**PMOSH Course 2**

**Special Topics: BCP 8813/6200: Industrial Hygiene Principles and Health Hazards**

**Instructors:** Javier Irizarry, PhD; Myrtle Turner, PhD; Kristen Butler, MPH, CIH; Jenny Houlroyd, MSPH, CIH

**Course Description:**

This course provides an overview of the discipline of industrial hygiene: the science of anticipation, recognition, evaluation, communication and control of biological, chemical, physical, ergonomic and psychosocial environmental stressors in, or arising from, the workplace that may result in injury, illness, impairment, or affect the well-being of workers.

**Prerequisites:** BCP 8803/6100

**Textbooks:** Fundamentals of Industrial Hygiene 6th Edition (2012), Barbara Plog and Patricia Quinlan; Selected text excerpts and Case Studies

**Course Objectives:**

Students will learn to identify the industrial hygiene risks associated with various workplace scenarios, evaluate hazards, develop and manage control strategies, and determine the appropriate safety design that apply to various workplaces.

# Learning Outcomes:

By the end of this course, students should be able to:

1. Describe the role of industrial hygiene in managing occupational health risk
2. Compare various regulatory and non-regulatory approaches to achieving worker health protection
3. Use basic quantitative industrial hygiene data to evaluate worker exposure and health risk
4. Explain basic statistical models of occupational epidemiology
5. Apply concepts of aerosol physics to evaluate worker exposure
6. Identify control measures for biological, chemical, infectious, and physical risk factors in the occupational setting

**Grading:**

Grades will be based on course participation, knowledge assessments, assignments, one midterm exam, one final exam and two course projects.

Participation: 10%

Knowledge Assessments: 10%

Assignments: 20%

Midterm Exam: 15%

Final Exam: 15%

Course Projects (2): 30%

1. Students are required to participate in the online learning platform through discussion boards, Q&A sessions, and online debates. Instructors will monitor participation and engage online with students.
2. The course contains four unit assessments (quizzes) – to be completed at the ends of units II, IV, VI, and VIII.
3. Assignments include independent research to identify and evaluate current industrial hygiene topic or event and share findings with the cohort through the online discussion boards.
4. There will be two course projects: a written report on an independent research study in an area of industrial hygiene, and a scenario based case study. In the case study, questions related to the scenario will encompass principles and industrial hygiene sampling strategies introduced throughout the course.
5. Exams will test student understanding of chapter content, reading assignments, and course instruction and will include a combination of true/false, fill-in-the-blank, short essay, and multiple choice.

**Learning Accommodations:**

If needed, we will make accommodations for students with documented disabilities. These accommodations must be arranged in advance and in accordance with the Office of Disability Services (http://disabilityservices.gatech.edu).

# Academic Integrity:

Students are encouraged to study together and collaborate on case studies, but each student must submit their own work unless the assignment is specifically structured as a group assignment/project. Any reference sources (including online sources) used to prepare written assignments must be paraphrased in your own words and cited. Students are to neither receive nor provide help to others during exams. Any student suspected of behavior in violation of the Georgia Tech Honor Code will be referred to the Office of Student Integrity. The Georgia Tech Honor Code is available on the Office of Student Integrity website ([http://www.osi.gatech.edu](http://www.osi.gatech.edu/))

