

Environmental & Occupational Hygiene PROGRAM BULLETIN

**DEPARTMENT OF ENVIRONMENTAL HEALTH
UNIVERSITY OF CINCINNATI
P.O. BOX 670056
CINCINNATI, OH 45267-0056**

MASTER OF SCIENCE DEGREE PROGRAMS

IN

COMPREHENSIVE PRACTICE (page 6)

HAZARDOUS SUBSTANCES (page 8)

OCCUPATIONAL SAFETY AND ERGONOMICS (page 10)

THESE PROGRAMS ARE COMPONENTS OF THE NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY & HEALTH – SUPPORTED EDUCATION AND RESEARCH CENTER (ERC) AT THE UNIVERSITY OF CINCINNATI (WWW.EH.UC.EDU/ERC). THE M.S. PROGRAMS IN COMPREHENSIVE PRACTICE & HAZARDOUS SUBSTANCE INCLUDE COURSE WORK THAT HAS BEEN ACCREDITED BY THE APPLIED SCIENCE ACCREDITATION COMMISSION OF THE ACCREDITATION BOARD FOR ENGINEERING AND TECHNOLOGY, INC.

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Comment [GT1]: Put first names first in the list. We all use our first names, you can keep the list in the same order.

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Biomechanics and Ergonomics	558-1158
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Bioaerosol Research Laboratory	558-0315
Environmental and Industrial Hygiene	558-1747
Hazardous Waste Worker Training	558-0528
Biomonitoring Laboratory	558-6050

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Faculty Profile

ENVIRONMENTAL AND OCCUPATIONAL HYGIENE DIVISION

*Department of Environmental Health, University of Cincinnati
P.O. Box 670056, Cincinnati, Ohio 45267-0056*

Each of the core faculty members has broad-based experience in environmental hygiene practice and is a specialist in one or more areas of environmental and industrial hygiene, indoor air quality or ergonomics research. Each core faculty is qualified to teach at the practitioner and advanced scientific levels. The core faculty is assisted at both levels by colleagues in the Department and the University as well as by adjunct and volunteer faculty members and lecturers from industry and governmental institutes in the Cincinnati area. A brief description of each of the core faculty's and support staff's areas of specialization is given below:

Core Faculty and Support Staff

Professor Emeritus **Howard E. Ayer**, CIH, C.S.P., has experience in industrial hygiene laboratory and field research, practice and training. His laboratory and field studies have included aerosols (oil mist, silica dust and asbestos), radiation (uranium mine radon studies), noise (airport and industrial) and ventilation.

Professor **Amit Bhattacharya**, Ph.D., CPE, was trained in the field of mechanical engineering with specialization in biomedical engineering and stress physiology. His research efforts are in biomechanics, ergonomics, neurobehavioral function, under exposure to toxians and stress physiology, novel screening tool for health protection of workers.

Professor **Scott Clark**, Ph.D., P.E., CIH, has a background in environmental health engineering and has been focusing his efforts on exposure pathways and intervention evaluation for environmental lead and on exposure assessments in residential and occupational environments. He is also involved in health risk assessment and occupational hygiene education program development.

Assistant Professor **Kermit Davis**, Ph.D., AEP, was trained in Industrial Engineering with specialization in occupational ergonomics and low back biomechanics with special interest in multiple exposures, both physical and psychosocial stressors.

Professor **Sergey Grinshpun**, Ph.D. was trained as a physicist with focus on aerosols. He is involved in research on aerosol measurement, characterization and control of airborne particles and microorganisms in indoor and outdoor environments. Since 2000, he has been directing the Center for Health-Related Aerosol Studies.

Associate Professor **Tiina Reponen**, Ph.D., is engaged in laboratory and field studies in aerobiology involving airborne aeroallergens, bacteria, fungi and pollen.

Professor **Carol Rice**, Ph.D., CIH, specializes in the assessment of current industrial exposures and the evaluation of working-lifetime exposures. She has a special interest in the use of historical exposure data to reconstruct past human exposures for occupational epidemiology studies; since 1987, she has been director of the Midwest Consortium for Hazardous Waste Worker Training.

