

EIH 7043C Aerosol Properties and Measurements

Meeting Days/Times: Thursday 10 - 11:50 am

Meeting Location: Kettering G-19

Prerequisites: None

Instructor: Jun Wang, PhD, CIH, PE, CSP, CHMM

Instructor Title: Associate Professor

Email: jun.wang@uc.edu

Phone: (513)558-4301

Office Location: Kettering 331

Office Hours: By appointment only

Communication Policy: Dr. Wang can be reached through email or Canvas messages. Responses will be given within 48 hours during weekdays, and will be delayed during weekends, holidays, or towards the end of semester.

Co-Instructor: Justin Morrow, PhD

Email: morrowji@ucmail.uc.edu

Course Materials

Required Textbook

Aerosol Technology: Properties, Behavior, and Measurement of Airborne Particles, 2nd Edition, by William C. Hinds, ISBN: 978-0-471-19410-1.

This textbook is available as an e-book from UC library for free for students.

Optional Reading Materials

Aerosol Measurement: Principles, Techniques, and Applications, 3rd Edition, edited by Pramod Kulkarni, Paul A. Baron, Klaus Willeke, ISBN: 978-0-470-38741-2

Course Description

This course provides the basic principles and real-world applications for aerosol formation from natural and anthropogenic sources, transport in the ambient and occupational environment, and health effects upon inhalation exposure. Students will learn the physical, chemical, and biological aspects of aerosols and assess the properties of aerosols quantitatively. Additionally, this course will encompass the techniques to sample, measure, and characterize aerosols and how to control and mitigate aerosol exposures.

Course Learning Outcomes

Upon successful completion of this course, the learner will be able to:	How is this outcome assessed?
1. Define aerosols and describe sources of formation, emissions, and exposures in both ambient and occupational settings.	Final project report
2. Analyze the physical, chemical, and biological factors affecting aerosol interactions with the environment, and interpret numerical and empirical methods related to aerosol dynamics.	Assignments, exams, and report
3. Demonstrate proficiency in generating, measuring, and characterizing aerosol properties such as particle size distribution, concentration, and chemical compositions using samplers and monitors.	Assignments and exams
4. Articulate the health implications of aerosol inhalation, focusing on respiratory deposition, cytotoxicity, oxidative stress, and the significance of nanoparticles and ultrafine particles.	Exams
5. Utilize course content to address practical scenarios, including respiratory protection against aerosols, controlling airborne bacterial/viral transmissions, and HEPA air filtration, etc.	Final project report

Course Format

This course has the Canvas Learning Management System to provide student-centered online learning that will enhance the teaching and learning process. Canvas will be used to deliver lectures, assignments, exams, and participate in discussions. Please get yourself familiar with Canvas (<https://uc.instructure.com/>). All lecture materials will be uploaded to Canvas prior to the class and it is the student's responsibility to download the materials for notetaking and reference. If you are not familiar with these tools, please visit [Canvas Student Guides](#).

Course Assignments and Grading Policy

Course Grade: Course grades will be based on your performance on the following:

Point Allocation

<i>Assignments 1</i>	<i>50 points</i>
<i>Assignments 2-7</i>	<i>100 points each</i>
<i>Exams (2)</i>	<i>250 points each</i>
<i>Attendance</i>	<i>50 points</i>
<i>Total Points Available</i>	<i>1200 points</i>

Grading Scale

<u>Overall Percentage / Points</u>	<u>Letter Grade</u>
92% and above	A
87-91%	A-
82-86%	B+
77-81%	B
72-76%	B-
67-71%	C+
62-66%	C
Below 61%	F

No curving, bump up, or bonus credits will be given. Students are encouraged to track their grades through Canvas.

Academic Integrity

Academic misconduct or dishonesty is defined in the University of Cincinnati Student Code of Conduct. Academic misconduct includes, but is not limited to: acts of cheating, plagiarism, falsification, and misappropriation of credit. The Student Code of Conduct defines behavior expected of all University of Cincinnati students. It is each student's responsibility to know and comply with the University's Student Code of Conduct. Disciplinary procedures are explained in a step-by-step manner, and the procedures for appeal of decisions are stated. (see: [UC's Student Code of Conduct](#))

Plagiarism is defined as:

- Submitting another's published or unpublished work in whole, in part, or in paraphrase, as one's own without fully and properly crediting the author with footnotes, quotation marks, citations, or bibliographic reference.
- Submitting as one's own original work, material obtained from an individual, agency, or the internet without reference to the person, agency or webpage as the source of the material.
- Submitting as one's own original work material that has been produced through unacknowledged collaboration with others without release in writing from collaborators.
- Submitting one's own previously written or oral work without modification and instructor permission.

