

**GRADUATE
SELF-STUDY DOCUMENT**

**ENVIRONMENTAL HEALTH SCIENCES PROGRAM
Department of Health Education and Promotion
School of Health and Human Performance
East Carolina University
Greenville, North Carolina**

SUBMITTED TO:

**The National Environmental Health
Science and Protection Accreditation Council**

December, 2005

Foreword

This “Self- Study” document of the Master of Science in Environmental Health Program (MSEH) at East Carolina University (ECU) is the culmination of over a year-long process carried out by the Program's faculty in collaboration with faculty from other Departments and Programs. The study encompassed several major changes in the Program since the last review, resulting in a new and improved Program with a sense of academic excellence for graduate environmental health education. Two years ago we had a small number of graduate students in the Program. This year we made a substantial gain in enrollment with significant ties to ECU's new Master of Public Health Program (MPH) and the Security Studies Program, which can attract more students to the MSEH Program. With our new faculty expanding areas or research expertise, renovated laboratory facilities scheduled for the near future, and the development of an on-line applied MSEH degree in the works, the future appears promising for graduate education in Environmental Health Sciences at ECU. Take a look at the current status of our program and join us as we move forward with this new and exciting transition!

The Environmental Health Sciences Program



Sitting: Dr. Alice Anderson and Mrs. Vickie S. Best
Standing: Dr. Max Zarate, Mr. Paul Andrews, Mr. Ed Crotts,
Mr. William Hill, CAPT. Dan Sprau, and Mr. Bill Koch

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INTRODUCTION

1. **Program Name:**
Environmental Health Sciences

2. **Name of school/college or department:**
*Department of Health Education & Promotion
College of Health & Human Performance*

3. **Name of institution:**
East Carolina University

4. **Name of the program administrator or contact person:**
Daniel D. Sprau, DrPH, RS, CHI, CSP

5. **Mailing address:**
Belk 310, ECU, Greenville NC 27858-4353

6. **Telephone, fax number and E-mail address:**
*Phone: (252) 328-4434
Fax: (252) 328-0380*

7. **Name of the administrator who is to sign for the university:**
*James Leroy Smith, PhD,
Provost & Vice Chancellor of Academic Affairs*

8. **Name of the chairperson of the department:**
David R. White, EdD

9. **Name of the dean of the college:**
Glen G. Gilbert, PhD

10. Statement of institutional philosophy

The purpose of East Carolina University is to provide an environment and atmosphere conducive to the pursuit, discovery, and dissemination of knowledge and to serve the region, as well as the broader national and international communities, by developing its material and human resources.

Toward this end, East Carolina University is committed:

- *To encourage students to develop high standards of personal achievement and an understanding of the nature of academic endeavor and to provide students with a foundation for subsequent study;*
- *To prepare students for full and purposeful lives through undergraduate, graduate, and professional instruction;*
- *To promote pure and applied research;*
- *To provide services to the general community through research efforts, through programs of continuing education, cultural programs, and through service agencies;*
- *To develop programs of instruction, research, and service, including terminal graduate and professional programs; and to cooperate with other educational institutions for the advancement of mankind.*

East Carolina University is a public institution committed to rich and distinctive undergraduate and graduate education, exemplary teaching, research and scholarship, public service, and human and intellectual diversity. The University is one of the sixteen constituent institutions of The University of North Carolina. It offers degrees at the baccalaureate, master's specialist, and doctorate levels. Programs of study include the arts and sciences and a wide range of professional fields, including the first professional program in medicine. The University values the contributions of each member of the academic community, encourages the full development of human potential, and is dedicated to scholarly integrity and responsible of the public trust.

The fundamental educational goal of the university is to provide students with a substantive general education and to enable students and other constituents to secure specialized and multidisciplinary knowledge. Through instruction and other educational activities, the university is committed to developing each student's ability to discover, evaluate, and communicate knowledge, to make informed decisions, and to recognize a decision's ethical dimensions. The university is committed to imparting a sense of responsible citizenship, nourishing an understanding of the interdependencies of human-kind and the environment, enhancing individual potential, and fostering a lifelong commitment to learning, self-

discipline, and human well-being. The university strives to serve all who can benefit from these commitments and to address the educational needs of the mid-Atlantic region.

The primary research mission of the university is to advance knowledge, to encourage traditional and nontraditional creative activity, to solve significant human problems, and to provide the best basis possible for professional practice. To these ends, the university supports both pure and applied research. These activities enrich culture, increase knowledge and understanding, and establish the university as a productive social resource.

The service mission of the university is to provide leadership in the pursuit of educational, research, and cultural goals. Medical clinics, libraries, theaters, museums, athletic facilities, and other physical and human resources provide public services that guide and support the cultural, economic, educational, health, human services, and social aspirations of the public.

OFFICIAL SIGNATURES

- a. Signature of the environmental health science and protection faculty member directing the program**
- b. Signature of the authorized official of the institution (dean, vice president or president).**

*Daniel D. Sprau, DrPH, RS, CIH, CST
Director, Environmental Health Sciences Program*

*David White, EdD,
Chair, Health Education & Promotion*

*Glen G. Gilbert, PhD,
Dean, College of Health & Human Performance*

*James Leroy Smith, PhD,
Provost & Vice Chancellor of Academic Affairs*

BRIEF HISTORY OF THE PROGRAM

Following the establishment of a successful undergraduate program at East Carolina University in 1971, the faculty in the Department of Environmental Health saw the need for graduate studies and obtained permission to plan a Master of Science in Environmental Health Program (MSEH) in 1978. This Graduate Degree Program received its first approval by the Board of Governors of the UNC system in 1980 with Dr. Oris Blackwell as the first Director. Dr. Y.J. Lao succeeded Dr. Blackwell as Director in 1983. Dr. Kane succeeded Dr. Y.J. Lao as Director in 1986 and continued into his three year phased retirement beginning in the fall semester of 1992. Dr. Alice Anderson has been the current graduate program director since the fall semester of 2005.

The graduate program awarded its first Master of Science in Environmental Health Degrees in 1978 to Mr. Chip Lambeth and Mr. James Coppola. The Program was first accredited in 1978 by the National Accreditation Council for Environmental Curricula. It was re-accredited by that same council again in 1985. The National Environmental Health Science and Protection Council accredited the Program in and 1999.

The graduate program began with four full-time faculty members. The original faculty members were Drs. Oris Blackwell (Director), Trenton Davis, Y. J. Lao and Dr. Barney Kane. Drs. Davis, Lao and Kane continued as faculty and Dr. James Robertson joined them in 1985. Dr. Daniel Sprau, from ECU's Office of Radiation and Bio-Safety served as an Adjunct faculty in the graduate program, teaching courses and serving on graduate research committees. Currently, there are five full-time faculty appointments in the Environmental Health Sciences Program. The Department's secretary was Mrs. Hazel Lovett who started working before the creation of the graduate program. Ms. Crystal Respass, a part-time laboratory manager, was employed by the department in March 1998.

Dr. Lao served as Acting Chair of the Department of Environmental Health from 1984 - 1986 when Dr. Davis accepted a position in the Division of Academic Affairs. Dr. Lao was appointed Chair of the Department of Environmental Health in 1986, a position he held until 1996 when Dr. Kevin O'Brien was named Acting Chair. Dr. Davis returned to the department in July, 1990 after serving as Associate Vice Chancellor for Academic Support and Interim Dean of the School of Industry and Technology.

In the summer of 1999 the Department of Environmental Health was officially transferred administratively from the School of Allied Health Sciences to the School of Industry and Technology. The name of the department was changed from Environmental Health to Environmental

Health Sciences, Safety, and Technology. The reason for the change was that the Department expanded its curriculum by including the safety component previously located in the Department of Industrial Technology and adding Drs. Mark Friend and Dr. James Kohn to the graduate faculty.. Dr. James Robertson retired from the Department in August 1999 after 14 years of service. A successful search for the vacated position was completed in February, 2000. Dr. Burton Ogle accepted the position as an assistant professor and graduate faculty member and assumed the full time position in Fall, 2000. Also, Dr. Daniel Sprau joined the faculty in August, 1999; the position was vacated by the death of Dr. James Kohn. Dr. Y.J. Lao was again appointed as the Chair of the Department in the summer of 1999.

Dr. Y.J. Lao retired in July of 2000 and Dr. Barney Kane began a three year part-time phased retirement schedule. Dr. Daniel Sprau was appointed interim Chair while searching for a new Chair.

The search for a new Chair was unsuccessful and Dr. Doug Kruger, Chair of Construction Management was appointed Interim Chair of the Department in the Fall Semester of 2001 while another search for a new Chair began.

During the Spring Semester of 2002, the entire departmental faculty was informed individually that the Environmental Health Sciences Program and Department would be phased out. This was partially due to the low number of graduate students and the numbers completing the MSEH. This began a major campaign involving the faculty, students, alumni, NEHA, NC Health Departments, and AEHAP to save the Program. Through the major efforts of Dr. Trenton Davis, the Program was retained and moved as the Environmental Health Sciences Program to the Department of Health Education and Promotion in what is now called the College of Health and Human Performance. Dr. David White is Chair of the Department and Dr. Sprau serves as Program Director.

Mr. Ed Crotts, MSEH, CIH joined the program as visiting professor and graduate teaching faculty member in the fall semester of 2002. Dr. Trenton Davis retired from ECU after 32 years of exemplary service in the spring semester of 2003.

New graduate faculty members joined the Program as assistant professors; Dr. Alice Anderson in the fall semester of 2003 and Dr. Max Zarate in the fall semester of 2004.

In the spring of 2006 major revisions to the MSEH include a Research option and an Applied option. The Environmental Health Sciences program will be relocated physically for at least a year, starting the

summer of 2006, while complete renovations including graduate teaching laboratories are completed in the Belk Building.

MISSIONS, GOALS AND OBJECTIVES

- A. *The graduate program in Environmental Health Sciences and Safety at East Carolina University, because of the unique, broad, multidisciplinary scope of the field of environmental health, provides an opportunity for students to combine the ideals of the University's educational, research, and service missions with preparation for a public sector job in public health, through environmental, management, legal, and technical knowledge. Environmental Health Sciences graduate studies provides a broad disciplinary spectrum of educational opportunities in environmental issues and health, safety, regulatory, and legal decision-making, research in emerging health and environmental issues, and service to humanity in internship and service learning opportunities, and in preparation for plentiful and needed public sector jobs.*

For the baccalaureate student, development in the area of new knowledge and ethical decision-making, in applied research, and in leadership are parts of the curriculum.

- B. *The program objectives, to address the mission of the Environmental Health Sciences Program follow. We expect Environmental Health graduate students:*
1. *to make choices for advanced study in broad interdisciplinary areas of environmental health, guided by faculty committed to teaching, research, and service in these areas,*
 2. *to maintain intellectual and professional motivation due to the variety and the relevance of the Environmental Health Science and Safety Curriculum,*
 3. *to use the physical facility appropriately and safely finding quality equipment and support from the program, department, college, and university.*
 4. *to be sufficiently supported financially through assistantships and grants,*
 5. *to gain skills in order to provide effective service to the environmental health science and safety needs of the community served by the university and the state,*
 6. *to gain working knowledge of environmental health and protection programs and procedures in the state of NC, in the U.S., and in the world,*

7. *to earn a degree with national accreditation.*

C. *The Performance of the Program*

The performance of the program and the methods used for evaluating responsiveness to the mission, goals, and objective are found under the curriculum section.
(See Appendix E)

CURRICULUM (See Appendix A)

- a. **The methods used for evaluating responsiveness to the mission, goals and objectives. Information needs to be provided on:**

- **The system for routine review of course content and curriculum structure.**

Faculty routinely list goals in teaching, advising, research, and service with percentages of effort and a specific goal in each category for each year. This list of goals is then compared to accomplishments and reviewed by the department chair. For tenure track faculty, this review is part of the tenure and promotion process.

- **The methods for evaluating student accomplishments and knowledge and skills developed.**

The curriculum is undergoing complete revision this year as a result of adding new faculty, restructuring the program in the university, college and departmental structure, and surveying potential graduate students.

- **The methods used by students to evaluate the courses, faculty and program.**

Faculty in environmental health meet weekly to review curriculum matters, course content, and student performance; in informal discussions. Student opinion of Instructor Surveys (SOIS) are student evaluations, and are completed for each class each semester.

- **The program's effectiveness in meeting the educational objectives, and the projections for future achievement and recommendations for future changes and activities.**

Future changes include passage of the curriculum revisions included in this package, and the addition or revision of current courses as the increased number of graduate students continues to climb. Other changes that may have a large impact are the ability of the university to offer in-state tuition to students who reside in states without environmental health graduate degrees offered in any accredited program, and the general growth of all programs at East Carolina University. We will have to continually adapt to increasing numbers through additional faculty (we will have one more

full-time faculty member by the fall of 2006), and adjusting the curriculum to fit the emerging problems in environmental health, including bioterrorism and emerging diseases and disaster response.

b. A curriculum organized and structured to integrate and sequence its content in an orderly and logical fashion.

- *Curriculum requirements indicating those met within the program and those met outside the program.*
- *The degree requirements.*
- *The syllabus for each course integral to the program of study.*

c. A matrix of course requirements (course name, number, credit hours and instructor) linked to accreditation competencies: (See Chart)

d. Culminating Experience

- *Requirements.*

We have the thesis, professional paper, written exam, and practicum.

- *List of culminating experiences (theses, portfolios, written exams, professional papers, etc.) for the past two years.*

▪

Student thesis and paper titles and authors for the past two years.

Megan Hartwell, 2004

J. Marion Edy - Synergetic Effects and Mutational Frequency Differing in V79 Cells with the Insect Repellent, N, N-diethyl-meta-toluamide (DEET) and Varying Doses of UV Radiation

Marcus Jeanette - A Safety Assessment of Radiofrequency Electromagnetic Field Exposure Levels from Microwave Antennas Mounted on the Roofline of Several Buildings at East Carolina University

Jessica Cox Jones -

FACULTY (See Appendix B)

- a. List faculty teaching courses fulfilling accreditation competency requirements indicating if faculty members are full-time or part-time**

Alice Anderson, MS, PhD, Assistant Professor, Fulltime
Max Zarate, MPH, PhD, Assistant Professor, Fulltime
Daniel Sprau, DrPH, RS, CIH, CSP, Associate Professor, Fulltime
Ed Crotts, MSEH, CIH, Visiting Instructor, Fulltime
William Hill, MS, RS, Visiting Instructor, Fulltime
Paul Andrews, MSEH, RS, Visiting Instructor, Part-time
William Koch, MS, Visiting Instructor, Part-time

- b. List faculty working on research with environmental health science master's students (please put vitae in appendix).**

Dr. Alice Anderson, Assistant Professor, Fulltime
Dr. Max Zarate, PhD, Assistant Professor, Fulltime
Dr. Daniel Sprau, DrPH, RS, CIH, CSP, Associate Professor, Fulltime

- c. Curriculum vitae (please put vitae in appendix) of program faculty.**

ADMINISTRATION (See Appendix C)

- a. The organization of the department and its location within the university hierarchy.
- b. The mechanisms providing stability and continuity of administrative support.

