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)

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)

Topic Name	Objectives
Course Overview	1. Explain the necessity of occupational safety regulations. 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 Hazards and their Effects	1. Identify the main types of hazards to health, environment, and safety. 2. Explain the various routes of entry that chemical and biological hazards use to enter the human body. 3. Describe the short-term and long-term effects that hazards can have on an individual's health and safety 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	1. 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 2. Describe how blood borne pathogens can affect the human body. 3. Describe governmental regulations and industry guidelines that address biological hazards.
Equipment and Energy Hazards	1. 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) 2. Describe governmental regulations and industry guidelines that address equipment and energy hazards.
Fire and Explosion Hazards Fire and	1. 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) • Boiling Liquid Expanding Vapor explosion (BLEVE) • Explosions

Explosion Hazards (cont.)	• Detonation 2. Describe governmental regulations and industry guidelines that address fire and explosion hazards.
Topic Name	Objectives
Pressure, Temperature and Radiation Hazards	1. 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) 2. Recognize the hazards of heat and temperature in the working environment. 3. Explain the effects of ionizing and non-ionizing radiation. 4. Describe governmental regulations and industry guidelines that address pressure, temperature, and radiation hazards.
Hazardous Atmosphere and Respiratory Hazards	1. Describe the effect of hazardous atmospheres on respiration. 2. Name specific hazards associated with hazardous atmospheres, ventilation, and other respiratory-related issues. 3. Describe governmental regulations and industry guidelines that address hazardous atmospheres and respiration hazards.
Working Area and Height Hazards	1. Name specific hazards associated with work areas, such as the following: • Working surfaces • Means of egress • Heights • Confined spaces 2. Describe governmental regulations and industry guidelines that address working surfaces, means of egress, height and confined space hazards.
Noise and Hearing Hazards	1. Identify noise levels and specific hazards associated with noise generated in a process industry environment. 2. Describe how these variables can impact hearing: • Length of exposure • Volume of noise 3. Describe governmental regulations and industry guidelines that address noise and hearing protection.

Construction, Maintenance and Tool Hazards	1. Name specific hazards associated with construction and maintenance tasks in a process industry environment. 2. Describe how hand and power tools can be hazards. 3. Describe governmental regulations and industry guidelines that address construction, maintenance, and tool hazards.
Topic Name	Objectives
Vehicle and Transportation Hazards	1. Name specific hazards associated with vehicles and transportation used in the process industry environment: • 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.
Natural Disasters and Inclement Weather	1. Name specific hazards associated with natural disasters that could impact the process industries: • Hurricanes • 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	1. 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 2. Demonstrate proper lifting techniques. 3. Demonstrate proper ergonomics for repetitive motions. 4. Describe governmental regulations and industry guidelines that address ergonomic hazards.

Topic Name	Objectives
Recognizing Environmental Hazards	1. Identify specific categories of hazardous chemicals used in the process industries. 2. Identify the various factors that can lead to leaks, spills, and releases. 3. Describe the potential dangers of leaks, spills, and releases in the environment and the community. 4. 1Explain the EPA regulations that impact the process industries.
Introduction to Hazard Controls	1. Describe the three major types of hazard controls: • Engineering • Administrative • Personal Protective Equipment (PPE) 2. Discuss why, when and how these controls are applied.
Engineering Controls: Alarms and Indicator Systems	1. 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. 2. 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 3. Discuss actions required by process technicians when alarms occur.
Engineering Controls: Process Containment and Process Upset Controls	1. 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. 2. 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. 3. List common process fluids used in the process industries and describe

Topic Name	Objectives
Administrative Controls: Programs and Practices	1. 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. 2. Produce a site safety inspection and/or audit to identify potential workplace hazards. 3. Complete a safe work observation and provide feedback to coworkers on safe and potentially unsafe work practices. 4. Discuss the impact of government regulations and industry organization guidelines.
Permitting Systems	1. Describe the function and purpose of permitting systems found in local plants. 2. Use locks, tags, and blinds to isolate a piece of equipment. 3. Complete a job safety analysis and complete a safe work permit to ensure the work environment is safe prior to beginning a job. 4. Describe government regulations and industry guidelines that address permitting.
Topic Name	Objectives
Personal Protective Equipment and First Aid	1. Describe basic first aid procedures and responses. 2. 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 3. Describe the levels of protection PPE. 4. Describe governmental regulations and industry guidelines that address medical and first aid responses and PPE: • OSHA 1910 Subpart K: Medical and First Aid • OSHA 1910.132 Personal Protective Equipment (PPE) • OSHA 1910.133 PPE: Eye and Face Protection • OSHA 1910.134 PPE: Respiratory Protection • OSHA 1910.138 PPE: Hand Protection

