

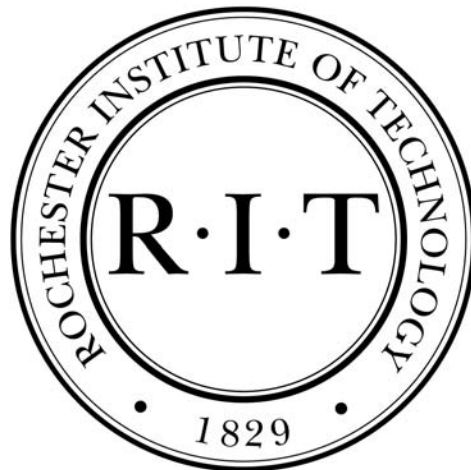
**R·I·T**

**MASTER OF SCIENCE DEGREE**

**IN**

**ENVIRONMENTAL, HEALTH & SAFETY  
MANAGEMENT**

**Program Description**



**2003 - 2004**

**ROCHESTER INSTITUTE OF TECHNOLOGY**

**5/03; REV Master of Science Degree in Environmental, Health & Safety Management  
Program Description**

2003-2004

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## Program Description 2003-2004

*The Department of Civil Engineering Technology, Environmental Management & Safety at Rochester Institute of Technology has produced this document to assist prospective and enrolled students in understanding the Master of Science degree program in Environmental, Health & Safety Management and in planning their graduate education. Reasonable effort has been made to ensure the accuracy of the enclosed information, however, all information is subject to change.*

*Questions about RIT's Master of Science degree program in Environmental, Health & Safety Management should be addressed to the Program Coordinator: Associate Professor Joseph Rosenbeck, Rochester Institute of Technology, Dept. of Environmental Management & Technology, 78 Lomb Memorial Drive, Rochester, NY 14623-5604, phone: (585) 475-6469, email: jmrce@rit.edu.*

### 1. Background

Management of environmental, health and safety (EHS) issues has changed significantly in the past decade. Although they are distinct disciplines, environmental management, occupational health and workplace safety share many technical, regulatory and organizational characteristics. Faced with pressure to streamline their organizations while improving performance, many companies have chosen to capitalize on synergies among these areas by managing them together. Originally trained in only one discipline, EHS professionals now need to be cross-trained in all three functions. The emergence of voluntary standards and the need for companies to consider how EHS can contribute to, rather than detract from, the bottom line, have resulted in a trend to go beyond regulatory compliance through implementing management systems and integrating EHS into key business processes.

### 2. Program of Study

Rochester Institute of Technology (RIT) established the Master of Science degree program in Environmental, Health & Safety Management in 1997 to address the educational needs of EHS professionals and their employers. The program curriculum was developed by an Advisory Committee of experienced EHS managers and program faculty, with the goal of providing graduates with a grounding in the technical and managerial aspects of, and leading practices in, EHS management.

The program is designed for early- to mid-career EHS professionals, and other professionals planning

a career move into this field. Graduates will be able to:

- Identify and leverage the regulatory, voluntary and business drivers for EHS programs.
- Design and implement effective EHS management systems and programs.
- Design and implement performance measurement processes to verify EHS effectiveness.
- Demonstrate how an effective EHS program adds value to the organization.

The program is designed to be flexible enough to meet the needs of:

- Part-time online-learning students.
- Full-time or part-time campus-based students.
- Students from a variety of academic backgrounds.

Students are able to tailor an individual program of study by complementing core courses with professional electives that match their academic needs and career interests. The 48 quarter-credit hour program can be completed in as little as 15 months of full-time study, or as little as 2 years of part-time study while working full-time.

RIT's faculty is highly experienced EHS professionals, ensuring that the curriculum is both relevant and practical.

### 3. About RIT

Founded in 1829, Rochester Institute of Technology is a privately endowed university in suburban Rochester, New York. RIT has approximately 8,500 full-time undergraduate students, 2,500 part-time undergraduate students, and over 2,200 graduate students. Throughout its history, RIT has been at the

forefront of technological and professional career education. RIT's educational philosophy emphasizes both theory and its practical workplace application. This dual emphasis is prized by employers and offers graduates upward career mobility and the flexibility necessary for changes in career direction.

RIT offered its first graduate degree in 1955.

Currently, more than 50 graduate degrees are offered by RIT. RIT has offered distance-learning courses since 1979, and is acknowledged as a leader in online-learning education. Over 4,000 students enroll in RIT online-learning programs annually. RIT has been recognized repeatedly by *U.S. News and World Report* as one of the nation's leading universities and the number one comprehensive university in the East for its science and technology programs. RIT is chartered by the legislature of the State of New York and is accredited by the Middle States Association of Colleges and Schools.

In addition to the MS degree program in Environmental, Health & Safety Management, RIT's Department of Civil Engineering Technology, Environmental Management & Safety offers a BS degree program in Environmental Management & Technology, a BS degree program in Safety Technology, and a BS degree program in Civil Engineering Technology.

#### 4. Applying to the Program

Graduate application forms may be obtained:

- Online: <http://www.rit.edu/~625www>
- Graduate Enrollment Services: (585) 475-2229
- CETEMS Department Office: (585) 475-7318

Applications may be completed and submitted online, or may be mailed to:

Director of Admissions  
Rochester Institute of Technology  
Bausch & Lomb Center  
60 Lomb Memorial Drive  
Rochester, NY 14623-5604

#### *Admissions Requirements*

Admission to the MS degree program in Environmental, Health & Safety Management requires:

- A 4-year bachelor's degree from an accredited college or university.

- An undergraduate grade point average of at least 3.0 (B) over the junior and senior level years.
- At least one college-level course or equivalent experience in computer science.
- At least one college-level course in statistics.
- At least 20 quarter credit hours (or 15 semester credit hours) of college-level science and math coursework. Applicants should have at least four quarter credit-hours (or three semester credit hours) in each of the following three categories:
  - 1) general chemistry or organic chemistry;
  - 2) biology, microbiology, ecology or biochemistry; and
  - 3) physics, geology, hydrology, or geochemistry.

