 (required)

Required course materials are available at the Brazosport College bookstore, on campus or online at http://brazosport.edu/bookstore/home.html. Students are not under any obligation to purchase a textbook from the college bookstore. The same textbook is/may also be available from an independent retailer, including an online retailer.

For Distance Education Courses include the following: Contact the Brazosport College Bookstore with a credit card for course materials. Phone: 979-230-3651. Fax: 979-230-3653. Email:bookstore@brazosport.edu. Website: http://brazosport.edu/bookstore/home.html

Safety, Health & Environment I is one of the core courses in the Process Technology Degree. The two-year program has been created to train students for careers as Process Technicians in the chemical and refining process industries. This course is a foundation for all of the other courses in the PTAC program.

Safety, Health & Environment I provides a general overview of the various types of plant hazards, safety and environmental systems and equipment, and regulations under which plants are governed.

B. Course Outline

This is a sample outline which may vary with individual instructors. It will also vary on whether the course is a summer course or a fall/spring course. Students should contact their instructor of the outline of the course they are taking.

WEEK#	TOPIC
1	Course Overview
2	Hazard Types and Their Effects
	Recognizing Chemical Hazards

3	Recognizing Biological Hazards		
	Equipment and Energy Hazards		
4	Fire and Explosion Hazards		
5	Pressure, Temperature, and Radiation Hazards		
	Hazardous Atmospheres and Respiratory Hazards		
6	Working Area and Height Hazards		
	Hearing and Noise Hazards		
7	Construction, Maintenance, and Tool Hazards		
	Vehicle and Transportation Hazards		
8	Natural Disasters and Inclement Weather		
	Physical Security and Cyber Security		
9	Recognizing Ergonomic Hazards		
	Recognizing Environmental Hazards		
10	Introduction to Hazard Controls		
11	Engineering Controls: Alarms and Indicator Systems		
	Engineering Controls: Process Containment and Process Upset Controls		
12	Administrative Controls: Programs and Practices		
	Permitting Systems		
13	Center for the Advancement of Process Technology 4/9/2007 4		
14	Personal Protective Equipment and First Aid		
	Monitoring Equipment		
15	Fire, Rescue, and Emergency Response Equipment		

Important Semester Dates:

Last Day to Withdraw from Classes—Check BC Academic Calendar at http://catalog.brazosport.edu/index.php

C. Virtual Campus/D2L: (for Online and Hybrid courses only)

Knowing how to use Virtual Campus is an <u>absolute must</u> to succeed in this course. Locations of technical support information on the Virtual Campus are on the school website, the Virtual Campus login page, on the My Home page, and Course Home areas of each online course.

These areas contain links to:

- technical support
- manuals & videos
- orientation to online courses
- distance learning website

Here is one of several links you can use to review and learn how to use Virtual Campus: http://brazosport.edu/DL

D. Check "Contents" in D2L to keep up with weekly assignments starting your first week.

- E. Deadlines are not flexible. There are only negotiable due to emergencies/event out of your control, and with written excuse from employer, doctor, etc.
 - Students must use D2L to keep up with announcements, assignments, etc.
 - I'd highly recommend forwarding your D2L email to whatever email account you check regularly. This way, you won't miss communications from me in a timely manner.
 - Several elements of D2L may be used including Dropbox, Discussions, Contents, Quizzes and more.
 - The assignments and quizzes should all appear in "Contents". Contents is a <u>key area</u> for you to check.

F. Check Your Knowledge (CYK) End of Chapter Weekly Homework

Is due every Sunday night by 11:59 p.m. The link to submit homework can be found in "Content" (see top menu bar) and the associated week folder. Submit this in Dropbox in a Word document (created and saved on your PC or flashdrive) with title as Week 1 HW.doc (Note: include <u>all</u> chapters for that week's assignment in <u>one</u> document. Please type questions and answers and <u>make sure numbering matches textbook and a separate line for each question answer)..</u>

See the HW format example document at top of "Content" section for a guideline to format your HW. Points will be deducted if homework not submitted in ONE weekly document. Points also deducted for not typing questions AND answers and for any missed answers. Homework will be graded within 5 days of submission.