Plagiarism will not be tolerated and according to the Student Code of Conduct may result in the following consequences:

- Formal report of academic misconduct.
- Reduced or failing grade on the exercise.
- Reduced or failing grade for the course.
- Recommendation to the College Hearing Panel/Dean/Provost for probation, suspension, or dismissal.

Plagiarism Check:

In this course, we will use Turnitin within Canvas for some or all assignments.

Turnitin is a plagiarism detection tool that checks the originality of your work against the expansive Turnitin database, as well as [AI detection](#). After submitting your written assignment, Turnitin will create an originality report identifying whether parts of your work match or are similar to other sources. Turnitin is a great way to prevent, as well as detect plagiarism within student writing. The work submitted to Turnitin will be added to the Turnitin database to be used solely for the purpose of checking future submitted work for originality.

Use of Artificial Intelligence (AI):

Turnitin also measures the use of AI and GPT bot software programs. **You MAY NOT utilize AI or GPT bots to complete assignments for this course.**

Missed and/or late examinations:

The instructor reserves the right to make decisions about extenuating circumstances for missed deadlines on a case-by-case basis. LATE ASSIGNMENTS MAY RESULT IN ONE LETTER GRADE EACH DAY IT IS LATE!

Classroom Procedures/Policies

Communication

The instructor will communicate with students via e-mail and CANVAS. Students are expected to check CANVAS regularly for current copies of the syllabus, announcements, assignments, readings, and posted grades. The instructor will check e-mail daily during the work week (Monday-Friday) for communication with students and will try to respond, if needed, within 24 hours (except when out of the office due to illness or academic business). Unless otherwise notified, e-mail will be sent the student's university e-mail address.

Attendance Policy

Attendance at class sessions and participation in class activities are a critical aspect of this course. Students are expected to attend class regularly. Missing more than two sessions without a valid excuse (e.g., documented medical reason), may lower the course grade. The instructor reserves the right to make decisions about extenuating circumstances for missing classes on a case-by-case basis.

Classroom Etiquette

It is expected that everyone will respect the rights of others and help provide a good learning environment. Cell phones must be turned off or "on silent" before class, food should not be consumed, and the bringing of children or other visitors is only permitted with instructor's approval. Appropriate e-mail etiquette should also be observed.

Class Cancellation and Weather Policy

This course will follow the University of Cincinnati Weather Policy: In-person courses will not meet if the University is closed. If opening of the UC Uptown campus is DELAYED, courses that are scheduled to start prior to the new opening time are CANCELLED. If UC closes early, classes scheduled to start after the closing time are CANCELLED. Watch local news outlets, University website, texts from University

Ohio's Testing Your Faith Act

Ohio law and the University's Student Religious Accommodations for Courses Policy 1.3.7 permits a student, upon request, to be absent for reasons of faith or religious or spiritual belief system or participate in organized activities conducted under the auspices of a religious denomination, church, or other religious or spiritual organization and/or to receive alternative accommodations with regard to examinations and other course requirements due to an absence permitted for the above-described reasons. Not later than fourteen days after the first day of instruction in the course, a student should provide the instructor with written notice of the specific dates for which the student requests alternative accommodations. For additional information about this policy, please contact the Executive Director of the Office of Equal Opportunity and Access at (513) 556-5503 or oeohelp@UCMAIL.UC.EDU.

Pass/Fail, Audit, and Withdrawal Policy: See MPH and UC Policies

Students are not permitted to change their mode of grade from traditional to Pass/Fail. Audits must be approved by the Instructor. Students who wish to withdrawal from this course are responsible for meeting the registrar deadlines.