Graduate Record Examination (GRE) scores are not normally required. Applicants who do not meet the above requirements may, however, be required to submit GRE scores to support their candidacy.

#### **In addition to the standard RIT Graduate Application package, applicants to this program must submit:**

- **Two (2) writing samples to demonstrate written communication skills.**
- **A current resume or CV with sufficient detail to identify specific tasks and levels of responsibilities.**

Applicants are expected to have formal academic training or documented work experience in one or more of the following functional areas:

- Environmental management (air, wastewater, solid and hazardous waste).
- Occupational health.
- Occupational safety.

Graduate-level foundation courses in each of these functional areas are available to address any academic or experiential gaps. Up to 12 foundation credits hours may be counted towards program electives. Students requiring foundation courses and/or other prerequisite coursework in excess of 12 credit hours can complete the program by taking the required number of credits beyond the 48-credit minimum. At the time of acceptance, the Admissions Committee will identify the foundation courses that will be required.

Generally, a minimum of one year of relevant work experience will be required. Applicants with less

experience will be expected to complete one or more Graduate Co-op quarters during their program of study.

*International Applicants*

International students are required to have achieved a minimum score of 570 on the Test of English as a Foreign Language (TOEFL) exam. Promising applicants with insufficient TOEFL scores may be accepted conditional on evaluation of language preparation by RIT's English Language Center (ELC), and students will be required to comply with ELC recommendations.

*Application Dates*

The Master of Science degree program in Environmental, Health & Safety Management has a rolling admissions process. Admissions decisions are made upon receipt of complete application forms and all supporting materials. Applications for graduate scholarship and/or assistantship are evaluated in the spring.

Full-time students should apply to start in the fall quarter. Part-time students may apply to start the program during any quarter, however course schedules are designed for fall and Spring entrance dates. Students starting in another quarter may be limited in available course choices

**Completed applications and supporting materials should be submitted at least two months prior to intended program entry if at all possible. Key application dates are:**

**April 1**      **Application for scholarship/assistantship**  
**July 1**        **Fall matriculation**  
**January 1**    **Spring matriculation**

Applications received after the dates above will be processed as fast as possible.

International applications take longer to process.  
**International students should apply at least four (4) months prior to intended matriculation.**

*Program Contact for Additional Information*

Prospective students are encouraged to contact the program coordinator for further information or for informal advising. Please contact:

Associate Professor Joseph Rosenbeck  
 Rochester Institute of Technology

Dept. of Civil Engineering Technology,  
 Environmental Management & Safety  
 78 Lomb Memorial Drive  
 Bldg. 7A, Rm. A464  
 Rochester, NY 14623-5603  
 Phone: (585) 475-6469

**5. Tuition and Financial Aid**

2003-2004 tuition for full-time students (12-18 credit hours) is \$7,655 per quarter. Part-time tuition is \$644/credit hour. Tuition rates for campus-based and online-learning courses are the same. Tuition rates are subject to change annually. Additional information on tuition rates, assessment and payment is contained in the *Graduate Bulletin* and the *Guide to Online Learning*.

Most students in the MS degree program in Environmental, Health & Safety Management finance their graduate education through some combination of: employer tuition reimbursement, personal resources, graduate scholarships and assistantships, and/or government grants and loans.

Traditionally, employers have been very supportive of continuing education for their employees. Because of this, many part-time students receive tuition reimbursement ranging from 25% to 100% of tuition charges.

A limited amount of merit-based graduate scholarship funds are available to both online-learning and campus-based students. Scholarships may cover up to 25% of tuition costs, and may be renewed based on the student's performance and progress towards obtaining the degree, and on program budgetary constraints. Only partial scholarships are available. Prospective students applying for a graduate scholarship must complete and submit the *RIT Graduate Scholarship Application* form that is contained in the RIT Graduate Application package.

The Department typically has a few graduate assistantships that are only available to on-campus students. Assistantships are awarded based upon the student's qualifications and ability to work up to 20 hours/week for the Department as a Laboratory Instructor, Teaching Assistant, Articulation Coordinator, or other administrative positions defined by the department. Generally, graduate assistantships support the Department's undergraduate degree programs. Assistantships are awarded on an annual basis, and are renewable

based on departmental need, student performance and degree progress, and other relevant factors. Students wishing to receive or continue a graduate assistantship must complete and submit the *MS Program in EHS Management Application for Scholarship & Assistantship* form, which may be obtained from the Department office.

**Applicants and students continuing in the program who want to be considered for graduate scholarships or assistantships should ensure that they have submitted the appropriate application forms no later than April 1.**

Information about need-based financial aid, including loans and work-study programs, is available from the RIT Office of Financial Aid. The Office of Financial Aid has counselors available by appointment. Call 585-475-2186 (voice) or 585-475-6909 (TTY).

Students also may wish to look into external organizations offering graduate scholarships and fellowships. Examples of such organizations include:

- US Department of Education - Jacob K. Javits Fellowships
- US EPA - National Network for Environmental Management Studies
- US EPA - STAR Fellowships
- National Science Foundation Fellowships
- American Association of University Women Scholarships
- Air and Waste Management Association Scholarships
- Water Environment Federation Scholarships

Additional information on financial aid, scholarships and fellowships is available at the RIT Financial Aid website: <http://www.rit.edu/~954www/>. This website includes links to recommended scholarship search engines.