**Lectures:**

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| Week | Topic | Assessments |
| 1 | Historical, Societal, and Regulatory Context of Occupational Health   1. Plog, Chapter 1, Chapter 23   Industrial Toxicology and Occupational Illnesses   1. Plog, Chapter 6   Occupational Epidemiology, Biostatistics, and Public Health   1. Essentials of Epidemiology in Public Health. Ann Aschengrau, George Seage III. Chapter 1. | HW 1 assigned: Students will research and provide a one page summary about an industrial hygiene concern at their place of work. This one page summary will include: information about the health hazard, potential health effects from exposure to the health hazard, and controls to reduce employee exposure to the hazard. |
| 2 | Anatomy, Physiology, Toxicokinetic Pathways   1. Plog, Chapter 2 2. Population Toxicokinetics of Benzene. Bois, FY, Jackson, ET, Pekari, K, Smith, MT. (1996 Dec.) *Environ Health Perspectives*. 104 (Suppl 6). 1405-1411 | Quiz 1- Multiple choice quiz related to information covered in first two weeks. |
| 3 | Gases, Vapors, and Solvents   1. Plog, Chapter 7   Particulates and Particulate Generating Processes   1. Plog, Chapter 8   Metal and Metal Fume Exposures   1. Metal Fume Fever: A Case Report and Review of the Literature. Kaye, P, Young, H, O’Sullivan, I. Emerg Med J (2002) 19. 268-269 2. Is meal fume fever a determinant of welding related respiratory symptoms and/or increased bronchial responsiveness? A longitudinal study. El-Zein, M, Infante-Rivard, C. Malo, J\_L, Gautrin D. *Occup Environ Med* (2005); 62; 688-694 3. Manganese, Iron, and Total Particulate Exposures to Welders. Flynn M, Susi P, Journal of Occupational and Environmental Hygiene. (2009) 7(2), 115-126 | HW 1 Due  Project Assigned  Students will prepare a written report on an independent research study in an area of industrial hygiene. |
| 4 | Industrial Noise and Hearing Conservation Programs  Ionizing and Non-ionizing Radiation   1. ACGIH 2016 TLVs and BEIs    1. Electromagnetic Fields    2. Optical Radiation    3. Ionizing Radiation 2. Little, MP. (2003) Risks Associated with Ionizing Radiation. *British Medical Bulletin.* 68(1) pp 259-275   Thermal Extremes in Work Environments   1. ACGIH 2016 TLVs and BEIs: Thermal Stress | Quiz 2- Multiple choice quiz related to information covered in second two weeks.  Mid Term Exam- will assess student understanding of chapter content, reading assignments, and course instruction and will include a combination of true/false, fill-in-the-blank, short essay, and multiple choice. |
| 5 | Ergonomic Principles   1. ACGIH 2016 TLVs and BEIs: Ergonomics 2. A prospective study of musculoskeletal outcomes among manufacturing workers: Effects of physical work factors. *Human Factors: The Journal of the Human Factors and Ergonomics Society*. (Feb 2014) 56-1. 112-130. 3. A prospective study of musculoskeletal outcomes among manufacturing workers: Effects of psychosocial stress and work organization factors. *Human Factors: The Journal of the Human Factors and Ergonomics Society*. (Feb 2014) 56-1. 178-190. | Project Due  HW 2 Assigned: Students will be asked to research journal articles related to a current industrial hygiene concern and create a one page summary of their research. |
| 6 | Industrial Ventilation   1. Plog, Chapters 18-20 | Quiz 3- Multiple choice quiz related to information covered during weeks 5 and 6.  Project 2 Assigned  Students will be asked to review a scenario based case study and provide a report analyzing the industrial hygiene monitoring results. |
| 7 | Bioaerosols, Infectious Diseases, and Biological Hazards   1. Plog, Chapter 14 2. Biologically Hazardous Agents at Work and Efforts to Protect Workers’ Health: A Review of Recent Reports. Rim K, Lim C. Safety and Health at Work (June 2014) Vol 5 (2). 43-52. 3. Worker Exposures to Particulates, Endotoxins and Bioaerosols in two Refuls-Derived Fuel Plants. Mahar S, Reynolds SJ, Thorne PS. American Indus Hyg Assoc J (1999). 60 (5): 679-683.   Air Contaminant and Noise Sampling Strategies   1. Plog, Chapter 15 | HW 2 Due |
| 8 | Practice of Industrial Hygiene and Other Allied Professions | Project 2 Due  Quiz 4- Multiple choice quiz related to information covered during weeks 7 and 8. |
|  |  | Final Exam will assess student understanding of chapter content, reading assignments, and course instruction and will include a combination of true/false, fill-in-the-blank, short essay, and multiple choice. |