Professor **Glenn Talaska**, Ph.D., CIH, has a background in industrial hygiene, genetic toxicology, and carcinogenesis. His research is related to biological monitoring, chemical carcinogens and includes DNA adduct analysis, cytogenetics and metabolite analysis.

Professor Emeritus **Klaus Willeke**, Ph.D., CIH, has a background in engineering and applied physics and has contributed primarily in the field of physical and biological aspects of aerosol science and technology. His research efforts include fundamental work on aerosol sampling and measurement techniques, deposition of aerosols in the human respiratory system, real time measurement of industrial and environmental aerosols, and new methods of respiratory protection techniques in industry and health care environments.

Additional Core Faculty for Occupational Safety & Ergonomics

Ash Genaidy, Ph.D.
Department of Mechanical, Industrial & Nuclear Engineering
Primary Research Areas: **Ergonomics, Occupational Biomechanics**

Richard Shell, Ph.D., PE
Director, Safety Engineering Program and Industrial Engineering, Department of Mechanical, Industrial & Nuclear Engineering
Primary Research Areas: **Ergonomics, Occupational Biomechanics**

Woojin Park, PhD, Department of Mechanical, Industrial & Nuclear Engineering
Primary Research Areas: **Occupational Safety, Ergonomics**

Thomas Waters, Ph.D., CPE (Certified Professional Ergonomist)
Volunteer Associate Professor
NIOSH, Cincinnati
Primary Research Areas: **Ergonomics, Occupational Biomechanics**

Ronald Huston, Ph.D. Professor
Department of Mechanics
Primary Research Area: **Biomechanics**

Part-Time/Adjunct and Volunteer Faculty

Paul Baron, Ph.D., National Institute for Occupational Safety and Health (NIOSH), Edward Burroughs, Ph.D., CIH (NIOSH), Laurence Doemeny, Ph.D. (NIOSH), Richard Fulwiler, Sc.D., CIH (Technology Leadership Associates), John Kominsky, CIH, CSP, CHMM, Andrew Maynard, Ph.D. (NIOSH), Thomas Waters, Ph.D. (NIOSH), Brian Lowe, PhD (NIOSH) Thurman Wenzl, Ph.D., CIH, Linda Levin, Ph.D.

UC Department of Environmental Health Faculty Interacting with Program Faculty and Students

Marshall Anderson, Ph.D., Stuart Baxter, Ph.D., Eula Bingham, Ph.D., Robert Bornschein, Ph.D., Ralph Buncher, Sc.D., Ranjan Deka, Ph.D., Kim Dietrich, Ph.D., Kathleen Dixon, Ph.D., Mary Genter, Ph.D., Judy Jarrell, Ed.D., George Leikauf, Ph.D., Grace LeMasters, Ph.D., Linda Levin, Ph.D., James Lockey, M.D., Roy McKay, Ph.D., Ann Middaugh, M.D., Marian Miller, Ph.D., Daniel Nebert, M.D., Jon Reid, Ph.D., Howard Shertzer, Ph.D., Rakesh Shukla, Ph.D., Paul Succop, Ph.D., David Warshawsky, Ph.D.

Other UC Department Faculty Teaching Required or Recommended Courses

Audiology: Robert Keith, Ph.D.

Civil and Environmental Engineering: David Altman, J.D., Timothy Keener, Ph.D., Riley Kinman, Ph.D., Pasquale Scarpino, Ph.D. (Joint Appointment in Environmental Health)

Mechanical, Industrial and Nuclear Engineering: Roy Eckart, Ph.D., Ash Genaidy, Ph.D. (Joint Appointment in Environmental Health), Urmila Ghia, Ph.D., Ronald Huston, Ph.D., Anil Mital, Ph.D., Richard Shell, Ph.D. (Joint Appointment in Environmental Health), Woojin Park, PhD and Henry Spitz, Ph.D.

PROGRAM DESCRIPTIONS, ADMISSION REQUIREMENTS

For each of the programs offered in the division, students are expected to register for at least 15 credit hours each quarter. The standard tuition allows up to 19 credits per quarter. An acceptable Master's thesis demonstrating critical judgment is required. Upon acceptance of a research proposal by the degrees committee, the thesis is performed under the guidance of the appointed committee. While working on the thesis, the student may sign up for thesis credits, up to 15 credit hours per quarter. Students receiving financial assistance must maintain satisfactory progress towards the degree. All requirements must be completed within 7 years of entry to candidacy; a student no longer in residence at the University must register for one graduate credit in the Autumn quarter. Financial support for qualifying students is available from the ERC and from the University of Cincinnati.