## 6. Profile of Program Students

The following statistics describe students enrolled in the program in 1999-2000:

<i>Students in program</i>	63 total; 96% part-time
<i>Average age and EHS experience</i>	36 years old; 7+ years experience

<i>Diversity</i>	38% female; 5% international
<i>Learning format</i>	27% campus based; 83% online learning
<i>Employed full-time in EHS field</i>	75%

### *Undergraduate degrees:*

31% Environmental management/science/studies
18% Biology
11% Engineering
11% Occupational health/safety
7% Chemistry
5% Business
3% Geology
13% Other

### *Examples of employers:*

Alcoa, Binney & Smith, Blasland Bouck & Lee, Bristol-Myers Squibb, Browning Ferris, Canandaigua Brands, Carrier Corporation, Columbia Gas, Dakota Software, Deferiet Paper Company, Delphi Automotive, Eastman Kodak, Elf Atochem, ERM Inc., Ferro Corporation, Firemans Fund Insurance, Ford, Global Crossing, Hodgson Process Chemical, Huntsman Packaging, Lockheed Martin, Malt-o-Meal, Merck, Morrison Knudson, Motorola, Niagara Mohawk Power, Pactiv, Penn Traffic Company, Proctor & Gamble, Regeneron Pharmaceuticals, Rochester Institute of Technology, St. John Fisher College, Schlegel Systems, Southern Peru Copper, Syracuse Supply Company, US Army, US Postal Service, United Steelworkers of America, VanDeMark Chemical, Wallace Corp., Xerox

## 7. Special Program Features

### *Non-Matriculated Students*

Qualified non-matriculated students may take up to 12 credit hours of coursework prior to applying to the program. **Non-matriculated students are urged to contact the program coordinator for informal advising on appropriate courses.** Coursework taken on a non-matriculated basis may, but will not always, count towards a degree.

### *Residency*

Other than the four-day Executive Leader sessions in two core courses, there are no residency

requirements for the Master of Science degree program in Environmental, Health & Safety Management.

#### *Transfer of Prior Graduate Coursework*

Students may have completed relevant graduate coursework at other universities. Up to 12 quarter credits (8 semester credits) of relevant graduate coursework may be transferred into the program with the permission of the Admissions Committee, or the student's advisor and the Department Chair. The total number of foundation and transfer credits may not exceed 20 credits.

#### *Foundation Courses*

The EHS professions are interdisciplinary, and people enter these fields with a variety of backgrounds. Additionally, traditional academic programs do not cross-train students in these related fields. RIT's Master of Science degree program in Environmental, Health & Safety Management is designed to allow students to round out their technical background in EHS through foundation courses that count towards the degree.

Based on the student's graduate application and supporting materials, the Admissions Committee may identify foundation courses that the student will need to take. The program offers five two-credit foundation courses:

Survey of Occupational Health  
 Survey of Occupational Safety  
 Survey of Solid and Hazardous Waste Management  
 Survey of Industrial Wastewater Management  
 Survey of Air Emissions Management

Depending on a student's background, other foundation coursework may be necessary or appropriate. Students may take up to 12 credits of upper-level undergraduate coursework (course numbers 400-699) that may be counted as Professional Electives, *with prior approval of the student's major professor and the graduate program coordinator.*

#### *Graduate Cooperative Education*

Graduate Co-ops provide opportunities for students to gain appropriate work experience. Typically, Co-op work experience is a paid position with an employer, although unpaid Co-op assignments are

possible. The Admissions Committee or the student's graduate committee will determine whether enrollment in one or more Co-op quarters will be required. Obtaining a Co-op position is the responsibility of the student.

#### *Campus Resources*

Campus-based students have access to RIT's many facilities, including:

- Wallace Memorial Library
- Computing services and computer labs
- Educational Technology Center
- Office of Cooperative Education and Career Services
- Counseling Center
- English Language Center
- Learning Development Center (Math and writing assistance)
- Student Health Center
- Student Alumni Union
- Athletic facilities
- Free parking
- On-campus child care (fee)

RIT has a variety of campus apartment options available for graduate students. The Center for Residence Life provides a free referral service for students looking for on-campus or off-campus housing in the Rochester area. For further information, contact the Center for Residence Life, Rochester Institute of Technology, 63 Lomb Memorial Drive, Rochester, NY 14623-5606 or call 585-475-2572.

#### *Resources for Online-Learning Students*

Online learning offers flexibility for students who <sup>2 credits</sup> cannot come to campus, either because they are not located within commuting distance to campus or because of work schedules which prevent being on-campus at specific times. Online learning allows students to pursue their education "anywhere, anytime" on a regular academic schedule.

Online-learning students have access to virtually all of the resources of RIT's Wallace Memorial Library, including the large collection of electronic journals and databases. Online learning students also have access to the Office of Cooperative Education and Career Services.

#### *About Online Learning*

The Master of Science degree program in Environmental, Health & Safety Management is offered in both campus-based and online-learning options. The curriculum is the same for both options.

**In order to ensure availability of courses and sharing of diverse student experiences, some courses are only offered in online-learning format. Campus-based students can expect to take at least some courses through online learning.**

Online-learning courses are delivered over the Internet using computer conferencing, email, videotaped lectures, texts and written materials. Students taking online learning courses are required to have access to a phone, a VCR and television, a personal computer and the Internet. The currently recommended minimum computer configurations are:

- Pentium with 90 MHz processor or higher with Windows 95, Windows 98 or Windows NT
- Macintosh Power PC with system 7.5.3 or higher
- 32 Megabytes RAM
- 20 Megabytes available hard drive space
- CD ROM drive
- Sound card and speakers
- Modem (28.8 K or better)
- World Wide Web/Internet access
- Web browser such as Netscape Navigator 3.0 or higher, or Microsoft Internet Explorer 3.0 or higher

After a student registers for an online course, s/he will receive a package of information about the course and instructions for ordering videotapes, texts, and other course materials. Most of these materials are purchased through RIT's bookstore.

RIT's Office of Online Learning will contact registered students with information on how to install or upgrade the FirstClass communications software used with online learning courses. This software is provided at no additional cost to registered online learning students. Continuing students should make sure that they are using the most current version of the software.

Registered students log into their courses through RIT's Online Learning website. An electronic

conference is set up for each online-learning course. This is available to registered students at any time.

In most online learning courses, students are asked to introduce themselves on the bulletin board and get to know their online-learning classmates. Each week, students are given reading assignments and typically instructed to view one or more videotaped lectures. Reading and writing assignments are comparable, and in some cases identical, to those used in a traditional classroom setting. Videotaped lectures, however, typically move along much more quickly than classroom lectures.