RESOURCES

a. The program capacity for graduate students.

15 Research/ 35 Applied

b. Identification of physical facilities including classrooms, laboratories, offices.

Information Technology and Computing Services (ITCS) provides computing, network, and outreach support for academic education, research, and administrative programs on campus. Recognized throughout the region as a leader in incorporating technological advances in all phases of operation, East Carolina University is one of five universities holding membership in Internet2 in North Carolina. Partnering with campus departments, other universities, and industry ITCS makes strategic investments in the information technology infrastructure.

The core server facility provides a platform for faculty to develop Internet-enhanced and online course material. This allows the course content to be available to students anywhere in the world. The facility also houses a Digital Resources Collection, a Windows Media Server, and personal webspace for faculty instructional material. Housed on remote corporate servers, Blackboard enhances course management system technical support.

Located throughout campus are more than sixty student compute laboratories that support both discipline-specific applications as well as general computing. All are networked and both the Apple and PC platforms are supported throughout the university. Students have access to the internet through a Cyber Café and through wireless connectivity on campus.

ITCS also supports an immersive visualization facility for teaching and learning; a SGI Origin 2000 parallel processing computer for ECU faculty, staff, and graduate students that are pursuing research objectives; and IP/TV video streaming system that enables the ECU-networked community to access instructive, and professional development opportunities, as well as real-time cable broadcasts and satellite programs over the Internet; an advanced videoconferencing Access Grid system that facilitates large-scale distributed meetings; collaborative seminars, lectures, work sessions, tutorials, and training; high-speed internet connection to the Internet. ECU's Onestop enables students to

access their grades, register for their classes, and take care of many everyday administrative functions on-line.

c. Identification of equipment, supplies, and library materials including internet resources.

Students majoring in environmental health have access to holdings of two libraries on campus; Joyner Library, located on main campus and the Health Sciences Library, located at the medical school. Joyner Library contains approximately 1.3 million volumes, more than 2 million pieces of microform, and about 12,000 serial titles. As a selective depository for U.S. Government publications, Joyner Library's Document department contains over 1 million international, federal, and state documents and 101, 586 maps. Joyner Library's holdings in education, naval and maritime history, and law reference materials are particularly strong. Access to information resources is provided by CD-ROM and online services located in the reference department.

The William E. Laupus Health Sciences Library is located in the Brody Medical Sciences Complex. It serves as the primary information resource facility for the university's health science programs. The Health Sciences Library contains approximately 145,814 bound or hard copy volumes, the equivalent of an additional 177,015 volumes in microformat, and receives 1,545 periodical and serial subscriptions.

The library is equipped with more than 100 computers available for public use and supports a growing program of electronic information and services. Reference services, bibliographic instruction, class reserves, historical collections, and a state of the art computer lab are also available.

Both Joyner Library and the Laupus Health Sciences Library resources are available through the VirtualLibrary@ECU.

Local, state, and commercial newspapers are available free of charge at student union & other locations.

d. Identification of support staff.

*Mrs. Vickie S. Best, Office Assistant
Ms. Wendy Pender, Office Assistant
Mrs. Debra Wightman, Office Assistant*

e. Identification of off-campus resources available to the program.

Pitt County Health Department; Regional Bioterrorism Lab; Craven County Health Department; Greenville Utilities Commission (GUC); Episcopal Hispanic Ministry, Washington, NC

f. Identification of research or special projects grants.

Greenville Utilities Commission - Water Resources Department

g. Identification of changes in resources.

New set of 10 research quality microscopes purchased by the Department of Health & Promotion

Revco-10 degree freezer

Research microscope for insect photography

1 Binocular compound microscope w/eyepiece-reti microgrid

1 Spectronic Aquamate Water Analysis Spectrophotometer

1 Centra-CLR5 multipurpos centrifuge w/rotor for 8x28 mL-tubes

1 Turbidimeter

1 Colorimeter

1 DO/BOD Probe

1 Water Test Kit

2 pH-meters

STUDENTS

- a. The admission requirements for the graduate program.**

A satisfactory GRE or MAT score, and an overall GPA of 2.5 or 3.0 in major

- b. The requirements for satisfactory performance in the program.**

Complete 34 s.h. satisfactory grades, satisfactory attendance

- c. The requirements for satisfactory progress in the program.**

Maintain a GPA of B.

- d. Credit hour requirements for graduation.**

34 Semester hours. If no environmental health experience, 3 s.h. internship must be taken. EHST 6010 must be take (not included in 34)

- e. Number of students enrolled in the program for the past six years.**

30

- f. Number of program graduates in each of the past six years.**

19

- g. Descriptive job titles and employer identification (may be given generically) for program graduates in each of the past six years.**

- *Environmental Consulting Company*
- *State of North Carolina Division of Environment and Natural Resources; Air Pollution control; Water resources*
- *County Health Department Registered Sanitarian*
- *Chemical Company Industrial Hygiene*
- *Manufacturing Company Industrial Hygiene*

SUMMARY

a. The major strengths of the program.

Facilities and research equipment are improving dramatically with the addition of new tenure track with research programs. Faculty take time to assist students in classwork and research.

Faculty expertise in Vector borne disease, water supply and wastewater treatment, radiation safety and industrial hygiene, as well as faculty with practical experience in public health work.

Enrollment is improving. Each week we have 2 to 3 inquiries and we will have approximately 15 in the fall.

b. The major weaknesses of the program.

Visibility and stability of the program has been weak in recent years due to long-term faculty retirement and department changes of the program's home. Planned renovation of the current building facilities will require another physical move and hinder visibility.

c. The long-term plans or expectations for the program.

- *Tie class syllabi more closely to Environmental Health core competencies.*
- *Continue developing program vision to keep pace with student need, community needs and needs of the society of the United States and the world.*

APPENDIX A
(Curriculum & Course Syllabi)

Curriculum Changes to the Master of Science Degree in Environmental Health (MSEH)

Major curriculum changes for the MSEH were approved by the Graduate Curriculum Council on February 15, 2006. The changes established two options under the degree program. The options are: (1) Research Option and (2) Applied Option. This overall curriculum change was requested in order to make the graduates of the program more marketable in the applied field of environmental health and also to provide online MSEH opportunities to Registered Environmental Health Specialists and Registered Sanitarians. Total semester hours required for the degree remains the same 34 semester hours. For those Registered Sanitarians working in the field the Applied Option may be completed totally on line. Also, there are plans for the Applied Option to be offered in conjunction with North Carolina Central University and Western Carolina University, the other two AEHAP accredited or seeking accreditation universities within the state.

Master of Science in Environmental Health Degree (MSEH)

David White, Chairperson, 204 Christenbury Gymnasium

MS IN ENVIRONMENTAL HEALTH (MSEH)

The master of science in environmental health requires completion of a minimum of **34 s.h.** A student having no prior environmental health experience must take EHST 6010 Fundamentals of Environmental Health (3 s.h.) and EHST 6980 Environmental Health Practicum (3 s.h.) in addition to the 34 s.h. minimum. All students must pass a written, comprehensive examination.

Environmental health offers two degree paths:

Research Option: Students must complete a thesis and also must take at least 4 s.h. of approved laboratory credit. A student may not count more than 15 s.h. from 5000 level courses or take more than 15 s.h. through on-line courses.

Applied Option: This option is intended only for Registered Sanitarians/Registered Environmental Health Specialists. Permission to choose this option must be obtained from the environmental health sciences program faculty. Students must complete a professional paper and may not count more than 15 s.h. from 5000 level courses.

1. **Research Option Courses** **13 s.h.**

HLTH/MPH 6011 (3) Introduction to Epidemiology or BIOS 5010 (3)

Epidemiology

BIOS 7021 (3) Biostatistics

EHST 5001 (1) Environmental Health Seminar

MPH 6020 (3) Research Methods

EHST 7000 (3) Thesis

All students write and orally defend a thesis. The thesis proposal and thesis must be approved by the student's advisor and a committee comprised of at least 3 graduate faculty members, 2 of whom must be environmental health sciences faculty, and 1 reviewer from outside the department.

Applied Option Courses.....**13 s.h.**

HLTH/MPH 6011 Introduction to Epidemiology (3) or BIOS 5010 (3)

Epidemiology

BIOS 7021 (3) Biostatistics

EHST 5001 (1) Environmental Health Seminar

EHST 6800 (3) Environmental Health Program Management

EHST 6990 (3) Professional Paper

All students write and orally defend a professional paper that reflects an applied learning experience leading to an environmental health action, intervention, or increased knowledge in the field. Paper may take many forms but summarizes a project selected by student and defended before student's committee comprised of at least 3 faculty members, 2 of whom must be environmental health sciences faculty, and 1 reviewer from outside the program.

2. Additional Environmental Health/Related Courses at least 21 s.h.

Course selection in consultation with the student's advisor.

EHST 5010, 5011 (3,1) Principles of Toxicology and Laboratory
EHST 5020 (3) Environmental Toxicology
EHST 5164 (1) Radiological Health Field Operations
EHST 5165 (1) Advanced Radiological Health Physics Laboratory (ORAU)
EHST 5510 (2) Physical Safety
EHST 5520 (2) Biological Safety
EHST 5530 (2) Chemical Safety
EHST 5540 (2) Radiation Safety
EHST 5800, 5801 (3,0) Solid and Hazardous Waste and Laboratory
EHST 6100 (3) Elements of Environmental Engineering
EHST 6201, 6202, 6203 (1,2,3) Individual Studies
EHST 6210, 6220, 6230 (1,2,3) Topics in Environmental Health and Safety
EHST 6300, 6301 (3,1) Public Health Pests and Vector Borne Disease and Laboratory
EHST 6400 (3) Technical Advances in Water Supply and Waste Water Treatment
EHST 6420 (3) Sanitary Microbiology and Safety of Foods
EHST 6600 (3) Air Quality Control Methods
EHST 6700, 6701 (3,1) Industrial Hygiene Application and Laboratory
EHST 6710 (3,0) Ventilation and Indoor Air Quality and Laboratory
EHST 6800 (3) Environmental Health Program Management
GEOL 5710, 5711 (3,0) Ground Water Hydrology
PLAN 6301, (3) GIS and CAD applications for Planning

MASTER OF PUBLIC HEALTH

The department participates in the offering of a graduate degree in public health. See the School of Medicine, Department of Family Medicine, for the Occupational and Environmental Health option and the degree requirements.

CERTIFICATE IN SECURITY STUDIES

The program participates in the offering of a graduate certificate in security studies. See College of Arts and Sciences, Department of Political Science, for certificate requirements.

EHST: ENVIRONMENTAL HEALTH

5001. Seminar in Environmental Health (1) Student, staff, and guest speakers on current research.

5010, 5011. Principles of Toxicology and Laboratory (3,1) For EHST majors but other majors accepted. P: Senior or graduate standing; 8 s.h. of general chemistry; 6 s.h. of biology, including BIOL 2130; or consent of instructor. Basics of toxicology such as physiological response and environmental sources as well as specifics of major toxins.

5020. Environmental Toxicology (3) P: EHST 5010, 5011; or consent of instructor. Effect of anthropogenic and naturally occurring toxins on environment. Toxin sources, distribution, and bioaccumulation. Covers pesticides, metals, solvents, radioactive isotopes, food additives, air pollutants, and natural plant/animal toxins.

5164. Radiological Health Field Operation (1) P: Consent of instructor. Field observation of radiological health physics, practices at nuclear fuel cycle facilities, and government nuclear facilities.

5165. Advanced Radiological Laboratory (1) P: Consent of instructor. Intensive radiological lab training at Oak Ridge Associated Universities. Tour of research facilities.

5510 Physical Safety (2) Formerly EHST 3100 Practical application of physical safety principles in living and work environments

5520 Biological Safety (2) Formerly EHST 6120 Practical application of biological safety principles in living and work environments.

5530 Chemical Safety (2) Practical application of chemical safety principles in living and work environments.

5540 Radiation Safety (2) Formerly EHST 2500 Practical application of radiation safety principles in living and work environments

5800, 5801 Solid and Hazardous Waste Management and Laboratory (3,0) 2 lecture and 2 lab hours per week P: CHEM 1160, 1161 or consent of instructor. Problems associated with collection, treatment, and disposal of municipal solid waste and hazardous wastes in the United States.

6010. Fundamentals of Environmental Health (3) Effects of environment on human health. Focuses on rural environment. Considers water supply and wastewater disposal, water quality, solid and hazardous wastes, air quality, occupational health and safety, food protection, and vector control.

6100. Elements in Environmental Engineering (3) Practical application of engineering principles to environmental health.

6201, 6202, 6203. Individual Studies (1,2,3) May be repeated for maximum of

3 s.h. P: Declared EHST major; consent of major professor. Advanced knowledge in selected areas of environmental health.

6210, 6220, 6230. Topics in Environmental Health and Safety (1,2,3)

Formerly EHST 6200 May be repeated with change of topic. Seminar. Selected environmental health and safety problems considering current studies and efforts at solutions.

6300. Public Health Pests and Vector Borne Disease (3) Identification, management, and ecology of arthropods and other disease vectors, and characteristics and epidemiology of diseases they carry.

6301. Public Health Pests and Vector Borne Disease Laboratory (1)

Concentration on mosquitoes and ticks in North Carolina, testing for West Nile Virus, and application of 3-D imaging techniques.

6400. Technical Advances in Water Supply and Waste Treatment (3) State-of-the-art advances in water and waste water treatment. Examines best practical available technology for coping with special water supply and waste disposal problems. Demonstrates principles upon which real life systems function.

6420. Sanitary Microbiology and Safety of Foods (3) P: Consent of instructor. Sanitary microbiology and chemical safety of foods. Topics include natural toxicants, food additives, and regulations for protection of public health.

6600. Air Quality Control Methods and Devices (3) Theory, use, evaluation, advantages, and limitations of procedures and methods employed in air quality control.

6700. Industrial Hygiene Application (3) Principles of evaluating and controlling work environment. Emphasis on resolving occupational health problems.

6701. Industrial Hygiene Application Laboratory (1) C: EHST 6700. Methods of measurement and evaluation used by industrial hygienists.

6710, 6711. Ventilation and Indoor Air Quality and Laboratory (3,0) 2 lecture and 2 lab hours per week. P: Consent of instructor. Principles and basic design of ventilation systems and fundamentals of indoor air quality.

6800. Environmental Health Program Management (3) Knowledge and practice in planning, developing, and managing environmental health programs. Applies current management practices toward solutions of environmental health problems.

6980. Environmental Health Practicum (3) Directed work experience in clinical/environmental health agency.

6990. Environmental Health Professional Paper (3) May be repeated. May count a maximum of 3 s.h. toward degree. P: Admission to the Applied Option of the Master of Science in Environmental Health. Detailed summary of applied

learning experience leading to environmental health action, intervention, or increased knowledge in the field.