[UC Registrar Fall 2023 Dates and Deadlines](#)

Course Calendar

Dates	Topic(s):	Textbook Chapters	Assignments	Due Dates
1/11	Introduction to aerosol in environment	1	Assignment 1 50 pts	1/18
1/18	Single particle motion	3, 5	Assignment 2 100 pts	2/8
1/25	Diffusion and thermal forces	7, 8		
2/1	Filtration	9	Assignment 3 100 pts	2/22
2/8	Electrical and optical properties	15, 16		
2/15	Aerosol generation: Nucleation, condensation, coagulation	12, 13	Assignment 4 100 pts	2/29
2/22	Aerosol generation in the lab	21		
2/29	Particle size distribution and measurement	4, 10		
3/7	Exam 1 (250 pts) (covering everything in the green)			
3/14	Spring break (no class)			
3/21	Particle sampling	10, 20	Assignment 5 100 pts	3/28
3/28	Direct reading monitors and aerosol sensors	10	Assignment 6 100 pts	4/11
4/4	Bioaerosol and sampling	19		
4/11	Respiratory deposition Health effects (I)	11	Assignment 7 100 pts	4/25
4/18	Health effects (II) Nanoparticles	-		
4/25	Exam 2 (250 pts) (covers everything in the blue)			

Student Resources and Academic Support

Students are expected to review and follow the [UC Faculty Senate policies](#) and [Campus Life](#) resources on the following topics:

[Accessibility Resources](#)

The University of Cincinnati is committed to providing full and equal access to students, employees and visitors with disabilities. The University is actively engaged in improving the accessibility of our community, in the classroom, in the workplace, on campus, and online. If you have a disability (e.g., visual impairment, hearing impairment, physical impairment, communication disorder, and/or specific learning disability, etc.) which may influence your performance in this course, you must meet with the Accessibility Resources Office to arrange for reasonable accommodations to ensure an equitable opportunity to meet all the requirements of this course. If you require accommodations due to disability, please contact Accessibility Resources at 513-556-6823, Campus Location: [Commons Edge North](#).

[Graduate Students' Guide to Library Resources and Services](#): resources, tools, and services provided to graduate students by the University of Cincinnati Libraries.

[Learning Commons](#): provides many FREE services and programs available to all students.

[Academic Writing Center](#) is available for one on one appointments, workshops and tutoring.

[Equity, Inclusion, & Community Impact](#)

The Division of Equity, Inclusion & Community Impact works to bring out the best in our students, faculty and staff by valuing their unique backgrounds, experiences and perspectives. The Division of Equity, Inclusion & Community Impact addresses issues of discrimination, harassment, sexual misconduct and retaliation so members of our community can work, learn, grow and thrive in a safe and supportive environment.

[Notice of Non-Discrimination](#)

The University of Cincinnati is committed to building a welcoming and inclusive environment where discrimination, harassment, and retaliation is not tolerated.

Safety, Health & Wellness

[UC Police & Public Safety](#)

(513) 556-1111 (non-emergency)

UC's Public Safety Department work hand-in-hand with members of the Cincinnati Police Department and other community partners to prevent crime and provide vital safety services and resources. The UC Police have a dedicated victim support team available for sexual assault survivors. Making a police report and ensuring that evidence is collected is important to preserve the option of prosecution, but it does not mean you have to prosecute.

[Virtual Wellness Resources](#)

During these uncertain times, the Student Wellness Center wants to make sure you have the resources to maintain your health and wellness. This is a collection of virtual resources, apps, websites, podcasts, articles and more.

[Counseling and Psychological Services](#)

University of Cincinnati Counseling and Psychological Services (CAPS) is committed to embracing and celebrating diversity that works towards the ***inclusivity and belongingness for all*** in our campus community. The CAPS main office is located at 225 Calhoun St. Suite 200 (next door to Target).

[Crisis Emergent Services](#)

CAPS offers 24/7 phone crisis access to students who are in need of immediate support through telephone consultations or after hours crisis support. These services are accessible by calling **513-556-0648** and selecting the appropriate options.

Dean of Students Resources

[BCP and Resource Center \(Bearcats Pantry\)](#)

The UC Bearcats Pantry (BCP) and Resource Center provides free food, hygiene items, cleaning supplies, and professional clothing to students of all backgrounds with food and other insecurities. The pantry also provides meal vouchers that can be used at campus dining halls and To-Go Bags that can be conveniently picked up at locations across campus.