Instructors electronically post discussion topics, and individual and group assignments. Class discussion is an important part of most online learning courses, and is done through chat rooms and/or electronic bulletin boards. Many online-learning courses require group projects. Students participate in group projects through electronic bulletin boards, online chat rooms, telephone conferences and email. Assignments and quizzes are typically submitted electronically. Online-learning course exams may be on-line and open book, or proctored exams arranged at local schools or a student's employer.

Additional information about online-learning at RIT is found at the Office of Online Learning's website: <http://onlinelearning.rit.edu>.

## 8. Curriculum

The Master of Science degree program in Environmental, Health and Safety Management consists of 48 credit hours of graduate study. The curriculum consists of a sequence of core courses (24 credits), professional electives (18 credits) that may be chosen from the program or other departments, and a graduate thesis or graduate project (6 credits).

### Core Courses (24 credits)

0630-720	Environmental, Health and Safety Management <sup>†</sup> (4 credits)
0630-725	EHS Accounting & Finance (4 credits)
0102-740	Organizational Behavior and Leadership (4 credits)
0630-740	EHS Management System Design (4 credits)
0630-760	Integrating EHS into Business Management (4 credits)
0630-790	EHS Internal Auditing <sup>†</sup> (4 credits)

Professional Electives (18 credits)Graduate Thesis/Graduate Project (6 credits)

0630-890 Graduate Project/Thesis Planning  
(2 credits)

0630-891 Graduate Project (4 credits)

0630-899 Graduate Thesis (4 credits)

- Product and production systems
- Quality and applied statistics
- Business management
- International business
- Instructional technology
- Human resources development
- Information technology

† *These courses have an Executive Leader session at RIT. Executive Leader sessions consist of a Thursday through Sunday weekend of classroom and/or group workshop activities, and are scheduled components of each course.*

Program Planning

Students entering the program will be assigned a graduate academic advisor who will serve as a “major professor.” Students are responsible for planning program coursework in consultation with the major professor. Approximately halfway through the program, the student —with assistance from the major professor — will identify and recruit two additional advisors from academia or professional practice to serve as a graduate committee. The role of the graduate committee is to advise the student on remaining professional electives to be taken, review the graduate thesis or project proposal, and serve as a review committee for the thesis or project. Where appropriate, the role of the major professor may be reassigned to another faculty member participating on the committee.

Professional Electives

Professional electives provide opportunities for students to take coursework relevant to their educational and professional interests. Professional electives can be selected from courses offered within the program or from courses offered by other departments at RIT. Students are encouraged to use the professional electives as an area of concentration that supports their graduate thesis or project. Examples of possible elective concentration areas include:

Examples within EHS Management

- Environmental protection
- Industrial hygiene
- Occupational safety
- EHS risk assessment

Examples outside of EHS ManagementGraduate Project/Thesis Requirements

A 2-credit graduate project/thesis planning course and a 4-credit graduate thesis or graduate project are required for graduation. Students are responsible for identifying an appropriate thesis or project topic in consultation with the major professor. The planning course, as well as the project or thesis is graded.

The planning course prepares students to propose, design and conduct research or a project. Students must successfully complete the planning course prior to registering for graduate project or thesis credits.

Thesis and project topics should complement the student’s interests and program of study. Depending on the objectives and focus of the thesis or project, the student and graduate committee may decide during the planning stage to increase the committee membership.

The graduate thesis is a research document that empirically relates theory with practice. A formal written thesis and oral defense are required. A graduate thesis will be most appropriate for students with interests in conducting original research or in topics requiring substantial theoretical analysis.

Graduate projects are applied research projects, typically reflecting the student’s ability to utilize professional skills to explore, document and explain EHS decision-making. A formal written paper and oral presentation are required. A graduate project will be most appropriate for students interested in applied problem solving. The Admissions Committee may recommend that students without substantive EHS work experience undertake a graduate project in order to obtain applied experience. Graduate projects are often selected from real problems that face a student’s employer. Students utilizing Graduate Cooperative Education may conduct their projects concurrent with, or following completion of, a Graduate Co-op assignment.

*Graduation Requirements*

Students must complete all of the following requirements to graduate from the program.

- Complete a minimum of 48 quarter-credit hours for the masters degree.
- Maintain a program cumulative grade point average of at least 3.0 (B).
- Complete all graduate thesis or graduate project requirements.
- Complete all degree requirements within 7 years.

*Sample Student Program Schedules*

One of the program's strengths is its flexibility: students are able to enter with a variety of backgrounds, are able to focus on specialized study in different areas, and are able to pursue their graduate education either full-time or part-time, campus-based or through online learning. This makes each student's plan of study unique.

Two sample programs are provided as examples of how a student might progress through the program. One sample plan of study is designed for a full-time student to complete the program in 15 months. The other sample plan shows how a part-time student can complete the program in 24 months.

**SAMPLE PROGRAM FOR FULL-TIME STUDENT**

	FALL	WINTER	SPRING	SUMMER	FALL
<i>Core Courses</i>	0630-720 EHS Management 4 cr	0630-740 EHS Mgmt. System. Design 4 cr	0630-790 EHS Internal Auditing 4 cr		0630-760 Integrating. EHS into Business 4 cr
	0102-740 Organiz. Behavior 4 cr	0630-725 EHS Accounting & Finance 4 cr			
<i>Electives</i>	Electives 4 cr	Electives 4 cr	Electives 6-8 cr	Co-op (if required) 0 cr	Electives 4 cr
<i>Graduate Project/ Thesis</i>			0630-890 Project/ Thesis Planning 2 cr		0630-891/899 Project/ Thesis 4 cr
<i>Credits</i>	12 credits	12 credits	12-14 credits	0 credits	12 credits
<b>Total</b>	<b>48 credits</b>				