A brief description of each program is shown below, followed in the next few pages with specific course requirements. See the Department of Environmental Health Graduate Student Guidelines Handbook for additional information.

Environmental and Occupational Hygiene

Comprehensive Practice:

This program prepares individuals with the skills, scientific knowledge and state-of-the art expertise to anticipate, identify, evaluate, and control health hazards and causes of discomfort in the workplace and other environments. Successful candidates will be better prepared to develop solutions to occupational and environmental exposures that may cause adverse health effects (e.g., air contamination, noise, radiation, chemical).

Hazardous Substances:

Students desiring more education in the occupational and environmental aspects of hazardous material may enter this program that builds on the Comprehensive practice program. Additional requirements include course work in biomonitoring and risk assessment, completion of a 40-hour program for hazardous waste site workers (see 29CFR1910.120), and a thesis in a relevant topic.

Occupational Safety and Ergonomics (OSE)

This interdisciplinary program is offered with courses from the Department of Environmental Health (DEH) in the College of Medicine and the Department of Mechanical, Industrial and Nuclear Engineering (MINE) in the College of Engineering. The curriculum is designed to provide dual emphasis on the health and engineering aspects of ergonomics and safety. This program will prepare the students to meet the current and future ergonomic/safety concerns of the workforce. In general, a student with an undergraduate engineering degree will apply for admission into OSE through MINE while those with majors in medical sciences, biology, chemistry, physics, psychology and management will apply through the DEH. The OSE program in MINE has more of an engineering emphasis while that in the DEH has more of a health emphasis. Students are encouraged to take as many elective courses as possible from both departments in order to ensure broad-based training in both the engineering and the health aspects of ergonomics and safety.

Admission Requirements

Candidates for master's degrees in Environmental and Occupational Hygiene and in Occupational Safety and Ergonomics must hold a baccalaureate degree with a minimum of 120 semester hours or the equivalent, including 60 or more, and preferably 68 or more, semester-hour credits in undergraduate- or graduate-level courses in science, mathematics, engineering, and technology, with at least 15 of those at the upper (junior, senior, or graduate) level and a minimum of 21 semester-hour credits, or the equivalent in communications, humanities, and social sciences. Applicants to these programs must have completed at least three of the following one year college courses, with above average grades: chemistry, biology, physics and calculus or statistics. The Graduate Record Examination is also required of all applicants. For International students, a minimum score of 580 is required on the TOEFL examination.

THESE GUIDELINES ARE EFFECTIVE AS OF AUGUST 2005. CONTACT THE GRADUATE STUDIES OFFICE OF THE DEPARTMENT TO INSURE THAT THESE ARE THE MOST UP-TO-DATE GUIDELINES.