- **G. Weekly Chapter Quizzes** are also due weekly per schedule and can be accessed by Content tab <u>or</u> Assessment/Quizzes (see top menu bar). You can take these ahead of time if desired. Each quiz can be taken only once and is timed. They are due every week on Sunday no later than 11:59 p.m. Quizzes are automatically graded in D2L. You can review scores upon submission or in Assessment/Grades section of D2L.
- **H. Major Exams** are assigned per schedule in Contents and have a start and end date allowed. These can only be taken using Respondus Browser. *You must download this software onto your home computer* so I would advise doing this right away in case you need to get the Help Desk involved. I have provided a practice Respondus exam to ensure you get the system working <u>before</u> the first major exam is due.

The other option is to take the exam at Learning Services on campus (these must be scheduled and I must be notified AHEAD of time). For information on Respondus, try this link:

http://brazosport.edu/students/for-students/bc-online/respondus-lockdown-browser/

Exams are automatically graded in D2L. You can review scores upon submission or in Assessment/Grades section of D2L.

- I. Final Exam is required to be proctored by Learning Services. Their appointment spots are limited, so you will need to not delay in scheduling once I communicate the Final date.
- **J. Misc.:** The schedule will vary from semester to semester. In summer sessions the schedule will be adjusted to have more contact hours per week to accommodate the shorter semester.

K. Communications with Instructor

- Please send any emails to me through D2L or at @brazosport.edu The Brazosport policy is for students nor faculty to communicate via personal email or texting unless urgent/emergency.
- Make sure and identify which course and section you are in because I instruct more than one course/section and need this information to locate your information online
- I would highly recommend forwarding your D2L emails to an email account that you check regularly. Instructions for this are on D2L along with other useful resource.
- I would also recommend using the D2L notifications feature to remind you of upcoming assignments and other available topics.

V. STUDENTS WITH DISABILITIES

Brazosport College is committed to providing equal education opportunities to every student. BC offers services for individuals with special needs and capabilities including counseling, tutoring, equipment, and software to assist students with special needs. For student to receive any accommodation, documentation must be completed in the Office of Disability Services. Please contact Phil Robertson, Special Populations Counselor at 979-230-3236 for further information.

VI. TITLE IX STATEMENT

Brazosport College faculty and staff are committed to supporting students and upholding the College District's non-discrimination policy. Under Title IX and Brazosport College's policy FFDA (Local), discrimination based on sex, gender, sexual orientation, gender identity, and gender expression is prohibited. If you experience an incident of discrimination, we encourage you to report it. While you may talk to a faculty or staff member at BC, please understand that they are "Responsible Employees" and must report what you tell them to college officials. You can also contact the Title IX Coordinators directly by using the contact information below. Additional information is found on the Sexual Misconduct webpage at www.brazosport.edu/sexualmisconduct.

VII. ACADEMIC HONESTY

Brazosport College assumes that students eligible to perform on the college level are familiar with the ordinary rules governing proper conduct including academic honesty. The principle of academic honesty is that all work presented by you is yours alone. Academic dishonesty including, but not limited to, cheating, plagiarism, and collusion shall be treated appropriately.

Academic dishonesty violates both the policies of this course and the Student Code of Conduct. In this class, any occurrence of academic dishonesty will be referred to the Dean of Student Services for prompt adjudication, and may, at a minimum, result in F, in this course. Sanctions may be imposed beyond your grade in this course by the Dean of Student Services. Please refer to the Brazosport College Student Guide for more information. This is available online at http://brazosport.edu/students/for-students/student-services/.

VIII. ATTENDANCE AND WITHDRAWAL POLICIES

Class attendance contributes to your final grade, but you must attend class to successfully complete the course. If you are unable to complete this course, you must complete and submit a withdrawal form with the registrar's office. If the student decides to drop out of the class, it is the responsibility of the student to initiate a withdrawal before the withdrawal deadline in order to get a "W" on their transcript. If this is not done the student will receive a grade based on test grades and class grades earned during their attendance and absence (i.e., zeros on all missed materials, exams, skills tests, and final exam).