**SAMPLE PROGRAM FOR PART-TIME STUDENT**

	YEAR 1				YEAR 2		
	FALL	WINTER	SPRING	SUMMER	FALL	WINTER	SPRING
<i>Core Courses</i>	0630-720 EHS Management 4 cr	0630-740 EHS Mgmt. System. Design 4 cr	0630-790 EHS Internal Auditing 4 cr		0630-760 Integrating. EHS into Business 4 cr		
		0630-725 EHS Accounting & Finance 4 cr			0102-740 Organiz. Behavior 4 cr		
<i>Electives</i>	Electives 4 cr		Electives 4 cr	Electives 0-4 cr		Electives 4 cr	Electives 0-4 cr
<i>Graduate Project/ Thesis</i>						0630-890 Project/ Thesis Planning 2 cr	0630-891/899 Project/ Thesis 4 cr
<i>Credits</i>	8 credits	8 credits	8 credits	0-4 credits	8 credits	6 credits	4-8 credits

<b><i>Total</i></b>	<b><i>48 credits</i></b>
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## 9. Program Courses

### Course Offering Schedule

The course schedule information below is provided for planning purposes. On-campus courses are identified by “C” (for campus); online-learning courses are identified by “O” (for online learning); executive leader courses are identified by X. *All course schedules are subject to change without prior notice.*

Course #	Course Title	Fall	Winter	Spring	Summer
	<b>Foundation Courses</b>				
0630-610	Survey of Occupational Health	C		O	
0630-611	Survey of Occupational Safety	O		C	
0630-620	Survey of Solid & Hazardous Waste Management		C	O	
0630-621	Survey of Industrial Wastewater Management	C	O		
0630-622	Survey of Air Emissions Management	O	C		
0630-699	Independent Study	Offered as needed			
	<b>Core Courses</b>				
0102-740	Organizational Behavior & Leadership (Scheduled and taught by COB)	O, C	C	C	C
0630-720	EHS Management	X		X	
0630-725	EHS Accounting & Finance		O		
0630-740	EHS Management System Design		O		
0630-760	Integrating EHS into Business	O			
0630-790	EHS Auditing			X	
	<b>Electives</b>				
0630-710	Special Topics: Wetland Delineation	C			
0630-710	Special Topics: Contaminant Hydrology		C (odd years)		
0630-710	Special Topics: Modeling Methods		C (even years)		
0630-710	Special Topics: Remedial Investigation/Corrective Action			C	O
0630-735	Resource Reduction		C	O	
0630-750	Project Management			C	O
0630-770	EHS Risk Assessment, Management & Communication			O	
0630-780	EHS Law & Regulation: Interpretation & Negotiation		O		
0630-799	Independent Study	Offered as needed			
0630-810	Special Topics	To be determined			
0630-888	Cooperative Education	Offered as needed			
0633-712	Fire Protection	O			
0633-726	Occupational Health II (w/lab)		C		
0633-730	Mechanical & Electrical Controls & Standards		O		
	<b>Graduate Project/Thesis</b>				
0630-890	Graduate Project/Thesis Planning	O	O	O	
0630-891	Graduate Project	Offered as needed			
0630-899	Graduate Thesis	Offered as needed			

*Course Descriptions*

Course descriptions are listed by course number.

*0102-740 Organizational Behavior and Leadership  
4 credits*

This is the basic management course that introduces students to seminal concepts in management and organization. As such, it covers the basic aspects of managing quality in today's organizations. Topics include the concepts of total quality, the antecedents of quality in modern organizations, a systems approach to organizing for total quality, productivity and quality, organizational learning, developing a total quality culture, team management and organizational change. *This course is taught by the College of Business.*

*0630-610 Survey of Occupational Health 2 credits*

An intensive foundation course for students who have completed the appropriate science and mathematics prerequisites, but lack academic preparation or practical experience in environmental/industrial health. Introduces principles, strategies, technologies and regulations for environmental/industrial health. Provides a comprehensive examination of methods of minimizing employee exposure to chemical, biological and physical hazards in the workplace.

*0630-611 Survey of Occupational Safety 2 credits*

An intensive foundation course for students who have completed the appropriate science and mathematics prerequisites, but lack academic preparation or practical experience in safety management and engineering. Introduces principles, strategies, technologies and regulations for workplace and construction safety management.

*0630-620 Survey of Solid and Hazardous Waste Management 2 credits*

An intensive foundation course for students who have completed the appropriate science and mathematics prerequisites, but lack academic preparation or practical experience in solid and hazardous waste management. Introduces principles, strategies, technologies and regulations for reducing, recycling, handling, treating, storing and disposing of solid and hazardous waste.

*0630-621 Survey of Industrial Wastewater Management 2 credits*

An intensive foundation course for students who have completed the appropriate science and

mathematics prerequisites, but lack academic preparation or practical experience in wastewater management. Identifies and characterizes the sources of industrial wastewater and examines the related environmental impacts, regulatory implications, and technical and cost considerations of treatment and disposal methodologies.

*0630-622 Survey of Air Emissions Management 2 credits*

An intensive foundation course for students who have completed the appropriate science and mathematics prerequisites, but lack academic preparation or practical experience in air emissions management. Identifies and categorizes industrial air pollutants and their sources. Addresses applicable state and federal laws and regulations, reduction strategies, control technologies, testing, monitoring and reporting requirements.

*0630-699 Independent Study 1-4 credits*

Provides an opportunity for students to pursue relevant EHS topics at a fundamental level. Students will gain added depth and/or skill in a specific EHS area related to work or professional interests.

*0630-710 Special Topics 1-4 credits*

Permits students to pursue certain advanced undergraduate coursework at a graduate level. Examples include: Remedial Investigation/Corrective Action, Contaminant Hydrology, Wetland Delineation.

*0630-710 Special Topics: Remedial Investigation & Corrective Action*

Delineates and describes the sequence of events required in remedial investigations (RI), feasibility studies and corrective actions at hazardous waste sites. Explains the process flow logistics, concepts and rationale behind each RI action. Investigates the strategies, technologies and methodologies commonly in use for site investigation and characterization and corrective action. Explores current issues of "how clean is clean?" and Superfund liability. Students learn to develop conceptual site characterization plans; effective solicitations for RI proposals; review and evaluate work plans, procedures and operations plans and contingency plans.

