Course Syllabus

**TSM 471/571 – Safety Laboratory**

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| Instructor: Stephen A Simpson  Office: 1105 EHSSB  Office Hours: Wednesdays, 9-10AM  Webex: https://iastate.webex.com/meet/sasimps | Class Location: 1230 EHSSB  Class Time: W 10:00-11:50 |
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**REQUIRED MATERIALS**

Textbook: Basic Concepts of Industrial Hygiene (1997) Ronald M. Scott

ISBN-13: 978-1566702928, ISBN-10: 1566702925

**CATALOG DESCRIPTION**

*TSM 471/571 Safety Laboratory.  Prereq:TSM 470 for undergraduate students*

* Introduction to equipment, methods, and strategies to measure, evaluate, control, and research hazards and risk in the workplaces.

**Learning Objectives & Course Expectations**

**STUDENT LEARNING OBJECTIVES:**

This is a laboratory course were students learn that workplace hazards exist, how to evaluate, monitor, assess and make recommendations for their mitigation or control. Also, they will be familiar with appropriate regulatory guidance and references. Finally, they will know when and who to turn to when they have reached the limits of their knowledge regarding workplace hazards and risks.

The enduring understanding that forms the basis for every discussion and activity in this course is evaluation, measurement, assessment and communication of workplace hazards and risks are essential for a safe environment.

The overarching questions that this class will answer include:

1. How do you define a safe work environment?
2. What are hazards and risks in industrial and non-industrial environments?
3. How do you evaluate a workplace hazard or risk?
4. How do you measure a workplace hazard or risk?
5. What is meant by assessment of workplace hazards and risks?
6. How do evaluation, measurement assessment and communications relate to each other?
7. What is the best way to report results and/or recommendations from your hazard assessment?

At the conclusion of this course, you should be able to:

1. Identify workplace hazards and risks.
2. Select and use appropriate monitoring equipment to measure workplace hazards and risks.
3. Interpret the results of the monitoring activities based on appropriate health and safety guidance.
4. Report findings from the workplace hazard evaluation, assessment and/or monitoring.
5. Make recommendations on the implementation of appropriate engineering and administrative controls and personal protective equipment.
6. Reflect on your safety knowledge and clearly articulate your role in the prevention of workplace injuries and illnesses.