IX. COURSE REQUIREMENTS AND GRADING POLICY TESTING MAKE-UP POLICY

The final grade will be based on the following:

A. Grading:

Attendance/class participation	20% - 30%
Exams/Quizzes/Class exercises	20% - 40%
Homework	0% - 15%
Final	20% - 35%
Written Report	0% - 25%

Grades are assigned as follows:

Grade	Final Average
A	90-100
В	80-89
С	70-79
D	60-69
F	Below 60

X. STUDENT CONDUCT STATEMENT

Students are expected to be aware of and follow the Brazosport College Student Code of Conduct. Students have violated the Code if they "fail to comply with any lawful directions, verbal or written, of any official at BC." Lawful directions include precautions and requirements taken to prevent the spread of COVID-19 at Brazosport College. Students who do not follow safety requirements, including the wearing of a mask, may be removed from class by their instructor and referred to the Dean of Student Services.

XI. CAMPUS CLOSURE STATEMENT

Brazosport College is committed to the health and safety of all students, staff, and faculty and adheres to all federal and state guidelines. The College intends to stay open for the duration of the semester and provide access to classes and support services on campus in the safest way possible. The College will also comply with lawful orders given by applicable authorities, including the Governor of Texas, up to and including campus closure. It is possible that on campus activities may be moved online and/or postpone if such orders are given.

XIV. STUDENT RESPONSIBILITIES

Students are expected to fully participate in this course. The following criteria are intended to assist you in being successful in this course:

- 1. Understand the syllabus requirements
- 2. Use appropriate time management skills
- 3. Communicate with the instructor
- 4. Complete course work on time, and
- 5. Utilize online components (such as Desire2Learn) as required.

a. Class attendance

Much of the learning occurs in the classroom setting and cannot be made up by reading the textbook. Therefore, class participation is essential to your learning and attendance is taken.

b. Homework

As a standing homework assignment, students should review the scheduled sections of the textbook before coming to class and prepare questions for class discussion. Students should again review the scheduled section following the class (review forward, read, review back)

c. Class participation

Participation grade is based on the quality (not frequency) of your contribution. Those receiving high grades in class participation will be those who:

Are prepared for class

Arrive for class on time

Have excellent attendance

Make comments and ask questions that significantly contribute to the learning environment of the class

Participate in class activities and demonstrations.

d. Attention in class

Unless allowed by the instructor, the use of cell phones, classroom or personal computers, or other electronic communication is not permitted. Personal conversations and other distractions are not permitted, and may result in disciplinary action, including a reduction in class grade. Students who take notes on electronic media, or who have an urgent need to remain in contact, should discuss their situations with the instructor.

XV. OTHER STUDENT SERVICES INFORMATION

Information about the Library is available at http://brazosport.edu/students/for-students/places-services/library/about-the-library or by calling 979-230-3310.

For assistance with online courses, an open computer lab, online and make-up testing, audio/visual services, and study skills, visit Learning Services next to the Library, call 979-230-3253, or visit: http://brazosport.edu/students/for-students/for-students/places-services/.

For drop-in math tutoring, the writing center, supplemental instruction and other tutoring including e-tutoring, visit the Student Success Center, call 979-230-3527, or visit http://brazosport.edu/students/for-students/student-success-center/math-center/.

To contact the Physical Sciences and Process Technologies Department call 979-230-3618.

The Student Services provides assistance in the following:

Counseling and Advising 979-230-3040 Financial Aid 979-230-3294 Student Life 979-230-3355

To reach the Information Technology Department for computer, email, or other technical assistance call the Helpdesk at 979-230-3266.



Get the information you need – when you need it. Click http://geni.us/BRAZO to install **BC Connect** on your mobile device to receive reminders, explore careers, map your educational plan, be in the know about events, find out about scholarships, achieve your goals and much more.