Topic Name	Objectives
Monitoring Equipment	1. Explain the function and purpose of testing equipment found in local plants: • LEL/O_2 meters • Gas detection equipment • Personal monitoring devices (exposure, radiation, noise) • Detector tubes 2. Describe industry guidelines and governmental regulations that address usage and permitting of monitoring equipment.
Fire, Rescue, and Emergency Response	1. Explain the function and purpose of fire, rescue, and emergency response equipment typically found in the process industries: a. Emergency Response b. Fires (different types) c. Spills d. Rescue / retrieval e. Escape f. Chemical exposure g. Gas release 2. Demonstrate the proper selection and use of fire and rescue equipment. 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 and environmental program and the role of a process technician in relation to safety, health, and the environment; identify the functionality of safety, health, and environmental equipment used.	These outcomes will be assessed by the score on the course exams (one exam per 6 chapters) and, also the final exam
Recognize and identify the various types of Safety, Health and Environmental hazards in a plant environment and discuss the consequences of these hazards.	These outcomes will be assessed by the score on the course exams (one exam per 6 chapters) and, also the final exam
Demonstrate knowledge of the various types of hazard controls (administrative, engineering, personal protective equipment) and discuss methods of applying these controls.	These outcomes will be assessed by the score on the course exams (one exam per 6 chapters) and, also the final exam
OUTCOME	**METHOD OF ASSESSMENT**
Identify the fourteen elements of PSM (Process Safety Management) and discuss how they work together for the safety of plant personnel.	These outcomes will be assessed by the score on the course exams (one exam per 6 chapters) and, also the final exam
Discuss how to respond to various types of emergencies (fires, spills, vapor releases, natural disasters, etc.).	These outcomes will be assessed by the score on the course exams (one exam per 6 chapters) and, also the final exam
Discuss the vulnerabilities, risks and threats associated with the process industries (terroristic, cybersecurity, workplace violence, suspicious activities, etc.).	These outcomes will be assessed by the score on the course exams (one exam per 6 chapters) and, also the final exam

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

Multiple sections of the same course may be available. Each section's outline is presented separately. In the event of college closure or other factors, this schedule may change. A new schedule will be posted online under the Contents section in D2L. This course is a "Hybrid" course sessions will be on campus, virtual, or independent study. All exams will be on campus and students should plan accordingly.

1. Course overview
2. Hazard types and their effects
3. Recognizing Chemical hazards
4. Recognizing Biological hazards
5. Equipment and Energy hazards
6. Fire and explosion hazards
7. Pressure, Temperature, and Radiation Hazards
8. Hazardous Atmospheres and Respiratory Hazards
9. Working Area and Height Hazards
10. Hearing and Noise Hazards
11. Construction, Maintenance, and Tool Hazards
12. Vehicle and Transportation Hazards
13. Natural Disasters and Inclement Weather
14. Physical Security and Cyber Security
15. Recognizing Ergonomic Hazards
16. Recognizing Environmental Hazards
17. Introduction to Hazard Controls
18. Engineering Controls: Alarms and Indicator Systems
19. Engineering Controls: Process Containment and Process Upset Controls
20. Administrative Controls: Programs and Practices
21. Permitting Systems
    21.1. LOTO exercise
22.
23. Personal Protective Equipment and First Aid
24. Monitoring Equipment
25. 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

Office Hours:

Danny Randolph's office hours: M-R 8:30-12:00, + other times by appointment
For fulltime faculty, office hours may change from semester to semester. Current faculty office hours are included on the syllabus, see link: https://brazosport.edu/faculty-and-staff/resources/course-syllabi-instructor-information/

For an adjunct faculty, no office hours are required, and they are not assigned an office. To set up an appointment with an adjunct, contact the instructor as per the email address on the syllabus, see link: https://brazosport.edu/faculty-and-staff/resources/course-syllabi-instructor-information/

C. Virtual Campus/D2L: (for Online and Hybrid courses only)
Knowing how to use Virtual Campus is an absolute must 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 assignments.

E. Deadlines are not flexible. Overdue assignments may be accepted with a 20% penalty if completed within one week of the due date with the approval of the instructor.

- Students must use D2L to keep up with announcements, assignments, etc.
- 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 key area for you to check.

F. End of Chapter Weekly Homework/Quizzes
Homework/quizzes are due by midnight Sunday night at 11:59 PM before the next classes starts on Monday.

G. Chapter/Quizzes
These can be taken ahead of time if desired. Each quiz can be taken only once and is timed. They are due by midnight Sunday night at 11:59 PM before the next classes starts

on Monday. Most quizzes are automatically graded in D2L (some of the quizzes have written responses that must be graded by the instructor. You can review scores upon submission or in Assessment/Grades section of D2L.

H. Major Exams are assigned according to the schedule in Contents and have a start and end date allowed. These quizzes will be scheduled to be taken in the computer lab, using the school's computers, during class time, and proctored.

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

I. Final Exam is included in the schedule and will be completed in the computer lab with the same criteria as the chapter exams.

J. Communications with Instructor

- Please send any emails to me through D2L or at danny.randolph@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 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.

Alex Crouse, Director of Student Life and Title IX Coordinator
979-230-3355; alex.crouse@brazosport.edu

Mareille Rolon, HR Coordinator and Deputy Title IX Coordinator
979-230-3303; mareille.rolon@brazosport.edu

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%
Exams (15% each)	45%
Homework/Quizzes	15%
Final	20%

Grades are assigned as follows:

Grade	Final Average
A	90-100
B	80-89
C	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.

XII. 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.

XIII. 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/places-services/learning-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.