*0630-710 Special Topics: Wetland Delineation 4 credits*

A course in identifying wetlands and delineating their boundaries using the US Army Corps of

Engineers 1987 Wetland Delineation Manual. Students will learn the importance of wetlands in the world's ecology, a history of US wetlands policy and regulation, and wetland identification/delineation techniques. Delineation technique will be based on soil, hydrology and plant species identification. The course will include lectures and field sessions in RIT's wetlands. Prerequisite is a course in hydrology.

*0630-710 Special Topics: Contaminant Hydrogeology 4 credits*

This course focuses on the presence, movement and decay of contaminants in the groundwater environment. Students will learn the common types of contaminants found in the subsurface both in dissolved and NAPL form. Popular techniques for analyzing advection, dispersion and diffusion will be covered (calculator and software techniques). Students will learn the natural processes, which affect the fate of contaminants such as radioactive decay, biological and chemical transformation and sorption. Prerequisite is a course in hydrology.

*0630-720 Environmental, Health and Safety Management 4 credits*

This course presents an overview of environmental, health and safety management, and provides students with an introduction to management systems for EHS operations. Explores the motivations and strategies for environmental, health and safety management, identifies EHS management components, and presents the fundamentals of developing EHS visions and policies. This course includes an Executive Leader session.

*0630-725 EHS Accounting and Finance 4 credits*

Pollution and accidents impose costs — not just remedial costs, but also time, lost opportunities, long-term liabilities and even company image. These costs are often overlooked by current accounting practices. This course will train students to make good business decisions when all of the EHS costs of economic decisions, as well as the economic costs of EHS decisions, are taken into consideration. The course will focus on decisions made at the company level. Methods will be taught to identify and quantify the full costs of projects and activities. A more accurate approach towards EHS accounting will result in a safer environment and increased competitiveness.

*0630-735 Resource Reduction 4 credits*

This course will focus on strategies for reducing the use of material, energy and environmental resources. It builds upon courses for controlling air emissions, wastewater and solid and hazardous waste and moves upstream into the production process to reduce or eliminate waste by not producing it in the first place. Students learn how to conduct resource reduction assessments and identify opportunities to reduce or conserve resources. This course will take you beyond end-of-pipe controls and look at life-cycle assessment as an environmental management tool.

*0630-740 EHS Management Systems Design 4 credits*

This course examines the design and development of environmental, health and safety management systems to implement an organization's vision, mission and policies. Provides strategies for determining what needs to be measured in order to assess performance and ensure continual improvement. Introduces and develops data management procedures that correspond to organizational data needs for internal control and external information demands. Prerequisites: 0630-720 or permission of instructor.

*0630-750 EHS Project Management 4 credits*

This course focuses on unique factors in environmental, health and safety project management. It covers the nine major areas of project management: integration, scope, time, cost, quality, human resources, communications, risk, and procurement. Discusses modern project management techniques, including Program Evaluation and Review Technique (PERT), Critical Path Method (CPM), and various budgeting and resource allocation techniques. Includes an introduction to Microsoft Project for Windows software. Applies project management concepts and software to simulated EHS projects.

*0630-760 Integrating EHS into Business Management 4 credits*

This course examines strategies for integrating EHS systems and processes into business management. Using case studies, the course explores the interrelationships between EHS and total quality management, reporting, financial value, and approaches for sustainable business development. Students will be prepared to select appropriate quality tools to improve EHS processes; identify opportunities, strategies and tools for integrating EHS into business management; and identify best

practices in EHS/business integration. Prerequisites: 0630-720, or permission of the instructor.

*0630-770 EHS Risk Assessment, Management and Communication 4 credits*

This course presents an overview of risk assessment methodologies and history, along with current practices and developing trends. It takes a close look at strategies for reducing and managing EHS risks, and provides an introduction to the elements of internal and external risk communication. Students will gain skills in evaluating risk assessments and identifying associated strengths and weaknesses with respect to the EHS management needs of their respective organizations. They will be prepared to design and implement risk reduction and management plans for EHS-related activities and be able to identify essential risk-related elements that need to be communicated internally and externally. Prerequisite: 0630-720 and coursework in occupational health, or permission of instructor.

*0630-780 EHS Law and Regulation: Interpretation and Negotiation 4 credits*

This course provides a detailed examination of the EHS legal and regulatory framework, with emphasis on developing compliance strategies. Addresses strategies for advocating and negotiating flexible permits, enforcement matters and other legal requirements. Students will be prepared to discern the intent and applicability of EHS laws and regulations, prepare summary documents incorporating legal concerns and concepts, understand different approaches to negotiations, and work effectively with attorneys to achieve desired objectives. Prerequisite: 0630-720 or permission of instructor.

*0630-790 EHS Internal Auditing 4 credits*

This course addresses establishing and maintaining EHS auditing systems to examine how environmental, health and safety aspects are being managed relative to voluntary and regulatory standards. Students will be prepared to design, implement and evaluate auditing programs, and will practice auditing skills. This course includes an Executive Leader session. Prerequisite: 0630-740 and all required foundation courses, or permission of instructor.

*0630-799 Independent Study 1-4 credits*

Students will have the opportunity to pursue relevant environmental, health and safety topics related to their work or professional interests at an advanced

level. Students will gain added depth and/or specialized skill in a specific EHS area. *Note:* Students must have completed an approved Independent Study Proposal prior to registering for Independent Study.

*0630-810 Special Topics 1-4 credits*

This course discusses new and developing EHS topics in selected areas, such as: Workers Compensation, environmental economics, incident management, international environmental management, design for the environment, life-cycle assessment, industrial hygiene monitoring and measurement, regulatory strategy and compliance alternatives.

*0630-888 Graduate EHS Management Co-op 0 credits*

Students have the opportunity to gain appropriate work experience and applied knowledge of the profession working in one or more EHS areas. The graduate committee determines whether enrollment for one or more co-op quarters will be required.