**REQUIRED COURSES FOR
COMPREHENSIVE PRACTICE-M.S.**

Quarter	Course	Number	Credits
Autumn Year 1	Environmental Health Seminar	26-ENV-701	1
	Principles of Occupational Exposure Assessment	26-EIH-707	3
	Practice in Occupational Exposure Assessment I	26-EIH-741	3
	Programmatic Aspects of Occupational Health & Safety	26-EIH-781	1
	Introduction to Biostatistics	26-BE-787	4
	Identification of Potential Workplace Exposures	26-EIH-904	2
	Occupational Safety Engineering ^a	20-INDS-710	3
	Current Topics in Industrial Hygiene	26-EIH-981	<u>1</u> 18
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Winter Year 1	Environmental Health Seminar	26-ENV-702	1
	Practice in Occupational Exposure Assessment II	26-EIH-742	3
	Introduction to Epidemiology	26-BE-776	3
	Survey of Environmental Toxicology	26-TOX-782	3
	Physical Aspects of the Environment	26-EIH-790	3
	Identification of Potential Workplace Exposures	26-EIH-905	2
	Current Topics in Industrial Hygiene	26-EIH-982	<u>1</u> 16
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Spring Year 1	Environmental Health Seminar	26-ENV-703	1
	Physical & Biological Aspects of Aerosols	26-EIH-743	3
	Evaluation of Workplace Exposures	26-EIH-775	3
	Principles of Ergonomics	26-OSE-792	3
	Current Topics in Industrial Hygiene	26-EIH-983	1
	Electives ^b	---	<u>Var</u> 15 minimum
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Summer ^c			
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Autumn Year 2	Environmental Health Seminar	26-ENV-701	1
	Occupational Health, Hygiene and Safety Workshop	26-EIH-819	2
	Teaching Practicum in Environmental Health	26-ENV-725	1 (min)
	Hazardous Materials Management	26-EIH-834	2
	Health Physics	20-NUC-640	3
	Current Topics in Industrial Hygiene	26-EIH-981	1
	Master Thesis Research ^d	26-ENV-791	Var
	Electives	---	<u>Var</u> 15 minimum
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Winter	Environmental Health Seminar	26-ENV-702	1
	Occupational Health, Hygiene and Safety Workshop	26-EIH-820	2
	Special Topics	26-EIH-971	1
	Ethics in Research	26-GNTD-730	1
	Current Topics in Industrial Hygiene	26-EIH-982	1
	Effective Methods of Worker Health and Safety Training	26-EIH-846	2
	Master Thesis Research	26-ENV-791	Var
	Electives	---	<u>Var</u> 15 minimum
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Quarter	Course	Number	Credits

Spring 8/19/2005	Environmental Health Seminar	26-ENV-703	1
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Year 2	Occupational Health, Hygiene and Safety Workshop	26-EIH-821	2
	Current Topics in Industrial Hygiene	26-EIH-983	1
	Master Thesis Research	26-ENV-791	Var
	Electives	---	<u>Var</u> 15 minimum

- a) Acceptable substitutions for this class are: 20 MINE 779 Safety Engineering and Product Liability (winter quarter) or 20 MINE 621 System Safety 1.
- b) Choose a minimum of 9 credits from the following list:
- Stress and Cognition/ 15 PSYCH 824 (3)
 - Human Biological Monitoring & Biomarkers/ 26 EIH 843 (3)
 - Biomechanical & Physiological Aspects of Muscular Activity/ 26 OSE 744 (3)
 - Applied Risk Assessment/ 26 TOX 878 (3)
 - Basic Principles of Environmental Law/ 20 CEE 657 (3)
 - Management of Professionals/ 20 MINE 640 (3) or Occupational Health Management/ 26 OCCM 748 (2)
 - Methods to Obtain Complete Occupational Histories/ 26 EIH 845 (2)
 - Survey of Public Health/ 26 EHS 746 (3) (offered only in academic years beginning with even numbers)
 - System Safety I/ 20 MINE 621 (3) (not if taken in place of 20 INDS 771)
 - Respirators & Respiratory Protection/ 26 OCCM 854 (2)
 - Basics of Occupational Medicine/ 26 OCCM 786 (2) (not offered 2005-06)
 - Basics of Environmental Medicine/ 26 OCCM 987 (2) (offered only in academic years beginning with odd number, not offered 2005-06)
- c) A summer of internship is recommended for students with no prior EOH work experience. No course credit is given.
- d) A form is available in Graduate Studies office must be completed and returned to Graduate Studies.

The student is expected to take all courses listed above. Any required course may be waived with the permission of the instructor and advisor when the student has had the equivalent course content; the graduate studies office has a form to document these approvals. Another course with equivalent credit hours must then be selected. The academic advisor will assist in this process.

REQUIRED COURSES FOR OCCUPATIONAL SAFETY AND ERGONOMICS-M.S.

Quarter	Course	Number	Credits
Autumn	Environmental Health Seminar	26-ENV-701	1
Year 1	Practice in Occupational Exposure Assessment I	26-EIH-741	3
	Identification of Potential Workplace Exposures	26-EIH-904	2
	Introduction to Biostatistics	26-BE-787	4
	Principles of Occupational Exposure Assessment	26-EIH-707	3
	Current Topics in Industrial Hygiene	26-EIH-981	<u>1</u>
			16

