

2013

Hunter College  
School of Urban  
Public Health,

CUNY School of  
Public Health

*Master of Science*  
*Environmental and Occupational*  
*Health Sciences*  
***SELF STUDY REPORT***

**ACCREDITATION BOARD FOR  
ENGINEERING AND TECHNOLOGY –  
RELATED ACCREDITATION COMMISSION  
(ABET-RAC)**

Master of Science (MS)  
Environmental and Occupational Health Sciences  
Hunter College School of Urban Public Health,  
CUNY School of Public Health

# Table of Contents

|   |    |
|---|----|
| <u>BACKGROUND INFORMATION</u> .....   | 1  |
| a. <u>Contact information</u> .....   | 1  |
| b. <u>Program History</u> .....   | 1  |
| c. <u>Options</u> .....   | 2  |
| d. <u>Organizational Structure</u> .....  | 2  |
| e. <u>Program Delivery Modes</u> .....  | 2  |
| f. <u>Program Locations</u> .....   | 3  |
| g. <u>Deficiencies, Weaknesses or Concerns</u> .....                                      | 3  |
| <br>  |    |
| <u>CRITERION 1. STUDENTS</u> .....  | 7  |
| a. <u>Student Admissions</u> .....  | 7  |
| b. <u>Evaluating Student Performance</u> .....  | 8  |
| c. <u>Transfer Student and Transfer Courses</u> .....                                     | 9  |
| d. <u>Advising and Career Guidance</u> .....  | 10 |
| e. <u>Work in Lieu of Courses</u> .....   | 11 |
| f. <u>Graduation Requirements</u> .....   | 11 |
| g. <u>Transcripts of Recent Graduates</u> .....   | 12 |
| <br>  |    |
| <u>CRITERION 2. PROGRAM EDUCATIONAL OBJECTIVES</u> .....                                  | 14 |
| a. <u>Mission Statement</u> .....   | 14 |
| b. <u>Program Educational Objectives</u> .....  | 15 |
| c. <u>Consistency of Program Educational Objectives with Mission of Institution</u> ..... | 15 |
| d. <u>Program Constituencies</u> .....  | 18 |
| e. <u>Process for Review of the Program Educational Objectives</u> .....                  | 19 |
| <br>  |    |
| <u>CRITERION 3. STUDENT OUTCOMES</u> .....  | 22 |
| a. <u>Establishment and Revision of Student Outcomes</u> .....                            | 22 |
| b. <u>Student Outcomes</u> .....  | 23 |
| c. <u>Relationship of Student Outcomes to Program Educational Objectives</u> .....        | 26 |
| <br>  |    |
| <u>CRITERION 4. CONTINUOUS IMPROVEMENT</u> .....  | 43 |
| a. <u>Student Outcomes</u> .....  | 43 |
| b. <u>Continuous Improvement</u> .....  | 49 |
| c. <u>Additional Information</u> .....  | 50 |
| <br>  |    |
| <u>CRITERION 5. CURRICULUM</u> .....  | 54 |
| a. <u>Program Curriculum</u> .....  | 54 |
| b. <u>Course Syllabi</u> .....  | 59 |
| <br>  |    |
| <u>CRITERION 6. FACULTY</u> .....   | 62 |

|  |     |
|--|-----|
| a. <a href="#">Faculty Qualifications</a> .....                      | 62  |
| b. <a href="#">Faculty Workload</a> .....                            | 65  |
| c. <a href="#">Faculty Size</a> .....                                | 66  |
| d. <a href="#">Professional Development</a> .....                    | 67  |
| e. <a href="#">Authority and Responsibility of Faculty</a> .....     | 67  |
| <br>   |     |
| <a href="#">CRITERION 7. FACILITIES</a> .....                        | 71  |
| a. <a href="#">Offices, Classrooms and Laboratories</a> .....        | 71  |
| b. <a href="#">Computing Resources</a> .....                         | 72  |
| c. <a href="#">Guidance</a> .....                                    | 73  |
| d. <a href="#">Maintenance and Upgrading of Facilities</a> .....     | 73  |
| e. <a href="#">Library Services</a> .....                            | 74  |
| f. <a href="#">Overall Comments on Facilities</a> .....              | 75  |
| <br>   |     |
| <a href="#">CRITERION 8. INSTITUTIONAL SUPPORT</a> .....             | 76  |
| a. <a href="#">Leadership</a> .....                                  | 76  |
| b. <a href="#">Program Budget and Financial Support</a> .....        | 77  |
| c. <a href="#">Staffing</a> .....                                    | 79  |
| d. <a href="#">Faculty Hiring and Retention</a> .....                | 80  |
| e. <a href="#">Support of Faculty Professional development</a> ..... | 81  |
| <br>   |     |
| <a href="#">PROGRAM CRITERIA</a> .....                               | 82  |
| <br>   |     |
| <a href="#">Appendix A – Course Syllabi</a> .....                    | 84  |
| <a href="#">Appendix B – Faculty Vitae</a> .....                     | 112 |
| <a href="#">Appendix C – Equipment</a> .....                         | 121 |
| <a href="#">Appendix D – Institutional Summary</a> .....             | 124 |
| <a href="#">Appendix E – 2010 Evaluation Report</a> .....            | 129 |