*0630-890 Graduate Project/Thesis Planning (2 credits)*

This is the first of a two-course sequence in which each EHS Management graduate student will design and conduct graduate thesis research or a graduate project. In this course, graduate students will: rigorously develop their research or graduate project ideas, conduct literature reviews, prepare bibliographies, identify and plan methodologies, identify deliverables, prepare schedules, become familiar with report formats and the proper use of literary guides, and gain a clear understanding of the expectations of the faculty and the discipline. Each student will be required to prepare a complete thesis research or graduate project proposal as a final requirement of this course.

*0630-891 Graduate Project 4 credits*

Graduate projects are an applied research project reflecting the student's ability to utilize professional skills to design, develop, and/or evaluate an environmental, health and safety project and/or management decision. A formal written paper and oral presentation are required. Prerequisite is 0630-890.

*0630-899 Graduate Thesis 4 credits*

The graduate thesis is a formal research document that empirically relates theory with practice. A

formal written thesis and oral defense are required. Prerequisite is 0630-890.

*0633-712 Fire Protection 4 credits*

Introduces fundamental concepts in protection of industrial workers and property from fire and explosion. Fire chemistry, control of ignition sources in industry, and properties of combustible materials are discussed. Fire detection and extinguishment are covered along with building construction for fire prevention, life safety, fire codes and related topics. Prerequisite is 0630-611 or equivalent.

*0633-726 Occupational Health II w/ Lab 4 credits*

A lecture/laboratory course, which provides a basic understanding of techniques used in measuring and evaluating the magnitude of health hazards in industry. Laboratory sessions provide experience in air sampling, noise measurements, heat measurement, particle size analysis, chemical analysis and evaluation of industrial ventilation. Prerequisite is 0630-610 or equivalent.

*0633-730 Mechanical & Electrical Controls and Standards 4 credits*

Discussion of OSHA standards relating design and analysis for safety, including electrical circuit controls and mechanical guarding. Particular attention will be paid to OSHA, ANSI and NEC standards as they relate to wood, metal, films and automation. A portion of the course will change regularly to reflect emerging issues in industry. Prerequisite is 0630-611 or equivalent.

## 10. Program Faculty

### *Faculty*

The Department of Civil Engineering Technology, Environmental Management & Safety faculty is highly qualified and experienced professionals and educators.

***Maureen Valentine, Associate Professor and Department Chair***

PE Professional Engineer, New York  
M.E. Geotechnical Engineering, Virginia Polytechnic University  
B.S. Civil Engineering, Tufts University

Experience/Interest:

2000-present, Associate Professor and Chair, RIT Dept. of Civil Engineering Technology, Environmental Management & Safety  
1999-2000 Associate Professor, RIT Dept. of Civil Engineering Technology  
1993-1999 Assistant Professor, RIT Dept. of Civil Engineering Technology  
10 years industrial experience

***Joshua Goldowitz, Associate Professor***

CGWP Certified Ground Water Professional  
M.S. Hydrology and Water Resources, University of Arizona  
B.S. Geology, Dept. of Geology, State University of New York at Binghamton

Experience/Interest:

2000-present Associate Professor, RIT Dept. of Civil Engineering Technology, Environmental Management & Safety  
1998-2000 Associate Professor, RIT Dept. of Environmental Management & Technology  
1993-1998 Assistant Professor, RIT Dept. of Environmental Management & Technology.  
1993-Present President, Hydro-Logic Corporation  
1989-1993 Senior Hydrogeologist/Project Manager, H&A of New York  
1987-1989 Scientist, Geraghty & Miller, Inc.  
1986-1986 Hydrologist, Pima County DOT and Flood Control District  
1985-1987 Research Assistant, Dept. of Hydrology and Water Resources, University of Arizona  
1983-1984 Surveyor, U.S. Forest Service, Juneau Alaska District

Special interests include hydrology, hydrogeology, contaminant transport, and wetlands.

Teaches Environmental Geology, Introduction to Hydrology, Environmental Monitoring and Measurement, Contaminant Hydrogeology, and Wetland Delineation, and Environmental Modeling.

***John Morelli, Associate Professor***

PE Professional Engineer, New York  
DEE Diplomate Environmental Engineer  
Ph.D. Environmental Science, SUNY College of Environmental Science & Forestry (ESF)  
M.S. Environmental Resource Engineering, SUNY ESF  
B.S. Engineering (Environmental) & Public Affairs, Syracuse University

Experience/Interests:

2000-present Associate Professor, RIT Dept. of Civil Engineering Technology, Environmental Management & Safety  
 1991-2000 Chair, RIT Dept. of Environmental Management & Technology  
 1986-1991 Senior Project Manager, NYS Energy Research and Development Authority  
 1983-1986 Senior Environmental Engineer/Project Manager, NYS Department of Environmental Conservation, Bureau of Hazardous Waste Site Remediation.

Special interests include voluntary private sector EHS management and performance beyond minimum regulatory requirements, global environmental management issues, and sustainable development.

Teaches Environmental Management Seminar, Principles of Environmental Management, Environmental, Health & Safety Management.

**Joseph M. Rosenbeck, Associate Professor and Graduate Program Coordinator**

CSP Certified Safety Professional  
 CHCM Certified Hazard Control Manager  
 MS Industrial Safety, Central Missouri State University  
 BS Business Management, Central Missouri State University

Experience/Interests

1999-2001 Environmental & Safety Manager, Arch Chemicals Inc.  
 1996-1999 Safety & Responsible Care Manager, FMC Corporation  
 1993-1995 Safety Manager, FMC Corporation  
 1990-1993 Assistant Professor of Safety  
 1981-1990 Senior Safety Engineer, Amoco Corporation

**Jennifer Wadhams, Assistant Professor and Health & Safety Advisor**

CIH Certified Industrial Hygienist  
 PhD University of Massachusetts, Lowell  
 M.S. Industrial Hygiene, University of Rochester  
 B.A. Comprehensive Science: Chemistry & Biology, Roberts Wesleyan College

Experience/Interests:

2000-present, Assistant Professor, RIT Dept. of Civil Engineering Technology, Environmental Management & Safety

1997-2000 Assistant Professor, RIT Dept. of Environmental Management & Technology  
 1993-1997 Adjunct Faculty, RIT Dept. of Environmental Management & Technology  
 1995-1997 Supervisor Environmental Health & Safety, Goulds Pumps (ITT Industries)  
 1992-1995 Safety Supervisor, Mobil Chemical Company  
 1990-1992 Engineer/Industrial Hygiene Specialist, IT Corporation  
 1990 Reports Coordinator, Ecology & Environment

Special interests include occupational health and safety, hazardous materials, behavioral-based safety, VOC emission management and instrumentational analysis.

