

## ***Course Syllabus Aerosol Technology***

OEH:6450 (175:221) Fall 2014

Class Meetings: TR; S025B CPHB; 10:30AM – 11:45AM

Laboratory Meetings: in class or as specified at the  
Institute for Rural and Environmental Health (IREH) Building at the UI Research Park

### **Instructors**

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Office hours available upon request; email or call to set up an appointment.

This course is offered through the Department of Occupational and Environmental Health (Department Executive Officer: Dr. Peter Thorne, S341A CPHB, 335-4216, [peter-thorne@uiowa.edu](mailto:peter-thorne@uiowa.edu)).

### **Course Description**

An aerosol is an assembly of particles suspended in a gaseous medium. They are omnipresent in our workplaces and outdoor environments and include a wide range of phenomena such as dust, fume, smoke, mist, fog, haze, clouds, and smog. Certain aerosols pose significant health threats, while others improve the quality of our lives. It is necessary to understand how airborne particles behave to control against their undesirable effects and to harness their beneficial potential. This course will explore the mechanics of aerosol behavior, including their generation, transformation, and fate in occupational and environmental settings.

The specific goals for this course are provided below. Students should have passed a college-level physics course and calculus through CALC3 because of the calculation-intensive nature of this course.

### **Readings**

There is one required text for this course: Hinds, W.C. (1999) Aerosol Technology: Properties, Behavior, and Measurement of Airborne Particles, Second Edition, John Wiley and Sons, Inc.

Class notes and other useful information will be posted on Iowa Courses Online (ICON). Occasionally, articles will be referenced in class from the Journal of Aerosol Science and from Aerosol Science and Technology.

## Course Requirements and Evaluation

### ***Grading***

Laboratory Reports	20%
Problem Sets	10%
1 <sup>st</sup> Exam	20%
2 <sup>nd</sup> Exam	20%
In-class Final Exam	25%
Class Participation	5%

Grades will be assigned according to the following:

A 90-100

B 80-89

C 70-79

D 60-69

F < 59

### ***Attendance and Participation***

I expect students to attend each class meeting, ready to participate promptly at or before 10:30AM. If you have a conflict and are unable to attend, please email me prior to your absence. Each day, bring blank paper for taking notes and any printouts from ICON. Review assigned reading and work appropriate problems in the text to prepare yourself to engage in participation.

### ***Weekly Quizzes***

A 15-min quiz will be administered on-line (Quizzes Section on ICON) approximately once per week to ensure that you are keeping pace with the course material. The quiz will be made available on Thursday and due before class the following Tuesday. You will be allowed 2 attempts to complete the quiz. I expect you to complete this quiz without help from others.

The quiz may cover the reading material assigned from the text for that particular day or a computational problem based on the previous week's material. Each quiz will be worth 1-3 points of ***EXTRA CREDIT*** towards the next examination. A strong showing on quizzes can advance a text score by 1 grade level.

### ***Problem Sets***

*The amount that you learn in this course will relate directly to your ability to work problems related to course material and to critically interpret your answers. The midterm and final examinations will be problem based with additional questions from assigned readings.*

I will assign 5 problem sets throughout the semester that you will turn in on the ICON dropbox. I will not grade what you turn in but rather scan through to ensure that you have made the effort to work the problems. You can work these problems by yourself, with your classmates, or with students who took the course a previous year. If you are having difficulties with these problems, please feel free to discuss them with me.

### ***Laboratories***

Three laboratory sessions will be conducted in addition to the class lectures. Students are encouraged to work together on the laboratory assignments. However, each student must submit their own final report. Be sure your name on the first page of the report. The report should describe very briefly what you did (refer to the laboratory instructions for the introduction and methods section unless you did something different or had troubles – don't forget to include some reference to what instrument you used like the model, vendor, and serial number). Focus your report on results and discussion. I want to see nice looking figures and tables and clear paragraphs with thoughtful discussion (not long) of these graphical elements. Finally, take a step back and relate what you learned in the laboratory to lecture material. Further specific criteria for reports will be provided when they are assigned.

Submit laboratory reports by 5 PM of the due date into drop box on ICON. I will deduct 10% per day if late.

### ***Examinations***

The midterm examinations will be taken during the normal class time. The final examination will be 2 hours in length and will be given during examination week. Examinations will be closed book and closed notes, unless otherwise specified. Because the focus of the course is on analytical problem solving skills rather than simple recall, each student will be allowed to bring a single, standard, 8.5 inch x 11 inch sheet of paper with notes in to the examination.