**TENTATIVE COURSE SCHEDULE**

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| --- | --- | --- | --- | --- |
| **Date** | **Topic** | **Location** | **Reading(s)** | **Assignments** |
| January 19 | Risk Assessment | 1230 EHSSB (Learning Center) | [OSHA website for Workers (Links to an external site.)](https://www.osha.gov/workers.html);  [OSHA General Duty Clause (Links to an external site.)](https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=OSHACT&p_id=3359)  [Iowa Occupational Safety and Health (Links to an external site.)](http://www.iowaworkforce.org/labor/iosh/index.html)  [Iowa Regulations for Workers (Links to an external site.)](http://search.legis.state.ia.us/NXT/gateway.dll/ic/1/13/3215/3349/3546?%24q=%5bfield%20%2088%5d%24x=Advanced#LPHit1)  Chapter 2 | Quiz 1 - Chapter 2 - Risk Assessment and Hazard Identification;  Worksheet  – Risk assessment - in-class |
| January 26 | Safety Data Sheets | 1210 EHSSB (Learning Lab) | [OSHA’s Hazard Communication (Links to an external site.)](https://www.osha.gov/dsg/hazcom/index.html); | [Training - Worker Right-to-Know OSHA Hazard Communication Standard;Links to an external site.](https://training.ehs.iastate.edu/IowaSU/site/)  [Training - Fire Safety and Extinguisher;Links to an external site.](https://training.ehs.iastate.edu/IowaSU/site/)  Worksheet  - Safety Data Sheet (SDS) - in-class  Write Reflection paper on GHS and SDS. |
| February 2 | Instrument Calibrations | 1230 EHSSB (Learning Center) | [OSHA Technical Manual (Links to an external site.)](https://www.osha.gov/dts/osta/otm/otm_toc.html); [SKC Application Guides (Links to an external site.)](http://www.skcinc.com/guides.asp); [Q-100 Noise Dosimeter Manual (Links to an external site.)](http://multimedia.3m.com/mws/mediawebserver?mwsId=66666UF6EVsSyXTtOxf6oxfyEVtQEVs6EVs6EVs6E666666--&fn=Q100_Manual.pdf) | Worksheet - Calibrations - in-class  GHS/SDS Reflection paper due Febuary 1, 2022 11:59pm |
| February 9 | Client Monitoring Requests | 1210 EHSSB (Learning Lab) | Chapter 4 and 8 | Quiz 2 – Chapter 8 - Monitoring the Plant Atmosphere. |
| February 16 | Sampling Strategies | 1230 EHSSB (Learning Center) | Chapter 8 & 12 |  |
| February 23 | Emergency Preparedness | 1230 EHSSB (Learning Center) |  | [Training - Emergency Response Guide Video.Links to an external site.](https://training.ehs.iastate.edu/IowaSU/site/) |
| March 2 | Audiometric Monitoring (Audiograms) | G11 TASF  (ISU Occupational Medicine) | [OSHA 29 CFR 1910.95 Occupational Noise Exposure. (Links to an external site.)](https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=standards&p_id=9735) | Quiz 3 – Chapter 12 - Occupational Hearing Loss;  Visit [ISU Occ. Med.Links to an external site.](http://www.ehs.iastate.edu/occupational/occupational-medicine); Complete individual audiogram and hand-in copy to instructor. |
| March 9 | Project Sampling Activities |  |  | Collect group samples. |
| March 16 | SPRING BREAK |  |  |  |
| March 23 | Slips and Trips | 1230 EHSSB (Learning Center) | [NSC Slips, Trips and Falls Prevention Guide  (Links to an external site.)](http://www.nsc.org/NSCDocuments_Advocacy/Fact%20Sheets/Slips-Trips-and-Falls.pdf)and [American Slip Meter ASM 725. (Links to an external site.)](http://www.americanslipmeter.com/additionalinformation.html) | Quiz 4 - Slips, Trips, and Falls;  Worksheet - Slips - in-class. |
| March 30 | Heat / Cold Stress | 1230 EHSSB (Learning Center) | [Heat Stress;Links to an external site.](https://www.ehs.iastate.edu/services/occupational/heat-stress)  [Working in Cold Environment.Links to an external site.](https://www.ehs.iastate.edu/sites/default/files/uploads/publications/factsheets/NSC%20Working%20Cold-Environments%20Safety%20Talk.pdf) |  |
| April 6 | Asbestos | 1230 EHSSB (Learning Center) |  | [Training - Asbestos AwarenessLinks to an external site.](https://training.ehs.iastate.edu/IowaSU/site/)  Worksheet - Asbestos |
| April 13 | Ergonomic Evaluation | 1230 EHSSB (Learning Center) | Chapter 16 | [Training - Office Ergonomics;Links to an external site.](https://training.ehs.iastate.edu/IowaSU/site/)  Write a Reflection Paper for Ergonomics; |
| April 20 | Respiratory Protection | 1230 EHSSB (Learning Center) |  | Ergonomics reflection paper due April 19, 2021 11:59pm; |
| April 27 | Mold | 1230 EHSSB (Learning Center) | [A Brief Guide to Mold in the Workplace (Links to an external site.)](https://www.osha.gov/dts/shib/shib101003.html);  [Mold Remediation in Schools and Commercial Buildings (Links to an external site.)](http://www.epa.gov/mold/mold_remediation.html);  [Guidelines for the Protection and Training of Workers Engaged in Maintenance and Remediation Work Associated with Mold. (Links to an external site.)](http://tools.niehs.nih.gov/wetp/public/hasl_get_blob.cfm?ID=2034) | Quiz 5 – Mold;  Write a Reflection Paper for Mold based on lecture. |
| May 4 | Graduate Students' Safety Laboratory Project | 1230 EHSSB (Learning Center) | **TBD** | Mold reflection paper due May 3, 2022 11:59pm.  Group Sampling Report due May 3, 2022 11:59pm; |
| May 11 | Project Presentation and Peer Evaluation | 1230 EHSSB (Learning Center) | All Group Presentations | Group Monitoring/Sampling Report Presentation;  Instructor evaluation and provides feedback. |

**COURSE REQUIREMENTS**

Attend and actively participate in class. This includes being prepared.

1. Read assigned materials.
2. Participate in group work to ensure that all group members make satisfactory academic progress in achieving the goals of the course.
3. Pass the quizzes.
4. Participate in the completion and documentation of all group activities.

**GRADING**

There is a total of 800 points possible. Undergraduate and graduate point allocations will differ.

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| --- | --- | --- | --- | --- |
| **Assessment** | **Unit points**  **(undergraduate)** | **Unit points (graduate)** | **Total Points (undergraduate)** | **Total Points (graduate)** |
| Quizzes | 5 @ 10 points each | 5 @ 10 points each | 50 | 50 |
| Individual and Group Worksheets | 5 @ 15 points each | 5 @ 15 points each | 75 | 75 |
| Reflection Papers | 3 @ 25 points each | 3 @ 25 points each | 75 | 75 |
| EH&S online training | 5 @ 15 points each | 5 @ 15 points each | 75 | 75 |
| Audiogram (individual copy from test) | 1 @ 25 points | 1 @ 25 points | 25 | 25 |
| Group Sampling Report | 1 @ 200 points | 1 @ 150 points | 200 | 150 |
| Group Project Presentation | 1 @ 200 points | 1 @ 175 points | 200 | 175 |
| Class Participation | 1 @ 100 points | 1 @ 75 points | 100 | 75 |
| Graduate lab safety project | NA | 1 @ 100 points | NA | 100 |

**COURSE GRADE**

Your final grade will be computed based on the following scale:

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| --- | --- | --- | --- |
| A | 744 - 800 points | C | 584 – 615 points |
| A- | 720 – 743 points | C- | 560 – 583 points |
| B+ | 696 - 719 points | D+ | 536 – 559 points |
| B | 664 - 695 points | D | 504 – 535 points |
| B- | 640 – 663 points | D- | 480 – 503 points |
| C+ | 616 - 639 points | F | 479 points |

**CLASSROOM EXPECTATIONS**

To succeed in this course, expect to spend at least 2-3 hrs per week outside of class.

