

- Course Title:** Indoor Air Quality (IAQ)
- Course Number:** ENOH0644-J-030
- Course Pre-requisites:** PHCO0503-J-030/-035/-001 or equivalent via transfer credits, etc.
- Course Location:** School of Public Health (SPH) building, Piscataway (New Brunswick)
- Course Date & Time:** Monday in-person for up to two hours during 3-5 PM, plus asynchronous online readings and videos with required discussion board posts during scheduled times Monday and/or Friday-Sunday
- Course Instructor:** Derek G. Shendell, D.Env, MPH, Professor and Director of the New Jersey (NJ) Safe Schools Program, Department of Environmental & Occupational Health & Justice, Rutgers SPH; (732) 235-5409 w/voice mail checked on- and off-campus; shendedg@sph.rutgers.edu
- Note:** There will also be some guest lecturers during the semester, who will lead about one-half of an in-person class meeting with us.
- Office Hours:** Before and after class meetings for ~≤30 minutes; by appointment
- Course Assistant:** N/A
- Course Website:** <https://rutgers.instructure.com/courses/205369>
- Required Course Text:** N/A. We use peer-reviewed journal papers and NJ/U.S. agencies websites/materials as well as non-profit/university materials.

Additional/Supplemental Readings/Reference Books and Resources:

There is no perfect textbook available for this course. Please take good notes and organize any handouts/supplemental readings reviewed from peer-reviewed journals.

These books are recommended, however, for reference:

- (1) Godish, T. Indoor Environmental Quality. 2001, Lewis Publishers, CRC Press LLC, Boca Raton, FL.
- (2) Spengler JD, Samet JM, McCarthy JF (editors). Indoor Air Quality Handbook. 2001, McGraw-Hill Companies, Inc., New York, NY.

Course Description: This course addresses indoor air and environmental quality (IAQ / IEQ) problems and mitigation approaches. The course examines major sources, commonly identified pollutants (exposure agents or risk factors for acute and chronic adverse health effects), and factors determining pollutant concentrations in indoor environments. The course also examines health risks associated with various IAQ problems in contrast to other relevant types of health risks (from outdoor air, ergonomics, etc). Risk management options and recommendations, including regulatory and technical approaches, will be reviewed and discussed.

Selected Department Competencies Addressed: Each Department identifies competencies for each degree offered. The competencies addressed in this course for the MPH

and doctoral degrees (as an elective course) in Environmental and Occupational Health include:

- Describe the major environmental health problems to the general public as well as specific communities.
- Develop a testable model of environmental exposures (one or more agents) and adverse health outcomes (causing injury, disability, or other measure of morbidity or mortality).
- Specify current environmental risk assessment approaches and methods for a particular hazard or risk.

Course Objectives: By the completion of this course, students will be able to:

- Identify major IAQ problems in developed (industrialized) and less developed countries.
- Understand health risks associated with IAQ.
- Describe quantitatively (and qualitatively) factors determining measured or estimated (and/or perceived) levels of pollutants indoors.
- Describe sources, removal mechanisms, exposures, levels, potential adverse acute and chronic health effects, and measurement methods for commonly identified indoor air pollutants.
- Explain principles of technical approaches used to help improve IAQ, e.g., ventilation, particle and gases filtration.
- Describe existing policies and regulations for reducing exposures to indoor air pollutants.
- Understand how to reduce IAQ related health risks.

Course Requirements and Grading:

In addition to standard class lecturing, several other means will be used to enhance the teaching/learning effectiveness. Homework problems or mini-projects (group or individual) will be assigned. Students are expected to learn concentration, exposure and ventilation calculations through the assignments. Depending on the number of students enrolled, projects can be done on an individual or a group basis. This course is based on 1000 points as follows:

Weekly Preparation, Attendance, Participation & Discussion, ***both in-person and online***
= 12*5 (excluding 1st week/Dr. Shendell prepares everything in advance)
= **60%** (600 total points)

Preparation, Attendance & Participation for the week students choose readings
= **10%** (20 for paper selection, 20 to attend, 60 for oral presentation/discussion)

Mid-Term Exam as Paper/Project Report
= **20%** (200 total points)

Final Exam as Oral Presentation on Paper/Project Report
= **10%** (50 for PPT, 50 for oral presentation and questions/answers/discussion)

Note: Additional details about in-class participation and online discussion boards as well as the paper/project and presentation will be provided via Rutgers Canvas.

