“LABORATORY SAFETY: ISSUES AND PRACTICE”
CHM 691
Spring 2013 Semester

Time: Mondays 2:00 PM to 3:50 PM
Location: Pastore Hall, Room 124
Credits: 1

Course Syllabus:

This course consists of a series of weekly classes pertaining to environmental, safety and health aspects of laboratory work. Experts from industry and academia provide the lectures. Andy Clapham of the URI Chemistry Department (and formerly of The Dow Chemical Company) presents the initial lectures and presides over the subsequent classes.

January 28:
Week 1: Course Overview and Logistics followed by the initial Instructional Topic Entitled: “General Laboratory Safety Principles” – awareness promotion / safe laboratory practices - Andy Clapham, URI Chemistry Department

   a) Safety awareness and training
   b) Responsibility for safety
   c) Material safety data sheets (MSDS)
   d) Proper handling and transportation of chemicals
   e) Personal protective equipment
   f) Accident reporting

Feb 4:
Week 2: Principles of Ventilation - Frank C. Villa, Wilkem Scientific, Pawtucket, RI

   a) Laboratory ventilation (chemical storage areas, and general lab areas)
   b) Laboratory fume hoods (principles of operation, design and selection)
   c) Localized ventilation (what it is and when it should be employed.)
   d) ductless laboratory fume hoods
   e) ...

Feb 11:
Week 3: Principles of Industrial Hygiene - a Selective Overview – Sarah Jones, Industrial Hygiene Manager Pfizer, Inc., Groton, CT.

   a) The chemical hygiene plan (CFR 1910.1450)
   b) Exposure limits (as part of addressing CFR 1910.1000)
   c) Toxicology
   d) Carcinogens
   e) Exposure monitoring and controls
   f) Overview of OSHA’s Respiratory Standard
   g) Ergonomics
Feb 18:
Week 4: **Safe Handling, Storage and Usage of Compressed Gas Cylinders**, Ralph Nigro – Specialty Gas Product Manager, Air Gas East, Inc.
   a) How to safely handle and move gas cylinders.
   b) How to select the proper gas and related equipment for your application.
   c) A review of your laboratory gases, regulators and filters.
   d) Proper connections to gas cylinders.
   e) Requirements for cylinder storage.
   f) Internal and external gas cylinder / liquid container construction for various common laboratory gases and cryogenics.
   g) Working safely with cryogenics.

Feb 25:
Week 5: **Electrical Safety**- Tim Wasco, URI Chemistry Department
   a) Power distribution
   b) Proper grounding techniques
   c) Protective devices (circuit breakers, GIF, etc.)
   d) Electrical circuit faults
   e) Safe power restoration after a fault

Mar 4:
Week 6: **Laboratory Spill Prevention and Response** (when and how to clean up and When to call for help) – George Vassallo, Pfizer, Inc.
   a) What type and size of a laboratory spill can be cleaned up safely?
   b) When and how to call for help.
   c) Types and compatibility of spill cleanup products.
   d) Factors to consider when planning for spill emergencies and during actual emergencies.
   e) Examples of laboratory spill clean up materials

------------------ Spring Break-----------------------
(March 11 through March 15)

March 18:
Week 7: **Ionizing Radiation and Safe Usage of Lasers** (sealed sources, nuclides and X-ray emitters also discussion of the various types of lasers)- Stephen Guarino, , URI Radiation Safety Officer and Assistant Director for Radiation and Reactor Safety
March 25:  
Week 8: **Considerations For Safe Chemical Storage and Hazardous Waste Handling** – Andy Clapham, URI Chemistry Department

   a) Flammable and combustible liquids – CFR 1910.106  
   b) Organic peroxide and peroxide formers  
   c) Laboratory refrigerators  
   d) URI Chemical Hygiene Plan  
   e) NFPA 45 (Standard on Fire Protection for Laboratories Using Chemicals)  
   f) Storage and Inventory Management – Safety in Academic Laboratories (published by The American Chemical Society)  
   g) Chemical container labels  
   h) Hazardous waste procedures  
   i) “Just in time” purchasing practices

April 1:  
Week 9: **Ethics in Science**- Theodore A. Myatt, Sc.D., Director of URI Office of Research Compliance (Division of URI Research and Economic Development)

April 8:  
Week 10: **Biological and Animal Hazards**, – Dr. Jay Sperry, Chair, URI Department of CELS-Cmb Department, safety practices, toxicology and the safe design of experiments using infectious agents (BLS 1-4)

April 15:  
Week 11: **“Green Chemistry”**- Javier Magano, Pfizer, Inc., Groton, CT. How alternative laboratory practices may reduce chemical waste, improve safety and lessen environmental impacts. Novel chemical synthesis will be used as examples.

Also on April 15th: Issuance and explanation of final project

April 22:  
Week 12: **Laboratory Fire Safety**- Adam Kerop, Pfizer, Inc., Groton, CT 

   a) NFPA 45  
   b) Fire extinguishers  
   c) Flammable materials  
   d) Explosion hazards  
   e) Peroxides and peroxide formers  
   f) Fires  
   g) Fire prevention  
   h) dealing with a laboratory fire

Please note: This class will be directly followed by fire extinguisher training during the regularly scheduled seminar.

April 29:  
Week 13: **Submittal of final project report with presentations and discussion**  
The project will be described during previous lectures.
The course is available to faculty and those staff personnel who may require training per regulation(s). A sign up sheet will be available at start of each class to serve as evidence of attendance to satisfy university compliance with certain State and Federal Regulatory requirements. Andy Clapham will preside over each class, outline the course, introduce the speaker, set the tone of each class and tie the classes into the intended overall mission of the course and gather / evaluate course materials.

Please note!

• For those students taking the course for academic credit, a report or synopsis (assigned at the conclusion of the each class) of at least two pages double spaced in length will be required. The synopsis should detail the key points of the lecture material written in your own words and applied to your area(s) of interest. They should be e-mailed to aclapham@chm.uri.edu by the following Monday morning. (Do not send lecture notes. The report or synopsis must be your own interpretation of the lecture material and must be at least two pages in length.) Please make sure that spelling and grammar are correct. Some of the classes will require questions submitted by the speaker to be used for the class report. In these cases the answers should prepared in a narrative format as you would do for your two page double spaced report.
• In addition to the above, there will be periodic written reports required on specific topics utilizing the material presented in previous class lectures and discussions.
• Satisfactory completion of the course is based on attendance, timely submittal of course materials, and personal participation in class discussions.