7000. Thesis (3) May be repeated. May count maximum of 6 s.h.

7001. Thesis: Summer Research (1) May be repeated. No credit may count toward degree. Students conducting thesis research may only register for this course during the summer.

EHST Banked Courses

5710, 5711. Topics in Health Physics I (3,0) 5720, 5721. Topics in Health Physics II (3,0) 6501, 6502, 6503. Problems and Research in Environmental Health (2,2,2)

Principles of Toxicology
Department of Environmental Health Sciences
Course Number: EHST 5010, Credit Hours: 3

Instructor: Edward D. Crotts, CIH
Office: Room 310 A, Belk Building
Phone: 328-2991
Email: crottse@mail.ecu.edu
Classroom: Belk Building, Room 216
Days/Time: MW 8:30-9:50 a.m.
Office Hours: MTRF – 2:30 - 4:30 p.m., T Th 9:00 a.m. - 4:00 p.m.; or by appointment

I. TITLE:

Principles of Toxicology

II. CATALOG DESCRIPTION:

Basics of Toxicology - physiological response and environmental sources, as well as specifics of major toxins, will be covered. Primarily for environmental health majors, but open to other students.

III. PURPOSE:

To familiarize students with basic toxicological principles, methods, chemical risks and assessment procedures.

IV. COURSE OBJECTIVES:

By the end of this course:

Students will understand the basic principles of how chemicals adversely affect living systems.

Students will understand how chemicals adversely affect target organs.

Students will have an opportunity to improve written and verbal communication skills.

V. CONTENT OUTLINE:

Introduction – Course Structure, History

Basic Concepts of Toxicology:

absorption, distribution, elimination, biotransformation

Hematotoxicity
Hepatotoxicity
Nephrotoxicity
Neurotoxicity
Dermal Toxicology
Ocular Toxicology

Pulmonotoxicity
Immunotoxicity
Reproductive Toxicity
Mutagenesis
Carcinogenesis
Metal Toxicity

Pesticide Toxicity
Organic Solvent
Toxicity
Natural Toxins
Risk Assessment
Epidemiology

IX. ATTENDENCE POLICY:

Unexcused absences may (and likely will) affect your final grade for the course.

X. ACADEMIC HONESTY POLICY:

Cheating, plagiarism - submitting another person's work as one's own, or doing work for another person who will receive academic credit are not permissible. The unauthorized copying of examinations, assignments, reports and term papers, or the presentation of unacknowledged material as if it were the student's own work is also not permissible.

XI. REQUIRED TEXT & REFERENCES:

Hamilton & Hardy's Industrial Toxicology, 5nd Ed.; Raymond D. Harbison.

XII. PREREQUISITES:

Senior or Graduate Academic Standing; 6 semester hours in Biology (including BIOL 2130); 8 semester hours of general chemistry; or, the consent of the Instructor.

Instructor: Ed Crotts, MS, CIH, Visiting Instructor
Office Hours: MWF – 8:30-11 AM; TTh – 9:00- Noon, other times by appointment.
Contact Info: Office: 310A Belk
 Office Telephone: 328-2991
 Email: Crottse@mail.ecu.edu (typically, the best way to get me)

Course Description:
Practical experience and methods for evaluation of toxic substances.

Required Text: Hamilton & Hardy's Industrial Toxicology, 5nd Ed.,:
 Raymond D. Harbison.

Supplemental Text: Various CD-Rom media, supplied by instructor; course handouts

Course Objectives:
The student will demonstrate the knowledge and ability to evaluate toxic substances.
Student will develop better technical writing skills.

Grading Criteria:

A
B
C
60-69 D
Below 60 F

Evaluation Criteria:

Laboratory write ups	80%
Attendance/Participation	20%

Attendance Policy:

Class participation is essential to success in this course. The University attendance policy will be enforced. ATTENDANCE COUNTS! FIVE (5) POINTS WILL BE DEDUCTED FROM FINAL GRADE FOR MORE THAN 3 UNEXCUSED ABSENCES.

Students with Disabilities:

East Carolina University seeks to comply fully with the Americans with Disabilities Act (ADA). Students requesting accommodations based on a covered disability must go to the Department for Disability Services, located in

Brewster A-14, to verify the disability before any accommodations can occur.
The telephone number is 252-328-6799.

Academic Honesty Policy:

Cheating, plagiarism – submitting another person's work as one's own, or doing work for another person who will receive academic credit are not permissible. The unauthorized copying of examinations, assignments, reports and term papers, or the presentation of unacknowledged material as if it were the student's own work is also not permissible.

COURSE OUTLINE

Conducting LD50 experiments

Environmental toxicology tests using aquatic invertebrates

Environmental toxicology tests using aquatic vertebrates

Environmental toxicology tests using algae

Principles of conducting chronic toxicology tests for carcinogenicity, reproductive and target organ effects.

Principles of Toxicology
Department of Environmental Health Sciences
Course Number: EHST 5020, Credit Hours: 3

Instructor: Edward D. Crotts, CIH
Office: Room 310 A, Belk Building
Phone: 328-2991
Email: crottse@mail.ecu.edu
Classroom: Belk Building, Room 216
Days/Time:.
Office Hours: MTRF – 2:30 - 4:30 p.m., T Th 9:00 a.m. - 4:00 p.m.; or
by appointment

I. TITLE:

Environmental Toxicology

II. CATALOG DESCRIPTION:

Effects of anthropogenic and naturally occurring toxins on the environment. Toxin sources, distribution and bioaccumulation. Covers pesticides, metals, solvents, radioactive isotopes, food additives, air pollutants and natural plant/animal toxins.

III. PURPOSE:

To familiarize students with basic environmental toxicological principles, methods, chemical risks and assessment procedures.

IV. COURSE OBJECTIVES:

By the end of this course:

Students will understand the basic principles of how chemicals adversely affect living systems.

Students will understand how chemicals adversely affect target organs.

Students will have an opportunity to improve written and verbal communication skills.

V. CONTENT OUTLINE:

Introduction – Course Structure, History

Basic Concepts of Environmental Toxicology:

Bioaccumulation, biotransformation and biodegradation

Ecosystem effects

Environmental toxicity testing

Aquatic invertebrates

Invertebrates – fresh and salt water

Algae

Routes of exposure

IX. ATTENDENCE POLICY:

Unexcused absences may (and likely will) affect your final grade for the course.

X. ACADEMIC HONESTY POLICY:

Cheating, plagiarism - submitting another person's work as one's own, or doing work for another person who will receive academic credit are not permissible. The unauthorized copying of examinations, assignments, reports and term papers, or the presentation of unacknowledged material as if it were the student's own work is also not permissible.

XI. REQUIRED TEXT & REFERENCES:

***Introduction to Environmental Toxicology*, 3rd Ed.,: Landis and Yu.**

XII. PREREQUISITES:

Senior or Graduate Academic Standing; 6 semester hours in Biology (including BIOL 2130); 8 semester hours of general chemistry; or, the consent of the Instructor.

DEPARTMENT OF HEALTH EDUCATION AND PROMOTION
ENVIRONMENTAL HEALTH SCIENCES AND SAFETY PROGRAM
EHST 5800 Solid and Hazardous Waste Management

Spring 2006 (MWF) Belk Building
9:00-9:50

Instructor: W. E. Hill, Jr., RS, MSA, Visiting Instructor
Office Hours: MWF (11:00-12:00) TTH (1:00-2:00)
Times by Appointments also available
Contact Info: Office: 315 Belk
Office Telephone: 328-1690
Email: hillw@mail.ecu.edu

Course Description: A detailed examination of the problems associated with the collection, treatment and disposal of solid and hazardous wastes in the US. The study of the development of federal legislation and regulation for solid and hazardous waste management. Current technologies for solving waste management problems.

1. Introduction
 - a. Definitions
(1) Solid Waste
 - b. Regulations
2. Solid Waste Land Disposal
 - a. Size Reduction
 - b. Baling
 - c. Operation
 - d. Leachate
 - e. Closure
3. Solid Waste to Energy Facilities
 - a. Processed Solid Waste as Fuel
 - b. Material Handling
 - c. Resource Recovery
 - d. Marketing

- e. Air Pollution and Control
 - f. Health and Safety
4. Mass Burn Facilities
 5. Siting New Facilities
 - a. Public Acceptance (NIMBY)
 - b. Cost
 - c. Construction
 - d. Collection
 - e. Transfer
 6. Source Separation
 - a. Reduction
 - b. Reuse
 - c. Recycling
 7. Special Problems
 - a. White Goods
 - b. Tires
 - c. Bulk Items
 8. Hazardous Waste Disposal
 - a. Definition and Identification
 - b. Technology
 - c. Regulations
 - (1) Generator
 - (2) Transporter
 - (3) Disposal Facility
 9. Hazardous Waste Remediation
 - a. Superfund
 - b. Current Technologies

Text: Basics of Solid and Hazardous Waste Management Technology (Kanti L. Shah)

Grades based on:

Attendance	20%
Mid-Exam grades	25%
Homework Assignment	20%
Articles and Research Project	10%
Final Exam	25%

East Carolina University
College of Health and Human Performance/Department of
Health Education and Promotion
Environmental Health Sciences and Safety Program
Course Syllabus

EHST 6100 Elements in Environmental Engineering

Semester: Fall 2005

Instructor: Max A. Zárate B., MSc MPH PhD
Tel: (252) 328 5597; e-mail: zaratem@mail.ecu.edu

Schedule: W 5-8 (September 28: 6-9) Room: Global Classroom

Office Hours: M, 2:30-5:30; W & Th 10-12

Office: Belk 310 B

Course Description:

This graduate course is designed to learn about (1) measurement units and conversion factors; (2) sources and uses of water, and the water cycle; (3) key physicochemical and biochemical processes water treatment technologies, and mass balances; (4) water quality and health, pollutants in the environment, and principles of exposure assessment; and (5) water legislation. The International System of units and measurements is widely used in the current literature covering water and health issues, and students in this course will become skillful in working with it. The importance of water quality in understanding treatment processes and water use in estimating the fate of pollutants in the environment through mass balance applications is covered as the basis for exposure assessment. The above plus basic knowledge of both drinking- and waste-water treatment technologies will help students in better understanding policy making processes and interpreting water legislation at country and state levels.

Course Objectives:

To develop and enhance the knowledge, skills, and abilities of professionals who are interested or work in the environmental engineering field and apply it in addressing local and national water and health problems. The following activities will help in meeting the course objectives:

- Solving problems and homework will make students skillful in using conversion factors and gaining knowledge on the fundamentals of metrology and systems of standard units. This will be enhanced by its application to current water and health issues in eastern North Carolina and elsewhere.

- Learning key principles of water treatment technologies; physical, chemical, and biological processes; and the water cycle through lectures and literature review will enhance students' abilities to determine water management practices and sources of water pollution.
- Reading and discussing selected journal articles on water and health issues of current importance will help students to gain knowledge and enhance their abilities in addressing similar issues. Preparing the discussion sessions and writing the paper for this course will make students skillful in approaching environmental engineering problems related to water and health in an integrated way.
- Learning the fundamentals of water quality and mass balance to estimate the fate of pollutants in the environment will help students to become skillful on the basics of exposure assessment. Furthermore, applying this knowledge to local and national situations will be useful in understanding the process of policy making and interpreting water legislation.

Required Textbook: EHST 6100 Course Pack

Grading:

Requirements	Percent of Final Grade
<p><i>Attendance – 15%</i> Students can miss up to two (2) unjustified classes. It is responsibility of each student to get and review materials of the class(es) missed.</p>	15%
<p><i>Discussion Sessions – 15% each</i> Two (2) discussion sessions during the semester on new subjects covered previously.</p>	30%
<p><i>One five-page paper – 30% each</i> Required organization of the paper: [1] Introduction; [2] Discussion of subjects learnt in classes; [3] Conclusions; and [4] References. Criteria to grade paper: [1] Clarity of the organization; [2] Knowledge of the subject(s); [3] Clarity of conclusions; [4] Proof of extra research.</p>	30%
<p><i>Final Exam – 25%</i> Criteria to grade the exam: [1] Knowledge of the subject; [2] Ability of analyzing and solving problems; [3] Ability of analyzing and explaining a given situation.</p>	25%
T o t a l	100%

COURSE GRADE

90 – 100 % A

80 – 89 % B

70 – 79 % C

60 – 69 % D

<60 % F

Selected Web Pages and Links: TBA

Weekly Schedule:

Date	Subject	Remarks
Aug-24	Introduction Topics for five-page paper	List of topics will be delivered.
Aug-31	Measurement Units and Conversion Factors Selection of topic for five-page paper Survey on water use (e-mail & Bb)	International and English systems –handout. Survey will be e-mailed and placed in blackboard.
Sep-07	The Water Cycle	Review USGS website given the previous week and reading material.
Sep-14	Water Sources and Uses	Review IRC website given the previous week and reading material. Survey on water use due by 5:15PM.
Sep-21	Water Pollution and Sources of Water Pollution	Review USEPA and NC-DENR websites given the previous week and reading material.
Sep-28*	Key Issues in Water Treatment Technologies – Drinking Water	Review USEPA website given the previous week and reading material.
Oct-05	Key Issues in Water Treatment Technologies – Drinking Water (cont'd)	Review GUC website given the previous week and reading material.
Oct-12**	Discussion Session 1	Discussion of subjects covered Sep 7-Oct 5.
Oct-19	No class (class of Monday, Sep 05 is replaced)	
Oct-26	Key Issues in Water Treatment Technologies – Wastewater	Review USEPA and GUC websites given the previous week and reading material.
Nov-02	Key Issues in Water Treatment Technologies – Wastewater (cont'd)	Review journal articles handed out the previous week and reading material.
Nov-09	Water Quality, and Principles of Exposure Assessment and Bioaccumulation	Review reading material and journal article handed out the previous week.
Nov-16	Water Quality and Health (cont'd) Five-page Paper due	Review CDC website given the previous week and reading material. Paper due by 5:15PM.
Nov-23	No class (Thanksgiving)	
Nov-30**	Discussion Session 2	Discussion of subjects covered

		Oct 26-Nov 16.
Dec-07	General Review	In preparation for the final exam.
Dec-14	Final Exam	

* Class will be held 6-9PM

** DE students must attend these sessions

EHST 6700 - Industrial Hygiene – Summer 2005
Department of Environmental Health Sciences and Safety

Instructor: Edward Crotts, CIH
Office: Room 310A, Belk Building
Phone: 328-2991
Email: crottse@mail.ecu.edu

Class is offered on-line. Office Hours: MTWTh – 1:00 - 3:00 p.m.; or
by appointment

I. TITLE:
Industrial Hygiene Application

II. CATALOG DESCRIPTION:

6700. Industrial Hygiene Application (3) Covers principles of evaluating and controlling the work environment. Emphasis is placed on resolving occupational health problems.

III. PURPOSE:

This course is designed to review general concepts of industrial hygiene and explore advanced I.H. sampling techniques and control processes. Topics include: routes of exposure, chemical, physical and biological hazards, ventilation, noise and instrumentation. Identification, evaluation, and control of industrial health hazards are stressed.