You are expected to attend class and be on time each class meeting. There will be no reading of newspapers or other extraneous materials during class. Food and drinks will be allowed in class as long they do not become problematic and as long as each of you clean up after yourself to keep the classroom clean. Food and drinks are not allowed in laboratory areas on campus. Cellular phones should be turned off while in class. If your phone rings during class, I may answer it for you.

Each group will be assigned a socially distanced location within the classroom and all group members must sit in close proximity to each other. This will encourage additional group interaction and discussion.

**PREPARATION QUIZZES**

Quizzes will cover the readings discussed in class as well as topics of online safety training courses.

**EH&S ONLINE TRAINING COURSES**

You are expected to complete the five online trainings list below prior to the class time where that topic is discussed. The EH&S training site is found at [https://training.ehs.iastate.edu/IowaSU/site/Links to an external site.](https://training.ehs.iastate.edu/IowaSU/site/).

1. Emergency Response Guide Video
2. Fire Safety and Fire Extinguisher
3. Office Ergonomics
4. Radiation Safety Awareness
5. Worker Right-to-Know OSHA Hazard Communication Standard

**WORKSHEETS**

Throughout the semester there will be worksheets for several of our topics. These worksheets are designed to assist in developing understanding, knowledge and skills needed to perform workplace hazard assessments. Some of the worksheets will be completed by the individual, some by groups and others by both individuals and groups.

**REFLECTION PAPERS**

Thrice this semester, you will reflect on a safety topic presented by a guest lecturer. Each reflection must answer the some of following questions.

For GHS,

* Describe the changes that GHS implement to the original MSDS and
* And how these changes have improved hazard communication.

For Ergonomics,

* What are ergonomic evaluations and why are they important to conduct?
* How do you know to do an evaluation?
* What guidance is available to allow you to assess the hazard?
* What types of measurements are done to assess the hazard?
* How do you know whether the environment is safe or unsafe?
* What recommendations can be made to person(s) impacted by the evaluation?
* In what way(s), would you inform the person(s) of your findings?
* Evaluate the speaker. Was their information relevant to meet our goal for this course?

For Mold,

* What guidance is available to allow you to assess the hazard?
* What are some important aspects about mold?
* How is mold evaluated?
* What types of measurements are done to assess the hazard?
* How do you know whether the environment is safe or unsafe?
* How do you address unsafe findings? Who would you inform?
* Evaluate the speaker. Was their information relevant to meet our goal for this course?

These reflections (300-500 words) generally due before the next week by the start of class. Reflections should be prepared in Word or PDF and spell checked. Use the topic and your name as the title of the reflection (for example, “Ergonomics – Stephen Simpson”). Grading will be based on your ability to communicate your reflective thinking. Email these papers to [sasimps@iastate.edu](mailto:sasimps@iastate.edu) with your title as the subject line in the email.

**GROUP PROJECT REPORT**

This is your opportunity as a group to evaluate, measure, assess and report on hazards and risks for either the ISU Power Plant or ISU FP&M Shops or other campus clients, and make recommendations if any essential for a safer environment. Based on all of the topics discussed this semester, your report should:

1. Clearly identify and explain the hazards sampled
2. Describe sampling methods and why they were chosen
3. Brief discussion of sampling activities
4. Hazard assessment for each hazard identified and sampled
5. Describe impact of each hazard on workers
6. Discussion on comparison with regulatory standards and limits
7. Recommended actions if necessary (it is always helpful to provide management with more than one alternative).

All of your reports will be compiled and forwarded to the client for consideration. This activity will be assessed by the instructor with feedback given during the progress report meeting and by the class meeting after the final submittal.

**CLASS PARTICIPATION**

This score will be based on attendance, participation in class discussions, and contribution to the achievements of your group.

**GRADUATE STUDENT SAFETY LABORATORY PROJECT**

Graduate student will independently develop a teaching module on a workplace hazard of their choice to present to the class that would include an explanation of the workplace site hazard evaluation, regulatory guidance, sampling and monitoring plan, and possible recommendations that might be presented to a client. They are also responsible to develop a hands-on assessment for the class that is based on the materials presented.

**ACCEPTANCE OF LATE WORK**

Assignments are due as indicated in this syllabus and on the assignment instructions. Late worksheets, projects and assignments may be penalized 25% per class until completed.