The grading scale is:

<i>Grading Policy:</i>	94 – 100	A
	90 – <94	A-
	87 – <90	B+
	84 – <87	B
	80 – <84	B-
	77 – <80	C+
	70 – <77	C
	<70	F

Course Schedule: Please see supplemental Excel table of dates/topics, etc. on Canvas

Learning Management System: Canvas will be used extensively throughout the semester for course syllabus, assignments, announcements, communication and/or other course-related activities. It is the student's responsibility to familiarize themselves with Canvas and check it regularly. If you have difficulties accessing Canvas, please inform the instructor and Canvas Support (help@canvas.rutgers.edu). Canvas is accessible at canvas.rutgers.edu.

School of Public Health Honor Code: The School of Public Health Honor Code is found in the School Catalog (sph.rutgers.edu/academics/catalog.html). Each student bears a fundamental responsibility for maintaining academic integrity and intellectual honesty in his or her graduate work. For example, all students are expected to observe the generally accepted principles of scholarly work, to submit their own rather than another's work, to refrain from falsifying data, and to refrain from receiving and/or giving aid on examinations or other assigned work requiring independent effort. In submitting written material, the writer takes full responsibility for the work as a whole and implies that, except as properly noted by use of quotation marks, footnotes, etc., both the ideas and the works used are his or her own. In addition to maintaining personal academic integrity, each student is expected to contribute to the academic integrity of the School community by not facilitating inappropriate use of her/his own work by others and by reporting acts of academic dishonesty by others to an appropriate school authority. It should be clearly understood that plagiarism, cheating, or other forms of academic dishonesty will not be tolerated and can lead to sanctions up to and including separation from the Rutgers School of Public Health.

Students with Disabilities: Rutgers University welcomes students with disabilities into all of the University's educational programs. In order to receive consideration for reasonable accommodations, a student must apply for Services by first completing a Registration Form with the Rutgers Office of Disability Services (ODS) at ods.rutgers.edu. The student will also be required to participate in an ODS intake interview and provide documentation. If reasonable accommodations are granted, ODS will provide you with a Letter of Accommodations which should be shared with your instructors as early in your courses as possible.

Commitment to Safe Learning Environment: The Rutgers School of Public Health is committed to helping create a safe learning environment for all students and for the School as a whole. Free expression in an academic community is essential to the mission of providing the highest caliber of education possible. The School encourages civil discourse, reasoned thought, sustained discussion, and constructive engagement. Provocative ideas respectfully presented are an expected result. An enlightened academic community, however, connects freedom with responsibility. The School encourages all students to disclose any situations where you may feel unsafe, discriminated against, or harassed. Harassment or discrimination of any kind will be not tolerated and violations may lead to disciplinary actions.

Reporting Discrimination or Harassment: If you experience any form of gender or sex-based discrimination or harassment, including sexual assault, sexual harassment, relationship violence, or stalking, know that help and support are available. You may report such incidents to the [RBHS Title IX Office](#) or to the School of Public Health's [Office of Student Affairs](#). Rutgers University has staff members trained to support survivors in navigating campus life, accessing health and counseling services, providing academic and housing accommodations, and more. If you experience any other form of discrimination or harassment, including racial, ethnic, religious, political, or academic, please report any such incidents to the School's [Office of Student Affairs](#). The School strongly encourages all students to report any incidents of discrimination or harassment to the School. Please be aware that all Rutgers employees (other than those designated as confidential resources such as advocates, counselors, clergy and healthcare providers as listed in Appendix A to [Policy 10.3.12](#)) are required to report information about such discrimination and harassment to the School and potentially the University. For example, if you tell a faculty or staff member about a situation of sexual harassment or sexual violence, or other related misconduct, the faculty or staff member must share that information with the [RBHS Title IX Coordinator](#). If you wish to speak to a confidential employee who does not have this reporting responsibility, you can find a list of resources in Appendix A to University [Policy 10.3.12](#). For more information about your options at Rutgers, please visit [Rutgers Violence Prevention and Victim Assistance](#).

Graduate Student Computer Policy: Students are required to possess a personal laptop, no older than approximately two years, that must meet minimum requirements which may be found online at: sph.rutgers.edu/student-life/computer-support.html

Policy Concerning Use of Recording Devices and Other Electronic Communications Systems: When personally owned communication/recording devices are used by students to record lectures and/or classroom lessons, such use must be authorized by the faculty member or instructor who must give either oral or written permission prior to the start of the semester and identify restrictions, if any, on the use of mobile communications or recording devices.

Policy Concerning Use of Turnitin: Students agree that by taking this course all required papers may be subject to submission for textual similarity review to Turnitin.com (directly or via learning management system, i.e. Canvas) for the detection of plagiarism. All submitted papers will be included as source documents in the Turnitin.com reference database solely for the purpose of detecting plagiarism of such papers. Use of the Turnitin.com service is subject to the Usage Policy posted on the Turnitin.com site. Students who do not agree should contact the course instructor immediately.