IV. COURSE OBJECTIVES:

By the end of this course:

*Students will understand advanced principles of industrial hygiene.
Students will understand how chemical and physical workplace hazards are evaluated.*

Students will understand the methods used to control workplace hazards.

Students will understand the US regulations governing workplace hazards.

Students will have an opportunity to improve written communication skills.

V. CONTENT OUTLINE:

Introduction – Course Structure, Basic Concepts of Industrial Hygiene

RECOGNITION OF HAZARDS

- Gases and Vapors
- Particulate Matter

- Industrial Noise
- Non-Ionizing Radiation
- Ionizing Radiation

- Industrial Dermatoses
 - Temperature Extremes
 - Ergonomics
 - Biological Hazards
- EVALUATION OF HAZARDS**
- Industrial Toxicology
 - Evaluation Criteria
 - Methods of Evaluation

- Air Sampling Instruments
- CONTROL OF HAZARDS**
- Methods of Control
 - Ventilation (General & Industrial)
 - Protective Equipment
 - Indoor Air Quality (SBS)

Group projects will include topics on Ergonomics, Asbestos, Indoor air quality and Ethylene oxide. Students must coordinate the writing of a 10 page document with other members of the group. The document must answer the following questions about the topic:

What regulations cover the topic?

What limits are placed on exposure?

What are the safety and health implications of exposure?

How are exposures measured?

How are exposures controlled?

VI. INSTRUCTIONAL ACTIVITIES:

- **Group project**
- **Homework Assignments**
- **Laboratory Exercises**

VII. RESOURCES:

- **Text**
- **Handouts**
- **Instructor's reference library**
- **Internet resources**

VIII. GRADING:

- Participation 10%
- Homework & Quizzes 40%
- Examination 25%
- Group Project (Final Exam) 25%

X. ACADEMIC HONESTY POLICY:

Cheating, plagiarism - submitting another person's work as one's own, or doing work for another person who will receive academic credit are not permissible. The unauthorized copying of examinations, assignments, reports and term papers, or the presentation of unacknowledged material as if it were the student's own work is also not permissible.

XI. REQUIRED TEXT & REFERENCES:

Basics of Industrial Hygiene, Debra K. Nims, 1999.

XII. STUDENTS WITH DISABILITIES:

East Carolina University seeks to comply fully with the Americans with Disabilities Act (ADA). Students requesting accommodations based on a covered disability must go to the Department for Disability Services, located in Brewster A-114, to verify the disability before any accommodations can occur. The telephone number is 252-328-6799.

EHST 6700/6701 - Industrial Hygiene – Summer 2005
Department of Environmental Health Sciences, Safety and Technology

Instructor: Edward D. Crotts, CIH

Office: Room 310 A Belk Building

Phone: 328-2991

Email: crottse@mail.ecu.edu

Classroom: Belk Building, Room 216

Days/Time: MW 10-11:20 a.m. – Lecture, M 2-5 p.m. - Laboratory

Office Hours: F – 8:30-11:00, T Th 9:00 a.m. - 4:00 p.m.; or by appointment

I. TITLE:

Industrial Hygiene Application Laboratory

II. CATALOG DESCRIPTION:

6701. Industrial Hygiene Application Laboratory (1) Corequisite: EHST 6700. Methods of measurement and evaluation used by industrial hygienists.

IV. PURPOSE:

This course is designed to review hands on methods of industrial hygiene sampling techniques and control process evaluation. Topics include: Chemical, physical and biological sampling methods, ventilation system evaluation, noise, radiation and temperature extreme monitoring instrumentation. Requirements for personal protective equipment is practiced.

IV. COURSE OBJECTIVES:

By the end of this course:

Students will understand how chemical and physical workplace hazards are evaluated.

Students will have an opportunity to improve written and verbal communication skills.

V. CONTENT OUTLINE:

Introduction – Course Structure, History, Basic Concepts of Industrial Hygiene

MONITORING OF HAZARDS

- Gases and Vapors
- Particulate Matter

- Industrial Noise
- Non-Ionizing Radiation
- Ionizing Radiation

- Industrial Dermatoses
 - Temperature Extremes
 - Ergonomics
 - Biological Hazards
- EVALUATION OF HAZARDS
- Methods of Evaluation

- Air Sampling Instruments
- CONTROL OF HAZARDS
- Methods of Control
 - Ventilation (General & Industrial)
 - Protective Equipment
 - Indoor Air Quality (SBS)

VI. INSTRUCTIONAL ACTIVITIES:

- **Laboratory Exercises**

VII. RESOURCES:

- **Text**
- **Handouts**
- **Instructor's reference library**
- **Internet resources**

VIII. GRADING:

- Laboratory write ups 85%

Participation 15%

IX. ATTENDANCE POLICY:

Unexcused absences will negatively affect your final grade for the course.

X. ACADEMIC HONESTY POLICY:

Cheating, plagiarism - submitting another person's work as one's own, or doing work for another person who will receive academic credit are not permissible. The unauthorized copying of examinations, assignments, reports and term papers, or the presentation of unacknowledged material as if it were the student's own work is also not permissible.

XI. REQUIRED TEXT & REFERENCES:

Basic Industrial Hygiene, Nims.

XIII. STUDENTS WITH DISABILITIES:

East Carolina University seeks to comply fully with the Americans with Disabilities Act (ADA). Students requesting accommodations based on a covered disability must go to the Department for Disability Services, located in Brewster A-114, to verify the disability before any accommodations can occur. The telephone number is 252-328-6799.

EHST 6710 – Ventilation

Course Instructor: Edward D. Crotts, CIH
Visiting Instructor, Environmental Health Sciences, Safety
and Technology

Contact Info: Office: Belk 310 A
crottse@mail.ecu.edu
328-2991 (office w/voice mail)

Office Hours: M,F: 1:00-4:30 P.M.
W: 12:00-2:00 P.M.
T,Th: 8:00 A.M.- 4:30 P.M.
Appointments not necessary but appreciated.

Credit Hours: 2

Course Description: An overview of industrial hygiene-based ventilation principles, including industrial and laboratory ventilation system function and design.

Course Objectives: Students will develop an understanding of the basic principles of ventilation necessary for the practice of industrial hygiene. Students will learn to utilize the most common ventilation measurement instrumentation. Students will develop an understanding of ventilation design.

Course Overview: Introduction

- airborne contamination
- types of ventilation systems
- principles of air flow

Hood design and Selection

- capture velocity
- hood principles
- design procedures

Ventilation System Design

- duct design principles
- methods of calculation
- balanced and blast gate system
- fan theory

Laboratory Ventilation

- fume hood evaluation
- biosafety cabinet application

- specialized applications
- Other Related Subjects
- Make-up air
 - Air-cleaning devices
 - Comfort Ventilation

Grading: Participation: 20%
 Assignments: 30%
 Project: 10%
 Midterm: 20%
 Final: 20%

Attendance Policy:

Unexcused absences will negatively affect your final grade for the course (up to 20% of your grade – see above).

Academic Honesty Policy:

Cheating, plagiarism - submitting another person's work as one's own, or doing work for another person who will receive academic credit are not permissible. The unauthorized copying of examinations, assignments, reports and term papers, or the presentation of unacknowledged material as if it were the student's own work is also not permissible.

Required Text & References:

No required text. Periodically, the student must obtain a standard reference to complete assignments (such as the ACGIH Industrial Ventilation). Copies are available from the instructor or in the library or the instructor will assist the student with choosing a reference to purchase.

Handouts will be provided which will cover the majority of course reference information.

Prerequisites:

Graduate standing or consent of instructor.

Students with Disabilities:

East Carolina University seeks to comply fully with the Americans with Disabilities Act (ADA). Students requesting accommodations based on a covered disability must go to the Department for Disability Services, located in Brewster A-114, to verify the

disability before any accommodations can occur. The telephone number is 252-328-6799.

Syllabus

EHST 6300 Public Health Pests and Vector borne Disease .
Detailed information on arthropods that carry disease, and population theory used for management of each group for public health. Included are ticks, mites, spiders, lice, fleas, wasps, flies, mosquitoes, and rats. Population ecology, habitat, and management methodology will be emphasized to correlate public health with ecological theory as illustrated by vectors and the diseases they carry.

Instructor: Dr. Alice L. Anderson, Assistant Professor of
Environmental Health, Belk 310

Text: Mullen, Gary and Lance Durden, eds. 2002. Medical and
Veterinary Entomology. Elsevier Science, London. ISBN: 0-12-510451-0

Course Outline: I. General Introduction to Medical Entomology and Vector
borne disease

- II. Insects and Acarines of Medical Importance
 - A. Mosquitoes
 - B. Biting Midges
 - C. Sandflies
 - D. Blackflies
 - E. Tabanids (horseflies, deerflies)
 - F. Other flies (houseflies, Blowflies)
 - G. Fleas
 - H. Hemiptera
 - I. Lice
 - J. Mites
 - K. Chiggers
 - L. Ticks

- III. Rats and other non-arthropods , Ecology and
Disease

- IV. Pathogens transmitted by arthropods and other pest
species
 - A. Arboviruses
 - B. Typhus and other Rickettsial diseases
 - C. Relapsing Fevers, Borrelioses, Plague and
Tularemia
 - D. Malaria
 - E. Babesiosi

- F. Trypanosomiases and Leishmaniases
- G. Lymphatic Filariasis
- H. Human Onchocerciasis
- I. Helminths

Course Requirements:

- Each)
- I. Tests: Midterm and Final Exam 60% (30% Each)
 - II. Scientific Paper on Vector Borne Disease, Found in Recent News (12 pages) 40%
 - III. Regular Attendance and classroom discussion

Grading Scale:

A= 90-100%	Excellent
B= 80-89%	Good
C= 70-79%	Average
D= 60-69%	Below Average
F= Below 60%	Not Passing

EHST 6800 Environmental Program Management and Law

Environmental Health Sciences and Safety

Spring Semester 2005

East Carolina University

Dr. Alice L. Anderson, Assistant Professor of Environmental Health

Belk 310, Andersonal@mail.ecu.edu

Course Description: This course details knowledge and practice in planning, developing, and managing environmental health programs. Applications of current management practices toward solutions of environmental health problems will be utilized in practical exercises.

Instructor: Dr. Alice L. Anderson, Assistant Professor of Environmental Health, Belk 310

Text: Kubasek, Nancy K., J. D. and Gary S. Silverman, D. Env. **2005 Environmental Law, 5th Edition.**

General Course Requirements:

1. You will need a permanently bound JOURNAL for entries and writing assignments. Weekly assignments and more will be given.
2. You will need a Thesaurus, Dictionary, and a Writing Style Manual.
3. Turn in all assignments at the BEGINNING of the class period. Late assignments will be discounted.
4. Attendance will be recorded and counted.

Written Assignments:

1. Once weekly you will find **newspaper articles** and write your reaction to the news in your JOURNAL.
2. Periodic **JOURNAL assignments** will be given in addition to the article reactions.
3. A semester-long **term paper** project will be completed by April 14. No late papers will be accepted. Dishonest writing will result in failure of the class.
4. Review the plagiarism policy in the student handbook (on the web) if you are not familiar with the University Community rules.

Exams:

1. There will be 1 test and 2 exams
2. There may be occasional pop quizzes

Grading Scale:

A 92-100% Excellent

- B 83-91% Above Average
- C 75%-82% Average
- D 67-74% Below Average
- F Below 67% Below Passing Standard

Grading factors:

1. 1 test
2. 2 exams
3. Pop quizzes and attendance
4. Term Paper
5. JOURNAL

Class Outline and Assignments

Topics in Environmental Health Program Management and Law

- I. What is your personal purpose? *Weeks 1, 2, and 3*
 - Ethics and Environmental Health *Start collecting news articles*
 - A. Writing Honestly: homework assignments and term paper
 1. Keep a Journal for the entire semester: journal assignments
 2. *Write about a visit to a governmental meeting in your county.*
 3. Journal assignment for each week: collect articles from newspapers on Environmental Health issues: *Write a reaction paragraph in your journal, and tape in the article*
 - B. How do I understand Ethics? How do I tell right from wrong, right from right?
 1. Historical path of Ethical Philosophy from Socrates to Deconstruction...lectures from Great Books
 2. **Journal assignment:** Find a magazine or newspaper article that reflects Utilitarian thinking. Write the source in correct MLA style
 4. **Test on historical ethical systems terminology Jan 25**
 5. Global ethics: community, air quality, right vs. wrong worksheets using Great Books lectures
- II. What is the Goal of Society? *Weeks 4, 5, 6, Week 7 Midterm Feb 22*
 - A. Community values (refer to I. B. 4.) Lecture
 - B. Politics and Management in Environmental Health
 - C. Overview of Environmental Health Law: Textbook Chapters 1, 2, 3 Lectures and discussion online.
 - D. Two articles in NEHA Journal on Politics and Management (on blackboard). Discussion online
 - E. **Test on Chapters 1, 2, and 3. plus terminology (Midterm) Feb 22**

III. What is the goal of Environmental Health and of Organizational Management?

A. Core principals of Environmental Health and Disaster Management:

1.– 10 APHA list: (online) *week 8*

Journal assignment: write a paragraph to illustrate each one on the APHA list in your journal.

2. Disaster Management: Surveillance, Data, Incident Command, Implementation: *week 9*

3. **Journal assignment:** Interview someone in your community who has responded to a disaster: firemen, health department, emergency management, etc. Write up the interview in your journal.

B. Core Principals and Practices of Effective Management

1. Planning/Objectives *week 10*

Journal Assignment: Write an operations plan for a disaster response such as PART of the Tsunami disaster. Be sure to include clear objectives

2. People/ Meeting management *week 10*

Journal Assignment: Make a list of the team you would like to carry out the parts of your plan. Tell WHY each person is needed and what their contribution will be.

3. Task management *week 11*

Journal Assignment: Set up a Time table for the completion of the tasks. Put all the tasks in order of completion since some will depend on others to be completed first. Explain why each one is in the order it is, and explain as many details of the task as you can.

4. Implementation management *week 11*

Journal Assignment: Put together a list of all the tools and equipment you will need for each task you listed in “task management”.

5. Assessment management *week 11*

Journal Assignment: Set up a method to collect data on whether or not the tasks were finished to your specifications. Decide on what is a satisfactory completion of the tasks, and what would be considered “above and beyond” AND what would be considered “not completed successfully”.

