

EDMG240

STUDENT WARNING: This course syllabus is from a previous semester archive and serves only as a preparatory reference. Please use this syllabus as a reference only until the professor opens the classroom and you have access to the updated course syllabus. Please do NOT purchase any books or start any work based on this syllabus; this syllabus may NOT be the one that your individual instructor uses for a course that has not yet started. If you need to verify course textbooks, please refer to the online course description through your student portal. This syllabus is proprietary material of APUS.

Course Summary

Course : EDMG240 **Title :** Chemistry of Hazardous Materials

Length of Course : 8

Prerequisites : N/A **Credit Hours :** 3

Description

Course Description: This course gives the student an in-depth study of the chemistry of hazardous materials as emergency management personnel must deal with these types of materials. The course covers a great amount of material on the chemistry and physical properties of common materials that an emergency responder will commonly find in the course of responding to emergencies. It is important for emergency responders to have this knowledge for the safety of them and others. This course presents the chemical basis for classification of, and emergency response to incidents involving, hazardous materials. It is designed for the non-chemist emergency responder, transporters and others who need to understand the implications of single product and multiple product spills, releases and incidents.

Course Scope:

EDMG 240 gives emergency management personnel a depth of knowledge about the chemistry of hazardous materials. It is not to make chemists out of the students. The course covers a great amount of material on the chemistry and physical properties of common materials an emergency responder will commonly find in the course of responding to emergencies. It is important for emergency responders to have this knowledge because even though a chemical might say that it is relatively non-hazardous, if it reacts with another chemical, for instance even water; the chemical can now become extremely hazardous. Take for example the Pepcon explosion in Henderson, NV, in this event even the plant owners had the understanding that ammonium chlorate was only an oxidizers and could not detonate without a fuel source. This understanding was incorrect, as was evident by the explosion.

Objectives

CO-1 Assess the basics of chemistry

CO-2 Identify major chemical families and individual chemicals

CO-3 Explain explosives, compressed gases, flammable materials, poisons, toxic materials, and radiation.

CO-4 Explain acids and bases

CO-5 Interpret the information on a safety data sheet

CO-6 Predict the hazards/reactivity of a chemical based on chemical family

Outline

Week 1:

Topic

Introduction

Basic Chemistry

Inorganic Compounds

Learning Objectives

Introduction to chemistry specifically the elements, atomic structure, common trends in the periodic table, general characteristics of the elements, as well as some chemical and physical aspects of chemical compounds. Inorganic chemistry as discussed from the naming point of view, identifying the hazards in each inorganic chemical class. **CO-1, CO-2**

Readings

Text Readings: Chapter 1. pages 1-22

Chapter 2. pages 25-32; and 110-132

Supplemental Reading: See electronic references listed under Resources and in the Lessons section of the classroom

Assignment

Week 1: Forum

Week 1: Worksheet 1

Week 2:

Topic

Explosives

Compressed Gases

Hydrocarbons

Learning Objectives

Introduction to some basic terms of explosives such as mechanical (or physical) and chemical explosives. Understand the hazards of compressed gases. Explore flammable compressed gases with BLEVE incidents. Identify the behavior and nomenclature of organic chemicals, specifically hydrocarbons. **CO-2, CO-3**

Readings

Text Readings:

Chapter 3. pages 135-176

Chapter 4.

pages 177-227

Supplemental Reading: See electronic references listed under Resources and in the Lessons section of the classroom

Assignment

Week 2: Forum

Week 2: Worksheet 2

Week 3:

Topic

Flammable Materials

Organic Compounds that contain oxygen

Learning Objectives

Explore some of the physical properties that influence flammable liquid vapors, such as boiling points and vapor pressure. Continue our understanding of hydrocarbons specifically those hydrocarbons that contain oxygen. Review at some categories of flammable solids to include spontaneous combustion and dangerous when wet. **CO-2, CO-3**

Readings

Text Readings:

Chapter 5.

pages 229-299

Chapter 6.

pages 301-322

Supplemental Reading: See electronic references listed under Resources and in the Lessons section of the classroom

Assignment

Week 3: Forum

Week 3:

Worksheet 3

Week 4:

Topic

Oxidizers

Poisons

Organic Compounds that contain nitrogen

CWA

Learning Objectives

Learn about oxidation and oxidizers, including halogens, oxysalts, inorganic and organic peroxides and acids. Explore organic compounds that contain nitrogen; and compounds that contain phosphorous, specifically chemical warfare agents. **CO-2, CO-3**

Readings

Text Readings:

Chapter 7.

pages 323-343

Chapter 8.

pages 345-394 (stop at Infectious Substances)

Supplemental Reading: See electronic references listed under Resources and in the Lessons section of the classroom

Assignment

Week 4: Forum

Week 4:

Worksheet 4

Week 5:

Topic

Poisons

Radiation

Learning Objectives

Review biological agents, their routes of exposure and onset of symptoms. Understanding different types of ionization radiation, the difference between contamination and radiation, and units of measure. **CO-2, CO-3**

Readings

Text Readings:

Chapter 8.

pages 394-415

Chapter 9.

pages 417-434

Supplemental Reading: See electronic references listed under Resources and in the Lessons section of the classroom

Assignment

Week 5: Forum

Week 5:

Worksheet 5

Mid-Term Exam (Exam 1)

Week 6:

Topic

Corrosives

Caustics

pH

Learning Objectives

Defining an acid and a base, understanding the pH scale and review inorganic and organic acids. **CO-2, CO-4**

Readings

Text Readings:

Chapter 10.

pages 435-451

Supplemental Reading:

See electronic references listed under Resources and in the Lessons section of the classroom

Assignment

Week 6: Forum

Week 6:

Worksheet 6

Week 7:

Topic

Miscellaneous Hazardous Materials

Incompatible Materials

Learning Objectives

Defining chemicals that don't fit neatly into any DOT class. Predicting incompatible materials based on chemical family. **CO-2, CO-5, CO-6**

Readings

Text Readings:

Chapter 11.

pages 453-460

Chapter 11.

pages 461-476

Supplemental Reading:

See electronic references listed under Resources and in the Lessons section of the classroom

Assignment

Week 7: Forum

Week 7:

Homework

Assignment

Week 8:

Topic

Course Wrap Up, Research Paper and Final Exam

Learning Objectives

Demonstrate your knowledge by submitting an 8-12 page research paper. Assess your knowledge of the Week 1 through 8 learning objectives by taking an online Final Exam **CO-1 through CO-6**

Readings

Assignment

Week 8: Forum

Week 8:

Research Project

Final Exam

(Exam 2)

Evaluation

Each week begins on Monday and ends on Sunday. All posted times are **Eastern Standard Time.**

Reading Assignments:

Each week the student will read one chapter in the course textbook found within the weekly Lesson.

Supplemental Readings:

There are supplemental PowerPoints within the weekly Lesson and Resources.

Forum Assignments:

Forum participation is mandatory and will count towards the course grade. You are expected to provide a substantial comment of several well-written paragraphs in each session and a similar comment or reflection in reply to at least two other students' contribution. Statements such as "I agree" or "good post" will not count as a reply. You will be marked down for this type of response. The initial postings are due by midnight (EST) Friday of the week. The replies are due by midnight (EST) Sunday of the week.

Homework Assignments:

There are weekly assignments that will vary in format. These assignments are crafted to provide the student with challenging applications of information while testing the student's learning that week. Each assignment must be completed on time for full credit. Late assignments will be accepted at the discretion of the instructor. Weekly assignments should be uploaded in the assignment area, unless otherwise instructed. Be sure to cite your references correctly. Homework assignments are due by midnight (EST) Sunday of the week.

Exams/Quizzes:

Exams are on-line & open-book.

Final Project:

By the end of Week 4 you will need to decide on your topic for your research paper.

The paper will focus on an actual accident involving a hazardous material or chemical(s), chemical plant, or explosion in a manufacturing plant. The research paper will require students to submit 10-12 double-spaced, typed pages complete with title page and reference page. APA format will be used. It is important that you use good research paper construction techniques and cite your references throughout your paper.

Grading:

Name	Grade %
Exams	20.00 %
Exam I (mid-term exam)	10.00 %
Exam II (Final Exam)	10.00 %
Week 8 Assignment: Research Paper	20.00 %
Week 8: Research Paper	20.00 %
Weekly Assignments	30.00 %
Week4: Worksheet #4	4.29 %
Week3: Worksheet #3	4.29 %
Week1: Worksheet #1	4.29 %
Week2: Worksheet #2	4.29 %
Week5: Worksheet #5	4.29 %
Week 6: Tanker Truck	4.29 %
Week 7: Two Detectors per Chemical	4.29 %
Forums	30.00 %
Introductory Forum	3.33 %
Week 1 Forum	3.33 %
Week 2 Forum	3.33 %

Week 3 Forum	3.33 %
Week 4 Forum	3.33 %
Week 5 Forum	3.33 %
Week 6 Forum	3.33 %
Week 7 Forum	3.33 %
Week 8 Forum	3.33 %

Materials

Book Title: Hazardous Materials Chemistry for Emergency Responders, 3rd Ed - Ebook available in the APUS Online Library

Author: Burke, Robert

Publication Info: Taylor & Francis Group

ISBN: 9781439849859

Book Title: To find the library e-book(s) req'd for your course, please visit <http://apus.libguides.com/er.php> to locate the eReserve by course #. You must be logged in to eCampus first to access the links.

Author: N/A

Publication Info: N/A

ISBN: N/A

Required Readings

Hazardous Material Chemistry for Emergency Responders by Robert A. Burke published by CRC Press, 3rd Edition

Additional Resources

Additional Resources can be found within the course Resources.

Web Sites

In addition to the required course texts, the following public domain web sites are useful. Please abide by the university's academic honesty policy when using Internet sources as well. Note web site addresses are subject to change.

Site Name	Web Site URL/Address
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Cameo Chemicals	http://cameochemicals.noaa.gov/
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AMU Math and Chemistry Videos	http://www.apus.edu/media/mathwv/index.htm
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Center for
Disease
Control <http://www.cdc.gov/>

Global
Incident Map <http://www.globalincidentmap.com/map.php>

Course Guidelines

This course requires a time management plan and the self-discipline to follow it. You are responsible for managing your time, completing assignments on time, completing the readings, and making inquiries as needed to complete the course effectively. This is an 8-week course, which means the material must be learned in a short period of time. This requires dedication and diligence on the part of each student.

Students will follow the American Psychological Association Style Guide (APA 6th Edition) as the sole citation and reference style used in written work submitted as part of this course. Specifically, the parenthetical citations-reference list style method, which includes in-text citations with an adjoining reference list, will be utilized. Additional information concerning this writing style can be found within the APUS Library.

Students are expected to submit classroom assignments by the posted due date and to complete the course according to the published class schedule. As adults, students, and working professionals, I understand you must manage competing demands on your time. If you find that you need additional time to complete an assignment, please contact me before the due date so we can discuss the situation and determine an acceptable resolution. Routine submission of late assignments is unacceptable and may result in points deducted from your final course grade.

University Policies

[Student Handbook](#)

- [Drop/Withdrawal policy](#)
- [Extension Requests](#)
- [Academic Probation](#)
- [Appeals](#)
- [Disability Accommodations](#)

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