Winter	Environmental Health Seminar	26-ENV-702	1
	System Safety I	20- MINE-621	3
	Safety Engineering & Product Liability	20- INDS-779	3
	Physical Aspects of Environment	26-EIH-790	3
	Identification of Potential Workplace Exposures	26-EIH-905	3
	Introduction to Epidemiology	26-BE-776	3
	Current Topics in Industrial Hygiene	26-EIH-982	1
			17
Spring	Environmental Health Seminar	26-ENV-703	1
	System Safety II	26-MINE-622	3
	Principles of Ergonomics	26-OSE-792	3
	Introduction to Measurement Techniques in Ergonomics	26- OSE-748	3
	Mgt. of Professionals	20-MINE-640	3
	Current Topics in Industrial Hygiene	26-EIH-983	1
	Electives ^a	-----	<u>Var</u>
			15 minimum
Summer	Ergonomic Internship ^b		
Autumn Year 2	Environmental Health Seminar	26-ENV-701	1
	Health Physics	20- NUC-640	3
	Occupational Health Hygiene and Safety Workshop	26-ENV-819	1
	Hazardous Materials Management	26-EIH-834	2
	Biomechanical and Physiological Aspects of Muscular activities	26-OSE-744	3
	Current Topics in Industrial Hygiene	26-EIH-981	1
	Master Thesis Research ^c	26-ENV-791	<u>Var</u>
	Electives	-----	<u>Var</u>
			15 minimum
Winter Year 2	Environmental Health Seminar	26-ENV-702	1
	Teaching Practicum	26-EIH-725	1-3
	Occupational. Health, Hygiene and Safety Workshop	26-ENV-820	<u>Var</u>
	Ethics in Research	26-GNTD-730	2
	Current Topics in Industrial Hygiene	26-EIH-982	1
	Master Thesis Research	26-ENV-791	1
	Electives	-----	<u>Var</u>
			15 minimum

Quarter	Course	Number	Credits
Spring Year 2	Environmental Health Seminar	26-ENV-703	1
	Occupational Health, Hygiene and Safety Workshop	26-EIH-821	2
	Current Topics in Industrial Hygiene	26-EIH-983	1
	Master Thesis Research	26-ENV-791	<u>Var</u>
	Electives	-----	<u>Var</u>
			15 minimum

a) Student is expected to take all course above and to choose a minimum of 9 credits from the following list:

- Introduction to Biomechanics/ 20-MECH-685 (3)
- Organizational Behavior & Theory / 22-MGMT-711 (4)
- Basics of Occupational Medicine/ 26-OCCM-786 (2) (offered only in academic years beginning with odd numbers, not offered 2005-06)
- Occupational Safety / 20-INDS-520/710 (3)
- Human Factors Analysis / 20-INDS-624 (3)
- Regression Analysis / 26-BE-788 (3)
- Stress and Cognition / 15-PSYCH-824 (3)
- Basics of Environmental Medicine /26-OCCM-987 (2) (offered only in academic years beginning with odd numbers, not offered 2005-06)
- Nonparametric Statistics / 26-BE-789 (3)
- Human Body Dynamics / 20-MECH-687 (3)
- Human Factors Design / 20-INDS-630 (3)
- Effective Methods of Worker Health and Safety Training/ 26-EIH-846 (2)
- Practice in Occupational Exposure Assessment II/ 26-EIH-742 (3)
- Evaluation of Workplace Exposures/ 26-EIH-775 (3)

b) Students are expected to work as an occupational ergonomic/safety intern or work on his/her thesis during the summer between year 1 and 2. See your advisor for details.

c) A form available in Graduate Studies office must be completed and returned to Graduate Studies.

The student is expected to take all courses listed above. Any required course may be waived with the permission of the instructor and advisor when the student has had the equivalent course content; the graduate studies office has a form to document these approvals. Another course with equivalent credit hours must then be selected. The academic advisor will assist in this process.

REQUIRED COURSES FOR HAZARDOUS SUBSTANCES—M.S.