Teaches Survey of Occupational Health, Survey of Occupational Safety, EHS Management Systems Design, and Occupational Health II.

**Scott Wolcott, Assistant Professor**

PE Professional Engineer, New York  
 M.S. Civil Engineering, SUNY Buffalo  
 B.S. Civil Engineering, SUNY Buffalo  
 A.A.S. Civil Engineering Technology, NYS Agricultural & Technical College at Canton

Experience/Interests:

2000-present, Assistant Professor, RIT Dept. of Civil Engineering Technology, Environmental Management & Safety  
 1996-1999, Assistant Professor, RIT Dept. of Civil Engineering Technology  
 1993-1996, RUST Environment & Infrastructure  
 1988-1993, Acres International Corporation  
 1987-1988, Goldberg-Zoino Associates

Teaches Survey of Industrial Wastewater Management

**Adjunct Faculty**

RIT is fortunate to have extremely well qualified and talented EHS professionals teaching as adjunct faculty in the Master of Science degree program in Environmental, Health & Safety Management.

Adjunct faculty include:

**Steven Campbell, Environmental Scientist, Lu Engineers**

CHMM Certified Hazardous Materials Manager  
 B.S. SUNY Brockport  
 A.A.S. Corning Community College  
 Teaches Remedial Investigation/Corrective Action

**Michael Chambers, Manager of Safety & Health Issues, Eastman Kodak Company**

CSP Certified Safety Professional  
 B.S. Mechanical Engineering, Clarkson University  
 Teaches Fire Protection Systems

**Twyla Cummings, Associate Professor, RIT School of Printing Management & Sciences**

Ph.D. Management, The Union Institute  
 M.S. Business & Industrial Management, Wright State Univ.  
 B.S. Chemistry, Wright State Univ.  
 Teaches Project Management

**Libby Ford, Senior Environmental Health Engineer, Nixon Peabody, LLP**

QEP Qualified Environmental Professional  
 CHMM Certified Hazardous Materials Manager  
 CEP Certified Environmental Professional  
 REA Registered Environmental Assessor, California  
 M.S. Environmental Health Engineering, University of Notre Dame  
 B.S. Biology, University of Notre Dame  
 Teaches EHS Law & Regulation: Interpretation and Negotiation

**Jacqueline Fox, Senior Toxicologist, Eastman Kodak Company**

Diplomate of American Board of Toxicology  
 M.S. Environmental Technology, University of Rochester  
 M.S. Secondary Education, Nazareth College  
 B.S. Biology, Nazareth College  
 A.A.S. Chemical Technology, Rochester Institute of Technology  
 Co-instructor for Risk Assessment, Management & Communication

**Deborah Gordon, Senior Toxicologist, Eastman Kodak Company**

Diplomat American Board of Toxicology  
 M.S. Environmental Studies, University of Rochester  
 B.H.S. Health Services, Florida Atlantic University  
 A.A.S. Medical Laboratory Technology, Erie Community College  
 Co-instructor for Risk Assessment, Management & Communication

**Jean H. McCreary, Partner, Nixon Peabody, LLP**

J.D. University of Florida School of Law  
 B.A. University of Rochester  
 Co-instructor for EHS Law & Regulation: Interpretation and Negotiation

**Edward Mullen, Environmental Engineer, High Falls Brewing Company**

P.E. Professional Engineer, New York  
 B.S. Civil/Environmental Engineering, Clarkson University  
 A.A.S. Civil/Environmental Technology, Monroe Community College  
 Teaches Survey of Solid & Hazardous Waste Management

**John Piampiano, Safety Engineer, Eastman Kodak**

CSP Certified Safety Professional  
 M.S. Industrial Hygiene, University of Rochester  
 B.S. Health & Safety Management, Empire State College  
 A.S.S. Chemical Technology, Alfred State College  
 Teaches Mechanical & Electrical Controls & Standards

**David P. Richardson, Unit Director Disability Management, Eastman Kodak Company**

Diplomat American Board of Toxicology  
 M.P.H. Environmental & Industrial Toxicology, University of Michigan  
 B.S. Chemistry, State University of New York at Cortland  
 Co-instructor for Risk Assessment, Management & Communication

**George Thomas, Manager-Pollution Prevention, Eastman Kodak Company**

P.E. Professional Engineer, New York  
 M.S. Environmental Engineering, Johns Hopkins University  
 B.S. Mechanical Engineering, Clarkson University  
 Teaches Resource Reduction

**Thomas Wickerham, Environmental Program Specialist II, NYS Dept. of Environmental Conservation**

B.A. Geology, Thiel College  
 Teaches Survey of Air Emissions Management

**11. Additional Sources of Information**

Prospective students are encouraged to contact the program coordinator for further information or for informal advising. Please contact:

Associate Professor Joseph Rosenbeck  
 Rochester Institute of Technology  
 Dept. of Civil Engineering Technology,  
 Environmental Management & Safety

78 Lomb Memorial Drive  
Rochester, NY 14623-5603  
Phone: (585) 475-6469

Additional information about RIT, RIT's graduate and online learning programs, and student resources can be found at the following websites:

- RIT website: <http://www.rit.edu>
- RIT Environmental Management & Technology website: <http://www.rit.edu/~704www/>
- RIT Online Learning website: <http://onlinelearning.rit.edu>
- RIT Admissions website: <http://www.rit.edu/Admissions/index.html>
- RIT Financial Aid website: <http://rit.edu/~954www/>
- RIT Wallace Library website: <http://wally.rit.edu>