IV. How can I communicate a position or idea that is important to me? Writing professional papers: **Term Paper Due Thursday April 14**

A. Consider your personal goals, values, worldview to find something important to you. (SEE item I.) *Week 12 Topic and purpose Due*

B. Consider your audience. (In this case, your community is ECU students and faculty) *Week 13 References and citations due*

C. Consider the Rules of the organization you write for.

- (Honesty as discussed in item I. especially) *Week 14 Rough Draft* *Due*
- D. Consider the Core Principals of Environmental Health.
(These are the rules of your profession) *Week 14*
 - E. Consider the Rules of Best Management practices.
(These will be a part of any job you have) *Week 14 Week 15*
- Oral reports*

**APPENDIX B
(Faculty Vitae)**

Alice Anderson, PhD.
108 Southridge Drive
Greenville, NC 27858

I. Employment

Assistant Professor : August 25, 2003- Present
Environmental Health Sciences and Safety Program, Department of Health
Education and Promotion, *East Carolina University, Greenville, NC*

Adjunct Assistant Professor: ECU/Brody School of Medicine
Public Health (MPH) Program: 2005 - present
Coordinator of Master of Science in Environmental Health, 2004 - present
Medical Entomologist: 1984- August 25, 2003
State of North Carolina, Morehead City, NC

Details of the position:

- Responsibility for medical entomology in the coastal region of North Carolina.
- Consulting with over 30 county health departments on topics of public health pest problems.
- Organization and teaching classes and workshops to local workers in mosquito control.
- Eight to twenty public addresses per year on public health pest problems, and emergency response issues.
- Chief investigator in Open Marsh Water Management research to qualify the state for this technique of salt marsh mosquito management. In this project, collaboration occurred with Duke University Marine Laboratory, NC Fish and Wildlife, NOAA, ECU, US Army Corps of Engineers, and CAMA officials.
- Collaboration on projects with NC State and work on local state and regional committees for state projects in stormwater management mosquito problems, lumbering sources, and others.
- President of the North Carolina Mosquito Control Association, and president of the Mid-Atlantic Mosquito Control Association of mosquito and vector control professionals.

PROFESSOR: 1994-2003

Park College, Park University Cherry Point, NC

Details of the position:

8 week accelerated classes two nights/week

- 200 and 300 level classes taught in: Science, Technology and Society, Human Ecology, Biology.
- 200 and 300 level classes taught in American Literature, The Novel, Short Stories, The Bible, and Business Communication.

- 100 level English composition.

HIGH SCHOOL BIOLOGY TEACHER: 1983-1984

Carteret County Public Schools Beaufort, NC

Details of the position:

- Sophomore classes in biology
- Special occupational classes in marine science

RESEARCH ASSOCIATE: 1980-1981

University of Arkansas, Fayetteville, AR

Details of the position:

- Associate for multi-university grant, the Ricefield Mosquito Management Project (RMMP).
- Duties included budget management,
- Supervision of laboratory technicians,
- Identification of mosquitoes and other aquatic insects,
- Planning and execution of field work,
- Data analysis followed by report writing,
- Journal article writing.

RESEARCH ASSOCIATE: 1979-1980

Savannah River Ecology Laboratory, SRP near Aiken, SC, University of Georgia

Details of the position:

- Aquatic entomologist for an environmental impact assessment(EIS) project, preparing for the installation of a glassification plant for nuclear waste.

HIGH SCHOOL BIOLOGY TEACHER: 1967-1975

Chippewa Hills Public Schools Barryton, Michigan

Details of the position:

- Biology, ecology, physiology, and advanced biology teacher .
- Biology department chairman
- Designed biology laboratory for a new school which was implemented.
- Summer biology classes at a University Biology Station
- Biology Club advisor 6 years.
- *Delta Kappa Gamma* membership nomination and award.
- Masters degree teaching fellowship award.

II. Education

DOCTOR OF PHILOSOPHY: 1979

Bowling Green State University, 1975-1979, Bowling Green, Ohio

Detail of activities:

- Concentration in statistics and aquatic entomology.
- Taught Biology 101 mass lecture for 150 students in large lecture hall.
- Coordinated Biology 101 labs for several graduate assistants, ordering

supplies and observing teaching.

- Worked in scanning electron microscopy laboratory on two projects. Three articles published.
- Dissertation field work done at Central Michigan University Biological Station Laboratory on Beaver Island, Michigan.
- President of Graduate Student Class
- Dissertation: The Biology and Ecology of Co-existing Species of *Polycentropus* (Trichoptera: Polycentropodidae) in a Michigan Bog Lake.

Master of Science: 1974

Central Michigan University 1967-1974 Summers Mt. Pleasant, Michigan

Detail of activities

- National Science Foundation grant for teacher education: 1967-1968.
- Classes and field work at Central Michigan University Biological Station on Beaver Island, Michigan.
- Teaching and then directing Biological Summer Camp for High School students on Beaver Island.
- Nominated to *Sigma Xi, Delta Kappa Gamma*, science and teaching organizations.
- Classes in water chemistry, aquatic plants, aquatic insects botany, entomology, statistics

Bachelor of Arts: 1966

Central Michigan University 1964-1966 Mt. Pleasant, Michigan

Detail of activities

- Major: English, Minor: Biology Teaching Certificate earned
- Permanent Michigan teaching certificate earned in two years.
- Spanish scholarship Freshman year
- Teaching Fellowship awards 4 years

III. Accreditations

- Public Health Pesticide Applicator: 1984-2005.
- Teaching: Temporary Certificate North Carolina 1983.
- Teaching: Permanent Certificate, Michigan 1966- 2005.

IV. Training Completed

- Tenure and Promotion Workshop, Feb. 25, 2005
- Successful Grant Writing and Successful Collaborative Projects Workshop, Nov. 16, 2004
- Enhancing basic Statistical Skills, Enhancing Intermediate Statistical Skills, and Enhancing Advanced Statistical skills for Research and Instruction, June, 2004
- Public Health Pesticide Licensing 1984-2003
- Ecology and Sampling Methods. Virginia Polytechnic Institute, 1999
- CDC Public Health Pest Control, 1987-1990

- Fundamentals of Management. State of NC. 1990
- Remote Sensing, NASA workshop for mosquito habitat. 1980

V. Publications in reverse chronological order:

Anderson, A. L. 2005. That Old Black and White Magic. *Wingbeats*. Vol (15:4)

Anderson, A. L. 2004. An unfortunate Hyperbole that Won't Go Away.

Wingbeats. Vol 15:3 p. 22-33.

[Http://www.floridamosquito.org/WING/summer2004web.pdf](http://www.floridamosquito.org/WING/summer2004web.pdf)

Anderson, A. L. 2004. Arthropod Pests and the Diseases They Carry: Prevention in Community and Athletic Settings. *Athletic Therapy Today* 9(3) 16-21.

Anderson, A. L., et al. 2000. Emergency Aerial Spraying in North Carolina after Hurricane Floyd, 1999. *Wingbeats* Vol.11:2 Summer 2000 p 4,5,27.

[Http://www.floridamosquito.org/WING/summer2000web.pdf](http://www.floridamosquito.org/WING/summer2000web.pdf)

Harrison, et al. 2000. Prevalence of *Ehrlichia ewingii* in *Amblyomma americanum* in North Carolina. *J Clinical Micro.* Vol.38:7. p. 2795.

Anderson, A. L., and W. W. Kirby-Smith. 1993. Effects of Open Marsh Water Management of Fish and Birds in Two North Carolina Salt Marshes.

Proceedings of NJ Anti-Mosquito Association , 1992.

Anderson, A. L., Charles S. Apperson, and Richard Knake. 1991. Effectiveness of Mist-Blower Applications of Malathion and Permethrin to Foliage as Barrier Sprays for Salt Marsh Mosquitoes. *J. Am. Mosq. Cont. Assn.* 7(1): 116-118.

Anderson, A. L. 1989. Salt Marsh Mosquito breeding during the first season following OMWM installation in a North Carolina salt marsh. *J. Florida Anti-Mosquito Association.* 60(2): 37-44.

Anderson, A. L. 1988. Open Marsh Water Management and the Permitting Process in North Carolina. Workshop on Salt Marsh Management and Research, Oct. 25-27. Vero Beach, Fla. p. 25.

Anderson, A. L., M. Slaff, and W. W. Kirby-Smith. 1987. Changes in vegetation, hydrologic regime, and the distribution of larval mosquitoes and fish in two North Carolina marshes, Proceedings of the Eighth annual meeting of the Society of Wetland Scientists, May 26-29, 1987.

Anderson, A. L., M. Slaff, and W. W. Kirby-Smith. 1987. Two-year changes in flora and hydrologic regime in a *Spartina alterniflora* marsh vs. a *Juncus roemerianus* dominated marsh in North Carolina. Proceedings of Wetlands Symposium, New Orleans, La. Sept. 24-25, 1987.

Slaff, M., N. Newton, A. Anderson, and B. Engber. 1987. Vector Control Programs in North Carolina. *Proc. NJ Mosq. Cont. Assn.* 74: 24-26.

Parker, M., A. L. Anderson, and M. Slaff. 1986. An automatic carbon dioxide delivery system for mosquito light trap surveys. *Journal of the Am. Mosq. Cont. Assn.* 2(2): 236-237.

Alexander, T. C., M. V. Meisch, W. B. Kottkamp, and A. L. Anderson. 1982. Effect of Notonectids on mosquito larvae and preliminary observations of insecticide toxicity. *Arkansas Farm research* 23(3): 5.

Meisch, M. V., A. L. Anderson, R. L. Watson, and L. Olson. 1982. Mosquito species inhabiting ricefields in five rice-growing regions of Arkansas. *Mosquito News* 42(3): 341-346.

Loesch, A. (former name) and J. Foran. 1978. Populations of *Heterocampa guttivitta* in a beech-maple forest on Beaver Island, Michigan. *Great Lakes Ent.* 12(1):44-45.

Crang, R. E., A. J. Loesch, and D. G. Pechak. 1978. Multivariate analysis of Phenyl Mercuric acetate effects on *Aureobasidium pullulans* ultrastructure. Proceedings of the 9th International Congress on Electron Microscopy, Toronto, Canada.

Loesch, A. and T. L. Harris. 1978. Preliminary report of the Ecology and Biology of *Polycentropus* species in a Michigan Bog Lake. Proceedings of the 26th Annual NABS Meeting, Winnipeg, Canada. P. 26.

Loesch, A. and R. E. Crang. 1978. Scanning Electron Microscopic Examination of the Net Structure and Attachments Sites of Larvae of the Genus *Polycentropus*. Proceedings of the 26th Annual NABS Meetings, Winnipeg, Canada.

Loesch, A. 1978. Fine structure of the larval retreat of the lentic caddisfly *Polycentropus* sp. Banks (Polycentropodidae). *Micron* 9(1):19-20.

Loesch, A. 1977. Populations of *Calosoma frigidum* (Coleoptera: Carabidae) in two areas of beech-maple woods during an outbreak of *Heterocampa guttivitta* (Lepidoptera: Notodontidae) on Beaver Island, Michigan. *Great Lakes Ent.* 10(3):166.

VI. Synergistic Activities

A. Noteworthy News Stories

Seligo, Jeffrey, 2004. On the Trail of a Persistent Pest, *The New York Times*, July 22, 2004. (Concerning collaborative work on Wireless Mosquito ID devices.)

B. Recent Invited Talks

Eastern NC Environmental Supervisors Association Meeting, September 16, 2004:

“Ticks and Related Topics”

Open Marsh Water Management (OMWM): Concepts and Techniques for Georgia Workshop January 28, 2004 “ North Carolina Perspective”

C. Awards

Certificate of Merit: National Environmental Health Association (NEHA) 2004 Meeting, Anchorage, Alaska

CDC Leadership Institute Award for training in Emergency Preparedness 2003-2006.

VII. References

Dr. Max. V. Meisch, Entomology Department, University of Arkansas, Fayetteville, Ar. Phone: (501) 433-5287

Dr. Marc Slaff, Supervisor, Morris Co. , NJ Extermination Commission. P.O. Box 405, Morris Plains, NJ 07950 Phone: (201) 538-3200

Dr. Nolan Newton, Medical Entomologist, North Carolina Division of Health Services, Raleigh, NC Phone: (919) 733-6407

Ms. Anne Thomas, Dare Co. Health Director, Manteo, NC Phone: (252) 441-3224.

Col. Bart Bartells, (ret.), Past Director Park College extension campus at Cherry Point Marine Air Station. Phone: (252) 247-0985

Curriculum Vitae
Edward Douglas Crotts
116 South Woodstock Dr.
Greenville, NC 27834
252-765-9376
crottse@mail.ecu.edu

Education

1976 - Bachelor of Science in Environmental Health from East Carolina University

1981 - Master of Science in Environmental Health from East Carolina University

Teaching Experience

East Carolina University – Visiting Instructor teaching classes on ‘Toxicological Fundamentals of Risk Assessment’, ‘Air Pollution’, ‘Onsite Waste Water,’ ‘Epidemiology’ ‘Environmental Issues in Construction’ and ‘Introduction to Environmental Health Sciences’. I have taught classes on various topics for members of the ECU EHST faculty.

Burroughs Wellcome / GlaxoWellcome – As an Industrial Hygienist, I trained environmental operators, laboratory, engineering and chemical production personnel on chemical hazard recognition, use of personal protective equipment and respirators, machine guarding, confined spaces and work permit procedures. I also was responsible for training of employees potentially exposed to ethylene oxide, asbestos, acrylonitrile and formaldehyde.

I was the moderator at a round table discussion of Asbestos Hazards at the ASSE Eastern Region Professional Development Conference in 1991.

Work Experiences

Lecturer and Visiting Instructor at East Carolina University – Part time 1/00 to 5/02 and full time 8/02 to present. In addition to teaching duties I am the advisor to the Environmental Health Club and advise students on their course selection.

President of Industrial Hygiene Concerns, Inc. – 3/01 to present - Industrial Hygiene Concerns is a consulting firm specializing in respiratory and personal protective equipment programs, employee exposure monitoring, asbestos programs and employee safety training, indoor air quality investigations.

Industrial Hygienist with Catalytica Pharmaceuticals – 8/97 to 3/01 - In August of 1997, GlaxoWellcome sold the Greenville manufacturing facility to Catalytica Pharmaceuticals Inc. In addition to maintaining the responsibilities below I served as the Radiation Safety Officer and Chair of the Toxicology Committee. I

was responsible for the health and safety evaluations of new pharmaceutical products produced at Catalytica's Greenville manufacturing facility.

Industrial Hygienist for Burroughs Wellcome Co. / GlaxoWellcome Inc. – 10/82 to 8/97 – I conducted assessments of employee exposures to hazardous chemicals. Made indoor environmental assessments to determine types and concentrations of contaminants and recommend ventilation, engineering or sanitation interventions needed to eliminate any hazards. I designed and implemented ventilation systems for the control of environmental hazards. I was responsible for organizing and reporting Hazard and Operability Studies for new chemical manufacturing processes in the Chemical Development Lab from 1992-95. Conducted incident and accident investigations for the determination of root cause. I was responsible for writing Material Safety Data Sheets for the active ingredients in Burroughs Wellcome products.

I served as a member of Burroughs Wellcome Co.'s Emergency Medical Response Team from 1983 to 1994 and the Hazardous Materials Response Team from 1987 to 1991.