Withdrawal/Refund Schedule: Students who stop attending their course(s) without submitting a completed [Add/Drop Course](#) form will receive a failing grade. Furthermore, students dropping to zero credits for the semester are considered withdrawn and must submit a completed [Leave of Absence](#) form from the School of Public Health's Office of Student Affairs. The School of Public Health refunds tuition only. Administrative and technology fees are non-refundable. You may find the Withdrawal/Refund Schedule on the School of Public Health website at: sph.rutgers.edu/academics/academic-calendar.html

Fall 2022: ENOH0644 Indoor Air [& Environmental] Quality, Rutgers School of Public Health, Piscataway (N.B. Busch) campus
v.8/1-3/2022 DGS (Note: This is subject to potential change up to and including week of 9/12/2022)

Week #	Course Part / Section	Class Meeting Date (then online after class)	Indoor Air Quality (IAQ) / Indoor Environmental Quality (IEQ) Topic of In-Person Class and Subsequent Online Discussion Board Activities
1	I	9/12/22	I.) Introduction, Course Overview and Dr. Shendell Review of Related Core Course's Concepts. II.) Indoor microenvironments group activity
2	I	9/19/22	biological agents of exposure, including moisture damage (leaks, flood, humidity), mold
3	II	9/26/22	heavy metals (inorganic chemicals including lead, mercury, arsenic, chromium), and persistent organic chemical pollutants (phthalates, PBDEs, PAHs, PCBs, etc)
4	II	10/3/22	chemical agents of exposure, e.g., volatile and semi-volatile organic compounds
5	II	10/10/22	particulate matter of various size fractions, pollen and fibers (asbestos, etc)
6	III	10/17/22	1.) ventilation or air exchange rates, operations/maintenance of building systems;
7	III	10/24/22	2.) thermal comfort parameters (temperature, relative humidity); 3.) noise (A-weighted decibels of human concern), light (fluorescent, natural daylight)
8	IV	10/31/22	1.) IAQ/IEQ issues in Commercial Office Buildings (Bldg) & Small Business, Bldg-Related Illness vs. Sick Bldg Syndrome Symptoms; 2.) Special Guest Lecture: Dr. Koshy Koshy, to cover specialized non-occupational and occupational indoor microenvironments: fire and
9	None-APHA	11/7/22	No Class Meeting In-Person, but finish readings for / completion of Paper #2 Assignment during weekend of 11/5-7

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Week #	Course Part / Section	Class Meeting Date (then online after class)	Indoor Air Quality (IAQ) / Indoor Environmental Quality (IEQ) Topic of In-Person Class and Subsequent Online Discussion Board Activities
10	IV	11/14/22	IAQ/IEQ issues in Residences/Homes
11	V	11/21/22	IAQ/IEQ issues in K-12 Schools (public, private, charter/independent) and Higher Education Institutions
12	V	11/28/22	IAQ/IEQ issues with School Buses (various fuels used)
13	VI	12/5/22	IAQ/IEQ issues with Personal Vehicles, Public Transportation and Truckers
14	VI	12/12/22	IAQ/IEQ issues in less developed countries. <i>Each student chooses or receives from Dr. Shendell (your choice) a paper to discuss on a residential/home study.</i>
15	Town Hall	12/19/22	Presentation/Discussion of paper #2 on lit review with "student choice" research journal papers, or of field mini-project (up to 15 minute per person/team)
Paper #1	Re: I-III	10/16/22	Please submit to Dr. Shendell via Canvas by 10-11 PM EDT! <i>Note: Graded papers returned ≤5-10 calendar days.</i>
Paper / Project #2	Re: I-VI	11/7/22	Please submit to Dr. Shendell via Canvas by 9-10 PM EDT! <i>Note: Graded papers returned ≤5-10 calendar days.</i>
Oral PPT	Re: I-VI	12/11/22	Please submit to Dr. Shendell via Canvas by 10-11 PM EDT! <i>Note: We use this file in final class Town Hall meeting.</i>
Competency			Assessments [Paper 1, Paper 2, Weekly In-Class Participation, Online 30 Weekly Assignments, Oral Presentation on Paper 2]
1	1, 2, 3	1-8 and 10-15	Paper 1, In-Class Participation, Online 30 Assignments
2	2, 3, 7	1-8 and 14	Paper 1, In-Class Participation, Online 30 Assignments
3	4, 6	1-2, 6-7, 10-11	Papers 1-2, In-Class Participation, Online 30 Assignments
4	2, 3, 4, 5, 7	1-5 and 14	Paper 1, In-Class Participation, Online 30 Assignments
5	1, 3, 4, 5, 6, 7	1-8 and 10-15	Papers 1-2, In-Class Participation, Online 30 Assignments, Oral Presentation