## **Industrial Hygiene Program Student Outcomes (called student outcomes by ABET and competencies by CEPH)**

At the time of graduation, we expect our students to:

1. Anticipate and recognize the processes that influence the magnitude and routes of exposure to occupational and environmental agents, factors, and/or stressors of chemical, physical, biological and ergonomic origin that pose potential for adverse health effects
2. Apply the highest scientific principles, instrumentation, and techniques to adequately evaluate exposures to these agents, factors, or stressors
3. Apply sound toxicological and epidemiological principles to anticipate adverse health outcomes that may be associated with these exposures
4. Apply sound scientific principles in the design and conduct of industrial hygiene investigations
5. Organize and interpret exposure data using qualitative and quantitative methods in the context of physiological, epidemiological, and toxicological data to synthesize an appropriate response.
6. Recommend and evaluate controls to reduce or eliminate these exposures, conforming to traditional hierarchy considerations.
7. Understand applicable business and managerial practices with emphasis on program and project management
8. Communicate effectively and appropriately to advocate for continuous improvement in worker health and safety to pertinent audiences, including workforce, management, the public, and professional peers

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9. Interpret and apply applicable and emerging regulations, consensus standards, and best practices affecting occupational and environmental health
10. Demonstrate an understanding of the professional code of ethics
11. Understand the value and path to attain professional certification in industrial hygiene and allied fields

Specific goals for the course:

Specific Outcomes of Instruction	UI-Defined Student Outcomes										
	1	2	3	4	5	6	7	8	9	10	11
Define, explain, and correctly use terms and concepts to describe the behavior of particles in a gaseous medium	x	x						x			
Recognize situations where aerosol behavior may play a critical role	x	x						x			
Formulate strategies to apply these concepts in solving problems encountered in air pollution control, industrial hygiene, and industry		x		x	x	x		x			

## Elements Required of All University of Iowa Syllabi

### Administrative Home

*This course is given by the College of Public Health. This means that class policies on matters such as requirements, grading, and sanctions for academic dishonesty are governed by the College of Public Health. Students wishing to add or drop this course after the official deadline must receive the approval of the Associate Dean for Academic and Student Affairs in the College of Public Health. Details of the University policy of cross enrollments may be found at: <http://www.uiowa.edu/~provost/deos/crossenroll.doc>*

### Electronic Communication

*University policy specifies that students are responsible for all official correspondences sent to their standard University of Iowa e-mail address (@uiowa.edu). Students should check this account frequently.*

### Availability of Accommodations for Students with Disabilities

*Any student eligible for and needing academic adjustments or accommodations under the Americans with Disabilities Act is requested to notify the instructor as soon as possible to make appropriate arrangements.*

### Academic Misconduct

*Academic misconduct is defined by the University of Iowa in its Code of Student Conduct here: <http://dos.uiowa.edu/policy-list/current/student-responsibilities-6/academic-misconduct-6/>. Please take the time to read this short description. Academic misconduct refers primarily to plagiarism or cheating. **It is the student's responsibility to seek clarification from the course instructor of any situation in which he/she is uncertain whether academic misconduct is/has been involved.***

*Plagiarism includes but is not limited to the following:*

- *presentation of ideas of others without credit to the source;*
- *use of direct quotations without quotation marks and without credit to the source;*
- *paraphrasing without credit to the source;*
- *participation in a group project which presents plagiarized materials;*
- *failure to provide adequate citation for material obtained through electronic research;*
- *downloading and submitting work from electronic databases without citation;*
- *submitting material created/written by someone else as one's own, including purchased term/research papers;*

*Cheating includes but is not limited to the following*

- *copying from someone else's exam, homework, or laboratory work*
- *allowing someone to copy or submit one's work as his/her own;*
- *accepting credit for a group project without doing one's share;*
- *submitting the same paper in more than one course without the knowledge and approval of the instructors involved;*
- *using notes or other materials during a test or exam without authorization;*

- *not following the guidelines specified by the instructor for a “take-home” test or exam.*

*Academic misconduct is a serious matter and is reported to the departmental DEO and to the Associate Dean for Education and Student Affairs. Instructors and DEOs decide on appropriate consequences at the departmental level while the Associate Dean enforces additional consequences at the collegiate level. For example, an incident involving plagiarism will result in consequences to the student ranging from a grade of 0 for that assignment to being terminated from his/her graduate program. Egregious acts of misconduct, such as cheating on a final exam, may result in the course grade being reduced to an F. Additional details concerning the consequences associated with acts of plagiarism, including a student appeals process, is provided in the Graduate College Manual section IV.F.*

### **Concerns about Faculty Actions**

*Students who have a concern about a faculty action should first address the issue with the instructor, then the course supervisor (if there is one), and then the departmental DEO. Students may also contact the Associate Dean for Education and Student Affairs in the College of Public Health. Another resource for students is the Office of the University Ombudsperson. If a complaint cannot be resolved at the departmental and/or collegiate level, students may file a formal complaint utilizing the procedure specified in the [Operations Manual \(II-29.7\)](#)*

### **Understanding Sexual Harassment**

*Sexual harassment subverts the mission of the University and threatens the well-being of students, faculty, and staff. All members of the UI community have a responsibility to uphold this mission and to contribute to a safe environment that enhances learning. Incidents of sexual harassment should be reported immediately. See the UI [Comprehensive Guide on Sexual Harassment](#) for assistance, definitions, and the full University policy.*

### **Reacting Safely to Severe Weather**

*In severe weather, class members should seek appropriate shelter immediately, leaving the classroom if necessary. The class will continue if possible when the event is over. For more information on Hawk Alert and the siren warning system, visit <http://hawkalert.uiowa.edu/>*