In 1984-86, Burroughs Wellcome Co. was the first company to find a drug that was effective against the AIDS virus. Azido-thymidine (AZT) was put into double blind clinical trials. The one-year clinical trials were stopped after only six months when the efficacy of AZT to increase the survival of AIDS patients was conclusively shown. Burroughs Wellcome Co. received a use patent for AZT and the fastest ever Food and Drug Administration approval of a new drug. Due to the large quantity of AZT needed, the drug skipped any chemical development and went from laboratory scale to full production. I was responsible for the hazard communication training and air monitoring for employees handling new chemicals required for the synthesis of AZT.

Control Scientist for Burroughs Wellcome Co. – 1/81 to 10/82 - Performed environmental assessment during sterile product manufacture to ensure the effectiveness of engineering controls on microbial and particulate contamination. Conducted antibiotic assays to ensure product potency. Assisted with process validation studies.

Sanitarian in Edgecombe County NC – 10/76 to 8/78 - I performed soil assessments to determine acceptability for subsurface sewage treatment systems. This included the design of the treatment system based on the projected wastewater flow and the soil characteristics. To protect private wells from contamination the location of drinking water sources was on the Land Improvement Permit. I was also responsible for inspecting county restaurants and issuing grades according to the NC Food Sanitation Regulations. Resolving complaints between neighbors could be especially challenging in a rural NC county.

Research Experience

Masters thesis was on Microbial Depuration and Bacterial Identification in the Brackish water Clam, *Rangia cuneata*. designed a depuration facility to clean contaminated clams.

Graduate Assistant to Dr. Bernard Kane, working on a grant to determine any microbial hazards associated with *Rangia cuneata*.

At Burroughs Wellcome I assisted with developing methods to validate product steam sterilization processes utilizing a steam retort and heat resistant bacteria.

GlaxoWellcome developed Occupational Exposure Limits for hazardous Burroughs Wellcome products. I helped develop analytical methods to determine the concentration of these products in air.

Certifications and Accreditations

Certified in the Comprehensive Practice of Industrial Hygiene

Accredited as an Asbestos Supervising Air Monitor and Inspector in North Carolina

Professional Organizations

Member of the American Industrial Hygiene Association

Member of the American Society of Safety Engineers

Served as secretary, vice president and president of the Eastern Carolina

Chapter of the American Society of Safety Engineers from 1988 to 91 and am currently chair of the Program Committee

Member of the Board of Directors for the East Carolina Safety and Health School

William E. Hill, Jr.
224 East Woodstock Drive
Greenville, NC 27834
(252) 353-0199
hillw@ecu.edu

OBJECTIVE

Seeking a position in the management of environmental health and safety program. Utilizing skills and experience in planning, development, oversight and monitoring of environmental health/food safety programs. Specialized experience and knowledge of environmental health principles and procedures.

HIGHLIGHTS

- Over 20 years of knowledge and experience in interpreting federal, state and local food safety rules emphasizing a collaborative yet decisive style. Provided oversight and conducted nationally recognized food safety courses for owners, managers and employees of foodservice establishments.
- Provided administrative and procedural support of different environmental health activities pertaining to food safety education. Conducts outreach efforts to identify the section's constituencies, assess their needs, and solicit feedback on information policies.
- Ability to work in coordination with many different agencies and stakeholders.
- Excellent interpersonal skills
- Represented the division on state policy development and rules governing food safety. Served as a project/team member to provide critical analyses and recommendations of food safety education studies, program plans and proposals.

PROFESSIONAL EXPERIENCE

(Cumberland County, Nash County and Craven County Health Departments)

MANAGEMENT

- Planned and adhered to a budget constraints.
- Supervised staff involving training, workflow, quality control, and conflict resolution.
- Provided leadership, administrative oversight and programmatic support for food, lodging and institutions sections of environmental health.

- Provided expertise regarding a wide range of food related issues for children, businesses and the public. As chairman of the Environmental Health Education and Marketing Committee, revitalized the group, provided leadership and increased recognition in the community.

DEVELOPMENT/MOTIVATION

- Effectively worked at state and regional level in policy administration and program development.
- Strong collaboration and communications skills, ability to utilize data for assessment and evaluation.
- Revised standard operating procedures (SOP) for food safety programs.
- Adept at building productive relationships with industry, regulatory authorities, and the public.
- Knowledge of statutes, regulations, and precedent decisions related to food safety. Knowledge of practices and principles of environmental health administration. Analyze data and information concerning program operations in order to evaluate effectiveness. Communicate effectively orally and in writing with division staff, industry representatives and community organizations.

WORK HISTORY

1974-1978	United State Air Force, Plattsburgh AFB, NY
1984-1994	Cumberland County Health Department Fayetteville, NC
1994-1995	Nash County Health Department Nashville, NC
1995-Present	Craven County Health Department

EDUCATION

B.S. Environmental Science and Natural Resources, Delaware State University, Dover, DE, (1983)

Masters of Science in Administration, Central Michigan University, Mount Pleasant, MI, (2003)

Daniel Downey Sprau, DrPH, RS, CIH, CSP
Associate Professor, Environmental Health Sciences Program
Department of Health Education and Promotion
College of Health and Human Performance
East Carolina University

Education:

1985 Dr.P.H., Environmental Health Management, University of Michigan, Ann Arbor, MI
1973 Master of Medical Science Degree in Radiological Health, Emory University, Atlanta, GA
1986 M.S., Environmental Health, East Carolina University, Greenville, NC
1971 B.S., Physics, Adrian College, Adrian, MI
1970 University of Graz, Graz, AUSTRIA

Experience:

East Carolina University – Academic

Associate Professor - Tenured June 1, 1994
Environmental Health Sciences and Safety Program
Department of Health Education and Promotion
College of Health and Human Performance
Associate Professor, August 2002 to Present

Department of Environmental Health Sciences, Safety and Technology
School of Industry and Technology
Associate Professor, August 1999 to 2002

Department of Family Medicine - School of Medicine
Associate Professor, July 1993 to July 1999
Associate Director, Division of Prospective Health, July 1993 to 1998

Department of Radiation Oncology - School of Medicine
Assistant Professor July 1991 to July 1997

Department of Environmental Health, School of Allied Health Sciences
Associate Professor, July 1992 to 1998
Adjunct Associate Professor, July 1988 to June 1992

Department of Physics - College of Arts and Sciences
Adjunct Assistant Professor, July 1991 to 1993
Adjunct Instructor, January 1989 to January 1992

Department of Preventive Med. and Public Health Policy
Assistant Professor, July 1989 to July 1991

Appointment to the Graduate Faculty starting 1991.

East Carolina University - Administrative

Associate Director
Office of Prospective Health
East Carolina University School of Medicine
July 1997 to July 1998

Director
Office of Radiation and Biological Safety
East Carolina University School of Medicine
Pitt County Memorial Hospital
July 1992 to 1997

Director
Office of Radiation Safety
October 1981 to June 1992

Educational Leave of Absence
University of Michigan School of Public Health
September 1980 to October 1981

Radiation Safety Officer
June 1976 to September 1980

STRAHLUNG SERVICES, Inc.

Radiation Consultant
NC License #074-1163-1 NC Qualified Expert #S000474

**U.S. PUBLIC HEALTH SERVICE - Commissioned Officer
Health Services Officer**

Bureau of Radiological Health, Food and Drug Administration-
DHHS

Active Duty - November, 1973 to June, 1976. Rockville, MD
Inactive Reserves - June, 1976 to Present

Certification:

Certified Industrial Hygienist - CIH # 4555 (11-89)
American Board of Industrial Hygiene
Certified Safety Professional - CSP # 10005 (8-90)
Board of Certified Safety Professionals
Registered Sanitarian – RS NEHA

**Professional
Societies:**

American Biological Safety Association
American Industrial Hygiene Association

American Academy of Industrial Hygiene
American Conference of Governmental Industrial Hygienists
American Society of Safety Engineers
National Environmental Health Association
Health Physics Society - National
Health Physics Society - North Carolina Chapter
International Radiation Protection Association

Professional Service:

N.C. Radiation Protection Commission Member

Chair – Emergency Response Committee
Radioactive Material Control Committee
Non-Ionizing Radiation Committee

International Atomic Energy Agency (IAEA) - Vienna, Austria, Consultant:

19-23 February 1996 - Advisory Group Meeting
Handling, Treatment, Conditioning and Storage of Radioactive Waste
14-18 April 1997 - Consultants Meeting
Management of Medical Radioactive Waste
26-30 May 1997 - Advisory Group Meeting
Management of Medical Radioactive Waste
November 2004 – Consultant Orphaned Sources of Radioactive Material Almaty, Kazakhstan

Publications:

Sprau, D.D., Handbook of Chemical Health and Safety, edited by Robert J. Alaimo. American Chemical Society, 2001. pp.704. Chapter 63 on Radiation Fundamentals. ISBN 084 1236704.

Sprau, D.D., et. al., "Management of small quantities of radioactive waste" IAEA-TECDOC-1041 International Atomic Energy Agency, Vienna Austria, September 1998.

Edwards, B., Thai, L.X., **Sprau, D.D.**, An Evaluation of Two Sample Preparation Methods for Measuring ^3H and ^{14}C in Incinerator Ash and Spent Lime. *Health Physics* January 2002 Vol. 82 Number 1 Pages 109-113.

Sprau, D.D., and Emery, Robert J., Chapter 29 on Radiation, *Environmental Health Secrets*, edited by Luanne Kemp Williams and Ricky Langley, MD, MPH. ISBN 1560534087.

Sprau, D.D. Handbook of Chemical Health and Safety, edited by Robert J. Alaimo. American Chemical Society, March 2001. Page 704. Chapter on *Radiation Fundamentals*. ISBN 084 1236704.

Sprau, D.D. International Conference on Incineration and Thermal Treatment Tech. May 8-12, 2000 Portland, Oregon: *The New East Carolina University Medical Waste Incinerator: Combining A Wet*

Scrubber With Granular Carbon Bed for Air Pollution Control to Meet New Source Performance Standards and (WASTE to ENERGY)

Emery, R.J., Sawyer, R.L. and **Sprau, D.D.**, Assessing the Service Provided by an Institutional Radiation Safety Survey Program@ Health Physics Vol. 70, No. 5, pp. 741-743, May 1996.

Emery, R.J., Johnston, T.P., and **Sprau, D.D.**, Simple Physical, Chemical, and Biological Safety Assessments as part of a Routine Institutional Radiation Safety Survey Program@ Health Physics Vol. 69, No 2, pp. 278-280, August 1995.

Langley, R.L., **Sprau, D.D.** and Dolezal, J.M., "Assessing Personal Occupational Safety and Health Training for Students at U.S. Medical Schools" Academic Medicine, Vol. 67, No. 9, pp. 603-605, Sept. 1992.

Emery, R.J., **Sprau, D.D.**, Lao, Y.J. and Pryor, W.H., "Release of Bacterial Aerosols During Infectious Waste Compaction: An Initial Hazard Evaluation for Health Care Workers", American Industrial Hygiene Association Journal Vol. 53(5) pp. 339-345, May, 1992

Emery, R.J., Jeanette, M.T., **Sprau, D.D.**, "Characterization of Low-level Radioactive Waste Produced by a Large University/Hospital Complex", Health Physics, Vol. 62 Number 2, pp. 183-185, 1992.
Emery, R.J., **Sprau, D.D.** and Harris, R.J., "Estimated Committed Dose Equivalent from the Volatilization of S-35 labeled Methionine Compounds" Radiation Protection Management, Vol. 7, No. 4, pp. 51-57, 1990.

Emery, R.J., Watson, J.E. and **Sprau, D.D.**, "Retention and Subsequent Release of Radioactivity from the Incineration of Waste Containing Microspheres" Health Physics, Vol. 59, No. 6, pp. 911-914, 1990.

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(252) 328 5597
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zaratem@mail.ecu.edu

KEY QUALIFICATIONS

Knowledge:

- The Water Cycle and Environmental Epidemiology
- Safe Water –from the Source to the Tap
- Water Reclamation and Wastewater Reuse
- Industrial Ecology and Solid Waste Management

Skills:

- Water Quality Management –Monitoring and Surveillance Programs
- Sanitary Inspections of Drinking Water, Wastewater, and Solid Waste Systems
- Water Treatment Technologies/Hygiene Practices at Household Level
- Exposure Assessment and Risk Analysis

Abilities:

- Community Organization and Social Capital
- Multidisciplinary Team Player
- Environmental Health Education and Communication
- Network Building in the Water, Environment, and Health Sector

EDUCATION

Ph.D.	Environmental Health Sciences	2001	University of California, Berkeley, U.S.A.
M.P.H.	Environmental Health Sciences	1995	University of California, Berkeley, U.S.A.
M.Sc.	Water Quality Management	1995	University of Surrey, U.K.
Chemist	Chemistry and Chemical Processes	1989	Universidad Mayor de San Simón, Bolivia.

ACADEMIC EXPERIENCE

August 2004-Present

Assistant Professor. East Carolina University (ECU), College of Health and Human Performance, Health Education and Promotion Department, Environmental Health and Safety Program. Greenville, NC

- Courses Teaching: (1) Drinking Water Supply and Wastewater Treatment and (2) Onsite Wastewater Treatment.
- Course Teaching and Developing: (3) Elements of Environmental Engineering; and (4) Safe Water and Wastewater Management (theory and lab).
- Researching: (1) Water Corrosivity and Lead Dissolution; (2) Ferric Iron in a Small Drinking Water System-A Community Based Approach; (3) Nutrients Removal and Reclamation from Wastewater; and (4) Water Management and Health in Rural and Urban Populations.

September 2005 – Present

Adjunct Assistant Professor. ECU/Brody School of Medicine's Master of Public Health (MPH) Program.

Coordinator of the MPH-Environmental and Occupational Health option.

August 2004 – Present

Adjunct Lecturer. University of California-Berkeley, School of Public Health, Center for Entrepreneurship in International Health and Development. Berkeley, CA

Guest Lecturer. Universidad Mayor de San Simón, MS in Environmental Engineering Program. Cochabamba, Bolivia

- Taught a course on Natural Systems for Wastewater Treatment, October 2004.

November 2003-May 2004

Guest Researcher. National Institute for Public Health and National Center for Epidemiology and Environmental Health. Universidad Mayor de San Francisco Xavier, Sucre/La Paz, Bolivia.

- Reviewed proposal to create an Environmental Health Program for the Ministry of Health.

Lecturer/Volunteer. Water and Academic Institutions in Bolivia and Peru.

- Lectured on (1) Principles of Environmental Health, (2) Sustainable Water Resources Management, and (3) The Public Health Action Plan in a Rural Town in Guatemala.
- Advised water and environmental authorities in Bolivia on water technology and health issues.

August 2002-May 2003

Assistant Professor. Fort Valley State University/Master of Public Health in Environmental Health Program. Fort Valley, GA, U.S.A.

- Developed and taught four graduate courses: (1) Environmental Pollution, (2) Environmental Health Hazard Management, (3) Epidemiology, and (4) Environmental Analyses.
- Developed and co-taught Environmental Microbiology and developed the Toxicology course.

- Advised students on research methods; attended faculty meetings; served in the graduate studies committee; presented work in an international event; and reviewed two textbooks.
- Started contact with federal and state health agencies.