Quarter	Course	Number	Credits
Autumn	Environmental Health Seminar	26-ENV-701	1
Year 1	Principles of Occupational Exposure Assessment	26-EIH-707	3
	Practice in Occupational Exposure Assessment I	26-EIH-741	3
	Programmatic Aspects of Occupational Health & Safety	26-EIH-781	1
	Introduction to Biostatistics	26-BE-787	4

8/19/2005

Identification of Potential Workplace Exposures	26-EIH-904	2
Occupational Safety Engineering ^a	20-INDS-710	3
Current Topics in Industrial Hygiene	26-EIH-981	<u>1</u>
		18

Winter	Environmental Health Seminar	26-ENV-702	1
Year 1	Practice in Occupational Exposure Assessment II	26-EIH-742	3
	Introduction to Epidemiology	26-BE-776	3
	Survey of Environmental Toxicology	26-TOX-782	3
	Physical Aspects of the Environment	26-EIH-790	3
	Identification of Potential Workplace Exposures	26-EIH-905	2
	Current Topics in Industrial Hygiene	26-EIH-982	<u>1</u>
			16

Spring	Environmental Health Seminar	26-ENV-703	1
Year 1	Physical & Biological Aspects of Aerosols	26-EIH-743	3
	Human Biological Monitoring & Biological Markers	26-EIH-843	3
	Evaluation of Workplace Exposures	26-EIH-775	3
	Principles of Ergonomics	26-OSE-792	3
	Current Topics in Industrial Hygiene	26-EIH-983	1
	Electives ^b	---	<u>Var</u>
			15 minimum

Summer ^c			
Autumn	Environmental Health Seminar	26-ENV-701	1
Year 2	Teaching Practicum in Environmental Health	26-ENV-725	1 (min)
	Occupational Health, Hygiene and Safety Workshop	26-EIH-819	2
	Hazardous Materials Management	26-EIH-834	2
	Health Physics	20-NUC-640	3
	Current Topics in Industrial Hygiene	26-EIH-981	1
	Masters Thesis Research ^d	26-ENV-791	Var
	Electives	---	<u>Var</u>
			15 minimum

Quarter	Course	Number	Credits
Winter	Environmental Health Seminar	26-ENV-702	1
Year 2	Special Topics	26-EIH-971	1
	Occupational Health, Hygiene and Safety Workshop	26-EIH-820	2
	Ethics in Research	26-GNTD-730	1
	Current Topics in Industrial Hygiene	26-EIH-982	1
	Effective Methods of Worker Health and Safety Training	26-EIH-846	2
	Masters Thesis Research	26-ENV-791	Var
	Electives	---	<u>Var</u>

Spring	Environmental Health Seminar	26-ENV-703	1
Year 2	Occupational Health, Hygiene and Safety Workshop	26-EIH-821	2
	Applied Risk Assessment	26-TOX-878	2
	Current Topics in Industrial Hygiene	26-EIH-983	1
	Masters Thesis Research	26-ENV-791	Var
	Electives	---	<u>Var</u>
			15 minimum

a) Acceptable substitutions for this class are: 20 MINE 779 Safety Engineering and Product Liability (winter quarter) or 20 MINE 621 System Safety I.

b) Choose a minimum of 9 credits from the following list:

- Basics of Environmental Medicine/ 26 OCCM 987 (2) (offered only in academic years beginning with odd number; not offered 2005-06)
- Biomechanical & Physiological Aspects of Muscular Activity/ 26 OSE 744 (3)
- Basics of Occupational Medicine/ 26 OCCM 786 (2) (not offered 2005-06)
- Basic Principles of Environmental Law/ 26 CEE 657 (3)
- Management of Professionals/ 20 MINE 640 (3) or Occupational Health Management/ 26 OCCM 748 (2)
- Stress and Cognition/ 15 PSYCH 824 (3)
- Methods to Obtain Complete Occupational Histories/ 26 EIH 845 (2)
- Survey of Public Health/ 26 EHS 746 (3) (offered only in academic years beginning with even number)
- System Safety I / 20 MINE 621 (3)
- Respirators & Respiratory Protection/ 26 OCCM 854 (2)
- Introduction to Geography Info System/ 23 PLAN 681 (4)
- Introduction to Geography Info System/ 23 PLAN 780 (4)

c) A summer internship is recommended for students with no prior EOH work experience. No course credit is given.

d) A form available in Graduate Studies office must be completed and returned to Graduate Studies.

The student is expected to take all courses listed above. Any required course may be waived with the permission of the instructor and advisor when the student has already had the equivalent course content; the graduate studies office has a form to document these approvals. Another course with equivalent credit hours must then be selected. The academic advisor will assist in this process.