

**OHLONE COLLEGE**  
**Ohlone Community College District**  
**OFFICIAL COURSE OUTLINE**

**I. Description of Course:**

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| 1. <b>Department/Course:</b> <u>CHMT - 102</u>  | 7. <b>Degree/Applicability:</b><br>Credit, Degree Applicable, Not Transferable (D) |
| 2. <b>Title:</b> <u>Chemical Safety and Hygiene</u>                                   | 8. <b>General Education:</b>   |
| 3. <b>Cross Reference:</b> Chemical Safety and Hygiene BIOT - 102                     | 9. <b>Field Trips:</b> <u>Not Required</u>   |
| 4. <b>Units:</b> <u>1</u><br><b>Lec Hrs:</b> <u>0.5</u><br><b>Lab Hrs:</b> <u>1.5</u> | 10. <b>Requisites:</b>   |
| 5. <b>Repeatability:</b> <u>No</u>  |  |
| 6. <b>Grade Options:</b> Grade Only (GR)  |  |

**12. Catalog Description:**

A course about chemical and lab safety in the workplace with emphasis on hazardous materials and chemical safety, MSDS sheets, government regulations such as ASHA, FDA, FTC and EPA, appropriate chemical disposal and recycling methodologies, inventory and storage, classification of chemicals according to safety and health hazards, ANSI standards, workers compensation and quality assurance. In addition, a brief overview of development of Good Laboratory Practice (GLP) and Good Manufacturing Practice (GMP) will also be taught. Students will also undergo basic first aid training, fire extinguisher training and basic (three hour) CPR training.

**13. Class Schedule Description:**

Chemical and lab safety in the workplace, including regulations, storage, disposal, health hazards, and first aid.

**14. Counselor Information:**

Prepares students for careers as chemistry technicians; it is also useful for students who plan to transfer as research scientists in biology, biotechnology, or chemistry.

**II. Student Learning Outcomes**

The student will:

1. Identify and describe the functions of various governmental agencies, such as the Food and Drug Administration (FDA), the Occupational Health and Safety Administration (OSHA), the Environmental Protection Agency (EPA), and Federal Trade Commission (FTC).
2. List the circumstances to be met to achieve the workplace standards of Good Laboratory Practice (GLP) and Good Manufacturing Practice (GMP).
3. Read and interpret basic standard operating procedures (SOPs) and use the Material Safety Data Sheets (MSDS) to determine chemical hazards associated with a variety of chemicals.
4. Describe handling and preparation protocols for various substances according to proper health, safety, and environmental considerations.

5. Identify government approved chemical disposal and recycling methodologies; describe protocols that comply with federal regulatory guidelines.
6. Describe proper storage protocols; identify compatibility of the material being stored; identify acceptable storage containers required for particular chemicals or substances.
7. Develop a chemical inventory system for a stockroom that includes all pertinent information regarding stability, hazards, and sensitivity.
8. Classify chemicals according to safety and health hazards (flammables, corrosives, oxidizers, and carcinogens).
9. Describe proper first aid procedures; describe how accidents can be avoided; outline procedures to follow in case of an accident.
10. Identify heating and ventilation systems used in chemical storage areas; compare their appropriateness for the groups of chemicals being stored.

### III. **Course Outline:**

Various roles served by government agencies

Food and drug administration (FDA)

Occupational Health and Safety Administration (OSHA)

Environmental Protection Agency (EPA)

Federal Trade Commission (FTC)

FDA and EPA audit

Workers compensation

Resources for handling of chemicals in the lab

Use of the Material Safety Data Sheets (MSDS)

Interpretation of standard operating procedures (SOPs)

Basic interpretation of Good Laboratory Procedure (GLP) and Good Manufacturing Practice (GMP)

Use of a chemical reference handbook to identify hazards associated with handling and storing chemical materials

ANSI Standards

Quality Assurance (QA)

Chemical handling in the lab

Recognizing the right kind of goggles, lab coat, and lab gloves

Mixing techniques appropriate for the materials -- acids, bases, oxidizers, and strong reducing agents

Cleaning laboratory glassware and laboratory equipment using appropriate solvents, detergents, and brushes or devices.

Recognizing chemical hazards in the workplace

Location of pertinent safety information about chemicals, and proper disposal of hazardous materials

Use of appropriate techniques to transfer gases, liquids, and solids from storage containers to equipment used in the laboratory

Electrical safety and its application to the work environment

Manipulation and care for glassware and other apparatus safely, including making connections, cleaning, and storing.

Protocols for working with pressurized equipment

Storage and transportation of compressed gas cylinders

Use of autoclaves, pressurized reactors, vacuum reactors/separators, closed systems, and a variety of valves for several chemical systems

## Chemical storage and disposal

Classification of chemicals according to safety and health hazards (flammables, corrosives, oxidizers, and carcinogens)

Handling of corrosive and volatile materials

Chemical storages according to federal safety guidelines

Handling, disposing, and recycling of hazardous materials according to regulatory guidelines

Heating and ventilation systems used in chemical storage areas

Development of a chemical inventory system for a stockroom that includes all pertinent information regarding stability, hazards, and sensitivity

## Accident training

First aid training

Basic (3 hour) CPR training

Fire extinguisher training

## IV. Course Assignments:

### A. Reading Assignments

1. Handouts
2. MSDS sheets
3. Federal safety guidelines and other materials on the internet

### B. Projects, Activities, and other Assignments

1. Videos and/or other instructional materials related to safety
2. Fire extinguishing, first aid and CPR training
3. Role-playing where students demonstrate proper response to a mock emergency situation

### C. Writing Assignments

1. Short papers based on case studies of special safety situations, preparedness, and appropriate response.

## V. Methods of Evaluation/Assessment:

- A. Objective tests
- B. Quizzes
- C. Written assignments such as a case studies on safety situations
- D. Response to "mock" emergency situations
- E. Demonstration of appropriate behaviors in the lab
- F. Following appropriate safety guidelines during chemical handling.

## VI. Methods of Instruction:

- A. Laboratory
- B. Lecture
- C. Discussion
- D. Demonstration
- E. Audiovisual
- F. Computer Assisted Instruction
- G. Collaborative Learning
- H. Other

1. Individual assistance
2. Power Point presentations enhanced by electronic notes made available on instructor's web page
3. Group activities
4. Lab safety training exercises

**VII. Textbooks:**

Required

1. John Kenkel *A Primer on Quality in the Analytical Laboratory* 1st Edition, Lewis Publishers, 2000 ISBN: 1-56670-516-9

Optional

**VIII. Supplies:**

- A. Goggles
- B. Lab coats
- C. Lab gloves
- D. Lab notebook
- E. Scientific calculator

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