January-May 2003

Instructor. Morehouse School of Medicine/MPH Program. Atlanta, GA, U.S.A.

- Taught Introduction to Environmental Health; member of the International Track Faculty Group.

June 2000-March 2001

Dissertation writing

July 1994-May 2000 (except for July-September 1998)

Graduate Student Researcher IV, III, and II. UC Berkeley's Applied Algae Research Group & Lawrence Berkeley National Laboratory/Earth Science Division. Berkeley, CA, U.S.A.

- **Developed and validated analytical methods to determine fate of soluble and particulate selenium (Se) in the components of an algal-bacterial system and determined rates of Se removal.**
- **Estimated minimization of wildlife and human exposure to Se in the San Joaquin Valley (SJV).**
- **Design, construction, and monitoring of an algal-bacterial system treating drainage water in SJV.**
- **Monitored real, demonstration, and pilot scale wastewater treatment systems.**
- **Designed and built slow sand filter units for a water reclamation project.**
- **Trained junior and mid-level water engineers from Bolivia and the U.S.-Mexico border, interns, and junior graduate students on the fundamentals of advanced integrated wastewater pond systems.**

February 1993-May 1994

Graduate Student. University of Surrey, Guildford, England, U.K.

- **Validated microscopic and spectroscopic methods to determine particle size distribution in water samples monitoring performance of a new multistage water filtration pilot plant.**
- **Participated in designing, constructing, and monitoring multiple-stage filtration pilot plants.**

November 1992-January 1993

Visiting Researcher. UC Berkeley's Applied Algae Research Group/Sanitary Engineering and Environmental Health Research Laboratory –Richmond Field Station. Richmond, CA, U.S.A.

- **Performed literature review on wastewater treatment systems and environmental pollution.**

August 1991-October 1992

Lecturer. Universidad Privada del Valle/College of Engineering. Cochabamba, Bolivia

- Developed and taught a Leather and Ceramic Industry course –focus: industrial ecology.
Associate Research Director. Universidad Mayor de San Simon (UMSS)/Water Program. Cochabamba, Bolivia
- Planned research and assembled team to study drinking- and waste-water treatment systems.

March 1990-June 1991

Young Professional Resident. Centro Panamericano de Ingeniería Sanitaria y Ambiental, CEPIS/PAHO/WHO. Lima, Peru

- Completed an industrial ecology case-study for the leather industry and wrote guidelines.
- Trained junior-level sanitary engineers during the conduction of the case-study.

September 1988-January 1990

Associate Research Director. UMSS/Water Program. Cochabamba, Bolivia

- Participated in designing and implementing a monitoring water quality program for 21 rural drinking water treatment and supply systems.
- Participated in training community members for the organization of their local water committees.

August 1987-August 1988

Visiting Researcher. UC Berkeley's Applied Algae Research Group/Sanitary Engineering and Environmental Health Research Laboratory, Richmond Field Station. Richmond, CA, U.S.A.

- Participated in the upgrade of a pilot plant to remove Se from agricultural drainage water.

PROFESSIONAL EXPERIENCE

September 2005 – Present

Research Consultant. Greenville Utilities Commission/Water Resources Department.

- Determination of soluble and particulate lead in drinking water, and nutrients removal and reclamation in wastewater. *Consultant. Program for the Rural Carolinas and Episcopal Hispanic Ministry.*
- Ferric iron in a small system supplying drinking water to a mobile home park – A community-based participatory approach.

February-August 2004

Wastewater Technology Consultant. Local Water Company (SEMAPA). Cochabamba, Bolivia

- Monitoring and evaluating a project to upgrade and design a 12MGD wastewater treatment plant.

November 2003-August 2004

Volunteer. Community Members of District Five, Tiquipaya, Cochabamba, Bolivia

- Community leaders and members of water committee education on water resources management.

April 2002-July 2004

Head Public Health Action Plan/Consultant. Ixtatán Foundation. U.S.A.-Guatemala

- Designed a public health action plan applying social capital principles in rural Guatemala.
- Developed a monitoring drinking water quality and a solid waste management programs.
- Performed secondary data analyses from the local Health Center –incidence of diarrheal diseases.
- Designed an environmental education component on water and health issues.
- Drafted strategy to create networks of collaboration to strengthen the public health action plan.

April 2-9, 2002

Consultant. Oswald Green, LLC/Ixtatán Foundation. U.S.A.-Guatemala

- Conducted a town-hall meeting to identify and prioritize key community-public health problems.
- Planned and designed strategies to address community-public health problems.
- Conducted sanitary surveys for drinking water systems, and disposal of wastewater and solid waste in San Mateo Ixtatán.

January 2002-May 2002

Researcher. Refugee Women's Network (RWN). Decatur, Georgia, U.S.A.

- Designed questionnaire, interviewed personnel and Board of Directors, and reported findings.

May 2001-March 2002

Consultant. Oswald-Green, LLC. Concord, CA, U.S.A.

- Produced technical bulletins.

July-September 1998

***Consultant.* Pan-American Health Organization (PAHO/WHO) – La Paz, Bolivia.**

- **Developed questionnaire and conducted survey on how the role of water institutions, human resources, and interpretation of policy may impact diarrheas incidence in five Bolivian cities.**
- **Proposed guidelines to implement a sustainable wastewater management program in Bolivia.**

August 1991-October 1992

***Director.* Municipality/Urban Sanitation Bureau. Cochabamba, Bolivia**

- **Chaired county task force to control cholera epidemic (1992); designed preventive program.**
- **Evaluated a \$3.25 million project to enhance municipal solid waste management.**
- **Designed, implemented, and directed the municipal solid waste management and public health plans.**

LANGUAGES

- Spanish: Native language; English: Fluent; Portuguese: Proficient in verbal and reading.

ACADEMIC AND PROFESSIONAL GEOGRAPHIC EXPERIENCE

- U.S., U.K., Bolivia, Guatemala, and Peru

PROFESSIONAL AFFILIATIONS

- American Association for the Advancement of Science (AAAS)
- American Public Health Association (APHA)
- APHA's Latino Caucus
- North Carolina Environmental Justice Network (NCEJN)
- Asociación Boliviana de Ingeniería Sanitaria (ABIS), Cochabamba

HONORS/AWARDS

- Advisory Board – Clean Water for North Carolina (2005)
- Panelist, International Safe Drinking Water 2003 Conference. Atlanta, GA (2003)
- Nominated head of the students committee for the Environmental Health Sciences Graduate Group Review. University of California, Berkeley (1998)
- The Doctoral Student Support Award for Research. University of California, Berkeley (1998)
- Member of Honor, Asociación Boliviana de Ingeniería Sanitaria (ABIS)-Cochabamba (1998)
- International Health Focus Group, co-Chair. University of California, Berkeley (1995-1997)
- The British Council/International Resource Development Ltd. Scholarship, U.K. (1993-1994)
- Pan American Center for Sanitary Engineering and Environmental Sciences/PAHO-WHO Young Professional Resident Scholarship, Lima, Peru (1990-1991)

PUBLICATIONS (2000-Present)

Dissertation:

The Fate of Selenium in an Algal-Bacterial System in the San Joaquin Valley of California, Public Health Considerations, University of California School of Public Health, Berkeley, March 2001.

Book Reviews:

Zarate MA (2004) "Wastewater Treatment, Biological and Chemical Processes," by Henze M, Harremoës P, Jansen JIC, and Arvin E (2002). 3rd edition, Springer Publishers. 430 pp, 193 figures, and 88 tables. *Waste Management* 24(2):221. "Ecosystem Change And Public Health: A Global Perspective," edited by Joan L. Aron and Jonathan A. Patz (2001). The Johns Hopkins University Press. 480 pp.

Posters:

Zarate MA, Wilcox J, Glascoff MA (2005) *Innovative Methodology to Gather Data on Perceptions of Pharmaceutical and Personal Care Products among Water Operators from Systems along the Tar-Pamlico River*. Poster accepted at the 133rd APHA's Annual Meeting & Exposition to be held in Philadelphia, PA. December 10-14.

Tajik M, De Leon Angel ME, and Zarate MA (2005) *Inter-community Coalition Building, Solidarity, and Public Policy*. Poster accepted at the 133rd APHA's Annual Meeting & Exposition to be held in Philadelphia, PA. December 10-14.

Papers and/or Oral Presentations:

Zárate MA, Rojas JM, Arzabe JO, and Stone HL (2005) Innovative Approaches to Strengthening the Water and Health Sector in Latin America: Experiences in Guatemala and Bolivia. Paper and oral presentation. Proceedings, Learning Alliances Symposium. Delft, the Netherlands, June 6-9.

Zarate MA (2003) "El Plan de Acción de Salud Pública para un Area Rural de Guatemala." Oral Presentation at the Pan American Center for Sanitary Engineering and Environmental Sciences (CEPIS/PAHO/WHO). Lima, Peru, December 22.

Zarate MA (2003) "Principios de Salud Ambiental." Oral Presentation at the National Institute for Public Health and National Center for Epidemiology and Environmental Health. Sucre, December 2.

Zarate MA (2003) "Principios de Aguas Residuales y Lagunas Tipo Oswald." Oral Presentation at the X Congress of ABIS. La Paz, November 28.

Zarate MA (2003) "Plan de Acción de Salud Publica en un Area Rural de Guatemala." Oral Presentation at the X Congress of ABIS. La Paz, November 27.

Zarate MA (2003) "Lagunas Tipo Oswald." Oral Presentation at the Water Company of Cochabamba, Bolivia (SEMAPA). November 20.

Zarate MA (2003) "Principios de Manejo de Residuos Sólidos." Oral Presentation at the Bolivian Association of Sanitary and Environmental Engineering (ABIS). Cochabamba, November 17.

Zarate MA (2003) "Manejo Sostenible de Recursos Hídricos." Oral Presentation at the Water Company of Cochabamba, Bolivia (SEMAPA). November 13.

Zarate MA (2003) "Ongoing Challenges in the Water and Sanitation Sector in Latin America: Experience in Bolivia and Guatemala." MPH Program/Emory Rollins School of Public Health. October 16.

Zarate MA (2003) "Challenges in Environmental Health." Presented at the 1st Faculty-Graduate Students Meeting of the MPH-EH Program at Fort Valley State University. January 24.

Zarate MA (2002) "Manejo Transparente y Sostenible de los Recursos Hidricos." Oral presentation before the IX Congress Bolivian Society of Engineers. Cochabamba, Bolivia, September 11-14.

Zarate MA (2002) "The Water Cycle: An Environmental Health Perspective." International Health Track Program at Morehouse School of Medicine, Atlanta, Georgia. February.

Zarate MA (2001) "Agua y Salud." Oral presentation at the School of Architecture, Universidad Mayor de San Simón; at the Centro de Mujeres Soberanía y Paz; and at the Engineering and Architecture Department, Universidad Privada Boliviana. Cochabamba, Bolivia, May 5-8.

Zarate MA, Lundquist TJ, Green FB, and Oswald WJ (2000) "Métodos Analíticos como Herramienta para la Evaluación de una Planta de Lagunas Integradas para la Remoción de Selenio en el Valle San Joaquín, California." Memorias de la I Conferencia Latinoamericana en Lagunas de Estabilización y Reuso, Cali, Colombia, October 24-27.

Zarate MA, Lundquist TJ, Mountford S, Quinn N, Green FB, Leighton T, Oswald WJ (2000) "Performance of an algal-bacterial selenium-removal system in the San Joaquin Valley of California." Paper presented before the 219th American Chemical Society National Meeting. San Francisco, California, U.S.A. March 26-30.

Zarate MA, Mountford S, and Oswald WJ (2000) "Selenium Determination In Agricultural Drainage Treated In An Algal-Bacterial Selenium Removal System In The San Joaquin Valley Of California." Paper presented at the 219th American Chemical Society National Meeting. San Francisco, California, U.S.A. March 26-30.

Reports:

Zarate MA (2004) "Evaluación Técnica del Estudio y Diseño de Alternativas de Tratamiento para Aguas Residuales." Interim and Final Reports, SEMAPA, February-August 2004. Cochabamba, Bolivia

Zarate MA (2003) "Trip Report to Bolivia, November 12-December 23." Oswald-Green LLC. 9 pp plus appendix.

Zarate MA (2003) "Trip Report August 7-19." Ixtatán Foundation. 12 pp plus illustrations.

Zarate MA (2003) "Trip Report June 12-28." Ixtatán Foundation. 17 pp plus illustrations and appendices.

Zarate MA (2003) "Trip Report March 7-16." Ixtatán Foundation. 14 pp plus illustrations and appendices.

Zarate MA (2002) "Trip Report July-August." Ixtatán Foundation. 16 pp plus appendices.

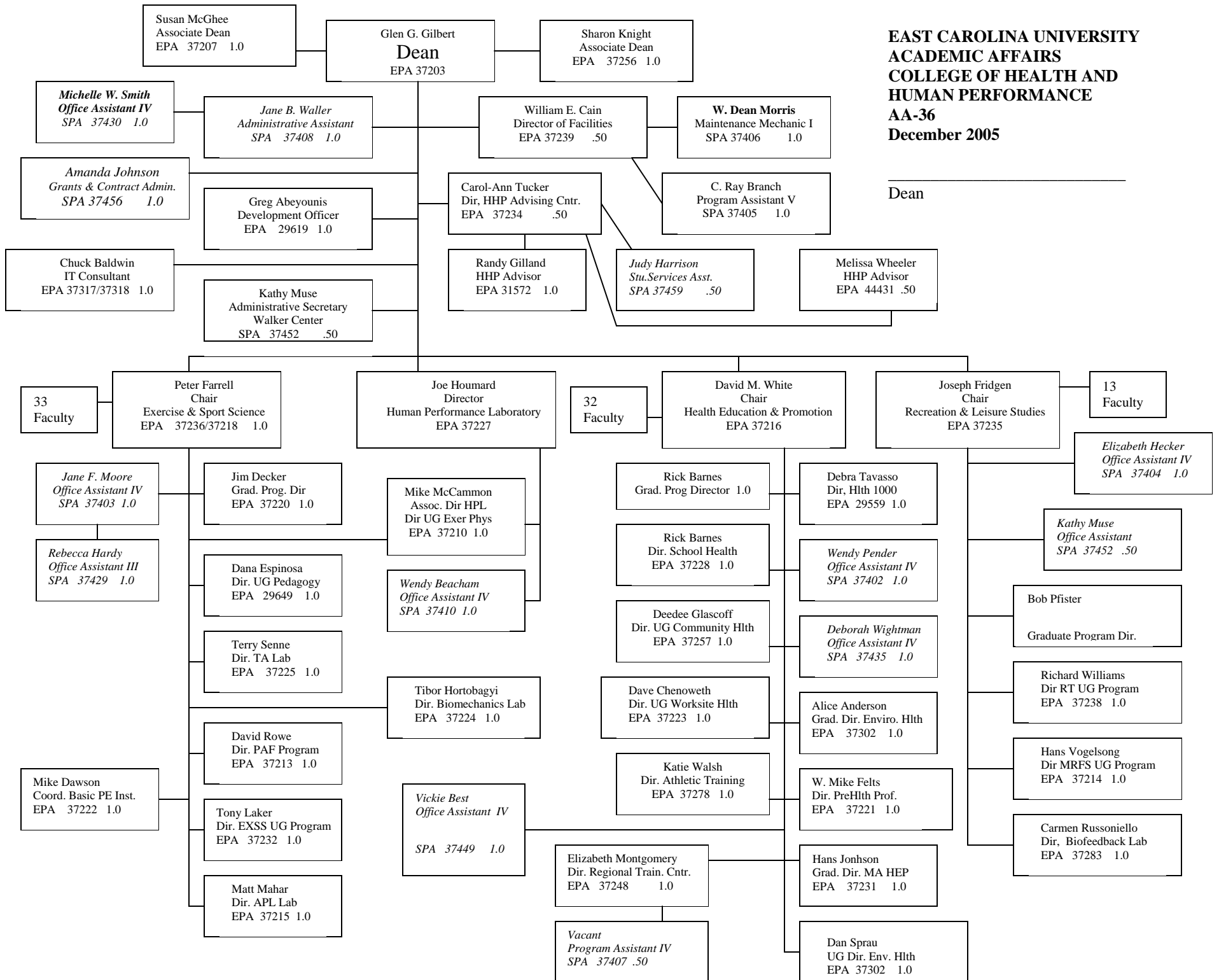
Zarate MA (2002) "Trip Report June." Ixtatán Foundation. 18 pp plus appendices.

Zarate MA (2002) "Trip Report April." Oswald-Green, LLC & Ixtatán Foundation.
16 pp plus appendices.

Zarate MA (2000) "Estudio de Evaluación de la Demanda y la Oferta Local para
las Investigaciones y Servicios del Centro de Agua y Saneamiento Ambiental."
Draft-Report prepared for the Belgian Cooperation to the University of San
Simón, Cochabamba, Bolivia. July:16 pp plus appendixes.

APPENDIX C
(Organizational Structure)

**EAST CAROLINA UNIVERSITY
ACADEMIC AFFAIRS
COLLEGE OF HEALTH AND
HUMAN PERFORMANCE
AA-36
December 2005**



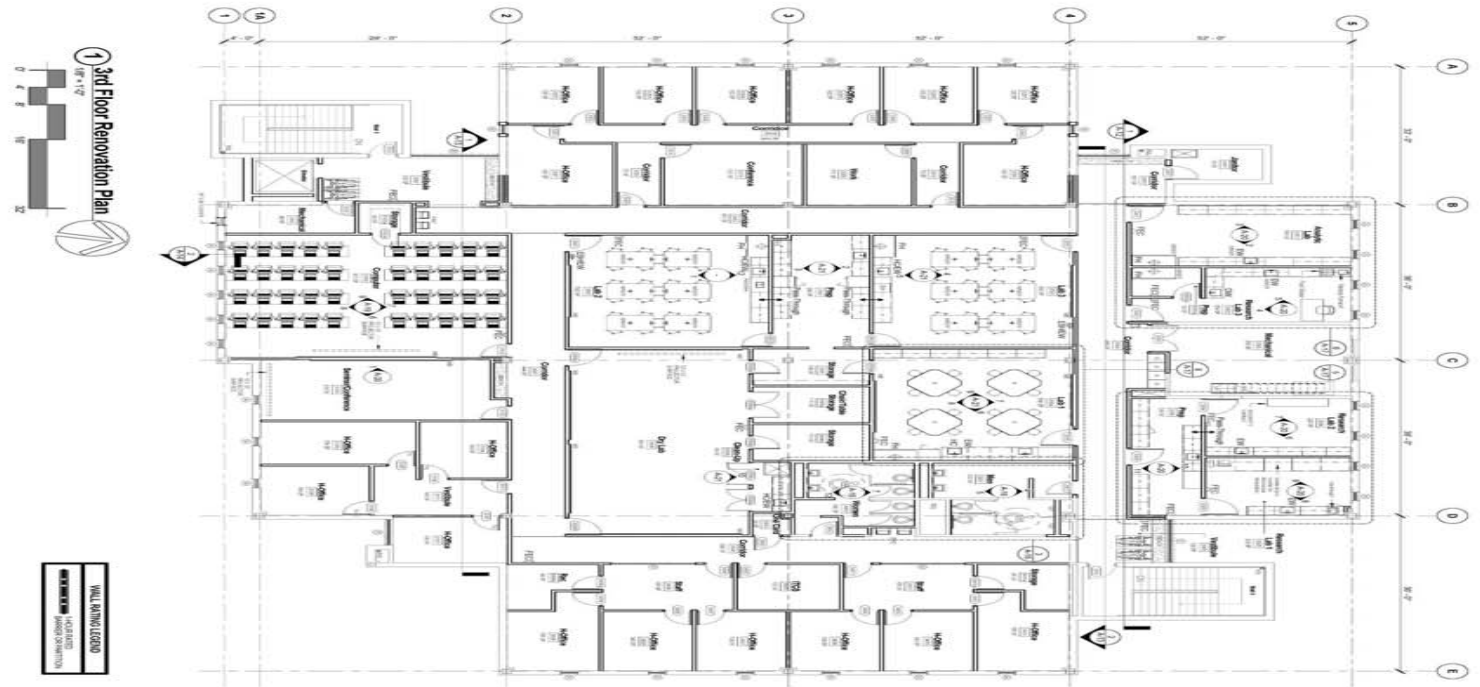
APPENDIX D

See webpage for larger image:

[\(Facilities Renovations\)](#)

<http://www.ecu.edu/cs-hhp/hlth/EHST/Environmental-Health-Sciences-Accreditation.cfm>

480925.03(17)A



3rd Floor Renovation Plan
REV. 11/17



WALL	UNFINISHED
DOOR	FINISHED
WINDOW	FINISHED
FURNITURE	FINISHED

A-6

SHEET NAME
PROJECT DATA
SHEET NUMBER

DATE: AUGUST 1, 2016
PROJECT: CAROL BELK BUILDING RENOVATION

PHASE
DESIGN DEVELOPMENT

REVISIONS

DATE: AUGUST 1, 2016
PROJECT: CAROL BELK BUILDING RENOVATION

Renovations to:
Carol Belk Building
East Carolina University - Greenville, North Carolina

MHAworks
ARCHITECTURE INTERIORS

85 WILSONA CIR. SUITE 201
CHAPEL HILL, NC 27514
P: 919.533.9093
F: 919.533.9093
www.mhaworks.com

CHARLES HILL
INDEPENDENCE
GREENVILLE
CHARLOTTE

APPENDIX E
(Academic Program Assessment)



ACADEMIC PROGRAM
ASSESSMENT REPORT

Health Education and Promotion
MS in Environmental Health

(Academic Department & Program)

August 2002 – May 2003

(Assessment Period Covered)

November 15, 2002

(Date Submitted)

Submitted by: David M. White, Chair _____

(Departmental Chair or Faculty Assessment Representative)



ACADEMIC PROGRAM **ASSESSMENT REPORT**

Health Education and Promotion BS in Environmental Health

(Academic Department & Program)

August 2002 – May 2003

(Assessment Period Covered)

November 15, 2002

(Date Submitted)

Expanded Statement of Institutional Linkage:

Institutional Mission/Goal(s) Reference: The educational mission is to provide students with a rich, distinctive undergraduate and graduate educational experience. The university is committed to developing each learner's ability to discover, evaluate, and communicate knowledge; to make informed decisions; and to recognize a decision's ethical dimensions. The university also is committed to imparting a sense of citizenship and personal responsibility, fostering lifelong learning, and nurturing an understanding of the interdependencies of people and their environments.

Academic Program Mission Statement:

Objective:

1. M.S.E.H. graduates will be prepared for employment in the field of environmental health and safety.

2. The M.S.E.H. program will provide graduates with preparation necessary to meet professional/registration requirements.

3. Upon completion of the M.S.E.H. degree, graduates will have adequate background to continue studies in environmental health and safety.



ACADEMIC PROGRAM ASSESSMENT REPORT

Health Education and Promotion
BS in Environmental Health

(Academic Department & Program)

August 2002 – May 2003

(Assessment Period Covered)

November 15, 2002

(Date Submitted)

Intended Educational Objective: M.S.E.H. graduates will be prepared for employment in the field.

First Means of Assessment for Objective Identified above:

Means of Assessment & Criteria for Success: Survey of graduates. At least 80% of students seek employment in environmental health or safety will have found employment within one year.

Stratify: High = ____; Middle = ____; Low = ____ on the 80% figure.

Description of Data Collection & Assessment Results:

Use of Results to Improve Program:

Second Means of Assessment for Objective Identified above:

Means of Assessment & Criteria for Success: Faculty developed survey of employers of program graduates. At least 80% of employers who respond to a survey will agree or strongly agree with the statement: "ECU Environmental Health Science graduates are adequately prepared to assume entry-level responsibilities.

Stratify: High = ____; Middle = ____; Low = ____ on the 80% figure.

Description of Data Collection & Assessment Results:



ACADEMIC PROGRAM ASSESSMENT REPORT

Use of Results to Improve Program:

Health Education and Promotion MS in Environmental Health

(Academic Department & Program)

August 2002 – May 2003

(Assessment Period Covered)

November 15, 2002

(Date Submitted)

Intended Educational Objective: The M.S.E.H. program will provide graduates with preparation necessary to meet professional/registration requirements.

First Means of Assessment for Objective Identified above:

Means of Assessment & Criteria for Success: Eighty percent of MSEH graduates will attain passing scores on certification/registration examinations and 80% of graduates will perform above the national average on certification exams. {Split this green part out and put as second means of assessment.}

Isn't the 80% overly lofty??

Stratify: High = ___; Middle = ___; Low = ___ on the 80% figure.

Description of Data Collection & Assessment Results:

Use of Results to Improve Program:

Second Means of Assessment for Objective Identified above:

Means of Assessment & Criteria for Success:



ACADEMIC PROGRAM ASSESSMENT REPORT

Description of Data Collection & Assessment Results:

Use of Results to Improve Program:

Health Education and Promotion MS in Environmental Health

(Academic Department & Program)

August 2002 – May 2003

(Assessment Period Covered)

November 15, 2002

(Date Submitted)

Intended Educational Objective: Upon completion of the M.S..E.H. degree, graduates will have adequate background to continue studies in environmental health and safety.

First Means of Assessment for Objective Identified above:

Means of Assessment & Criteria for Success: Survey of program graduates. Eighty percent of graduates who apply to graduate programs in environmental health or safety will gain admission.

Stratify: High = ___; Middle = ___; Low = ___ on the 80% figure.

Description of Data Collection & Assessment Results:

Use of Results to Improve Program:

Second Means of Assessment for Objective Identified above:



ACADEMIC PROGRAM **ASSESSMENT REPORT**

Means of Assessment & Criteria for Success: Departmental comprehensive examination. All MSEH candidates will score at least 70% on the departmental comprehensive examination and no more than 50% will receive a score of less than 50% on any subcategory. **Good. State who evaluates this.**

This can be greatly strengthened by using the subcategory scores for another level of analysis. Put the scale scores in a chart with the students names in the first column and their scale scores in the subsequent columns. This will give information about the relative strengths and weaknesses of these student in these areas.

Description of Data Collection & Assessment Results:

Use of Results to Improve Program:

Senior and Graduate courses			Core Competencies	10 Essential Services
5001	Seminar in Env Health	1	Problem solving, Issues (Management) Information gathering (Assessment)	#3 Inform, educate
5,010	Principles of Toxicology	3	Data analysis and interpretation Evaluation (Assessment) Issues, Reporting Documentation and Record-Keeping (Management)	#1Monitor health status, #4mobilize community partnerships,#10 research
5,011	Principles of Toxicology Laboratory	1	Same as 5010	Same as 5010
5020	Environmental Toxicology	3	Issues, Problem solving, Project Management, Reporting, Documentation and Record-keeping (Management)	#1 Monitor health status, #2, Diagnose health problems, #4 Mobilize partnerships # 10 Research
5164	Radiological Health Field Operations	1	Information gathering Data analysis and interpretation, Evaluation (Assessment)	#1 Monitor Health Status, #2 Diagnose and investigate #6 Enforce laws and regs
5165	Advanced Radiological Laboratory	1		Same as 5164
5510	Physical Safety	2	(Assessment- All)	#1, #2
5520	Biological Safety	2	(Assessment- All)	#1, #2
5530	Chemical Safety	2	(Assessment- All)	#1, #2
5540	Radiation Safety	2	(Assessment- All)	#1, #2
5800	Solid/Hazardouse Waste Mgt.	3	(Assessment) (Management- All)	#1, #2, #6, #4
6010	Fundamentals of Env Health	3	(Problem Solving, Issues, Computer, IT Collaboration, Communication, Educate	#3
6100	Environmental Engineering	3	(Assessment- All) Problem solving, Issues, Computer and IT knowledge, Collaboration	#1, #2, #6
6201	Individual studies	1	(Assessment-All) Problem solving, Issues, Oganizational Knowledge and behavior	#1, #2, #10
6202	Individual studies	2	Same as 6201	#1, #2, #10
6203	Individual studies	3	Same as 6201	#1, #2, #10
6210	Topics in EH and Safety	1	Same as 6201	#1, #2, #10
6220	Topics in EH and Safety	2	Same as 6201	#1, #2, #10,
6230	Topics in EH and Safety	3	Same as 6201	#1, #2, #10
6,300	Public Health Pests and VB Disease	3	(Assessment- All) Issues, Computer and IT Reporting Documentation and Record-Keeping	#1, #2, #10, #6, #8
6,301	Public Health Pests and VB Disease Lab 1		(Assessment –All) Computer and IT, Reporting Documentation and Record-Keeping	Same as 6301
6800	Environmental Health Prog Manag	3	Management-All, Communication- All	#6 Enforce laws and regulations,

				Research for new insights, Develop policies and plans#7 Link people to needed personal health services	
6,700	Industrial Hygiene	3	Management- All Assessment - All	#1, #2, #3	
6,701					
6,710	Ventilation and Indoor Air Quality and lab 3,1	3,0	Management-All, Assessment- All	#1, #2, #3	
6420	Sanitary Microbiology and safety foods	3	Assessment- All	#1, #2, #3	
6400	Tech advances in water supply and wwt	3	Assessment- All, Problem Solving, project management, computer and IT		
6980	Env. Health Practicum	3	Assessment- All, Management- All, Communication- All		
6990	Professional Paper	3	Assessment- All, Management- All, Communication- All		
7000	Thesis	3	Assessment-All, Management-All, Communication – All		
Other courses for EHST Students or taught by EHST faculty					
MPH 6010	Introduction to Environmental Health			X	X
MPH 6980	Env. Health Practicum		XX	X	X
MPH 6990	Professional Paper		X	X	X

X online

X* Online and DE

Various
Max
Alice
Ed
Will