## **BACKGROUND INFORMATION**

### **A. Contact Information**

Interim Dean Neal L. Cohen, MD  
School of Urban Public Health, Hunter College  
City University of New York School of Public Health (CUNY SPH)  
2180 Third Avenue  
New York City, NY 10035  
(212) 396-7729  
ncoh@hunter.cuny.edu

### **B. Program History**

The City University of New York (CUNY) is the largest and most diverse urban public university in the United States, consisting of 23 campuses and 250,000 matriculated students. Hunter College is one of 11 senior colleges.

The MS degree program in EOHS was one of the original programs established at the Hunter College Institute of Health Sciences in 1971. The initial focus of the program was two-fold: to develop specialists in environmental impact assessment and to train teachers seeking careers in environmental education. The industrial hygiene and occupational health curriculum was added in 1978 in response to workforce development needs, arising from the formation of the U.S. Occupational Safety and Health Administration (OSHA). The EOHS-MS program has also been a part of the National Institute for Occupational Safety and Health (NIOSH) – New York/New Jersey (NY/NJ) Educational Resource Center (ERC) since the late 1970s and receives government support to train and develop industrial hygienists. Today the EOHS graduate program is recognized as a leader in environmental and occupational health education in the NY/NJ metropolitan area.

In 1999, Hunter College combined its programs in Environmental and Occupational Health Sciences, Community Health Education, and Public Health Nutrition into a single program in Urban Public Health (UPH) with three relatively autonomous professional tracks each offering a Master of Public Health (MPH) degree. For many years, the EOHS program offered two degrees: the MS and MPH. The EOHS-MPH degree program was accredited by the Council on Education for Public Health (CEPH) in 2000. The MS curriculum is designed to impart competencies in core areas of environmental and occupational hygiene, while the MPH provides students with broader competencies in environmental health and safety. There are distinct curricula for each degree program (although students in both programs take some courses in common).

The MS curriculum was revised and approved by the Hunter College Faculty Senate in December, 2000 to fulfill the requirements for ABET accreditation. These changes took effect during the Fall 2001 semester, and the first graduate of the program completed the curriculum

in Spring 2002. The MS curriculum was further revised and approved by the Hunter College Faculty Senate, effective Fall 2010. The MS program in EOHS was first accredited by ABET in 2001 and reaccredited in 2007.

In September of 2006, CUNY Chancellor Matthew Goldstein announced the university's commitment to develop a collaborative School of Public Health that would include the public health programs at Brooklyn, Hunter and Lehman Colleges and the Graduate School and University Center (GC). Hunter was the only campus to house a program in EOHS. In 2007, CUNY received approval from its Board of Trustees and the New York State Education Department to create a Doctor of Public Health (DPH) program, including an Environmental and Occupational Health Track, jointly offered by Hunter College and the (GC). In 2010, CUNY approved a governance and administrative structure and bylaws that allow the SPH to function in its environment. As part of these changes, the Hunter College School of Urban Public Health (UPH) was established, as the 'home' of the bachelor's and master's programs in public health at the Hunter Camps. UPH is one of the four consortial campuses within the CUNY SPH. The EOHS Track was renamed the EOHS Program. In the summer of 2011, UPH and its EOHS track moved to a new eight-story, 147,000-square foot green building in East Harlem, which is shared with the Hunter College School of Social Work.

### **C. Options -Title of Degree and Program Under ASAC-ABET Review**

The CUNY SPH, and its component School of Urban Public Health (UPH) at Hunter College are seeking reaccreditation by ASAC-ABET of the EOHS-MS.

### **D. Organizational Structure**

For the sake of clarity and consistency, we have equated the following organizational terms used by ABET with the appropriate organizations within Hunter College and CUNY:

|                     |  |
|---------------------|--|
| PROGRAM NAME        | Environmental and Occupational Health Sciences (EOHS)                    |
| DEGREE              | Master of Science (MS)   |
| ADMINISTRATIVE UNIT | Hunter College, City University of New York (CUNY)                       |
| INSTITUTION         | CUNY School of Public Health (SPH) /School of Urban Public Health (SUPH) |

The organizational structure is depicted in Figure 1a and 1b at the end of this section. The CUNY SPH is a consortial school, comprised of four campuses. The EOHS-MS and MPH Degree Programs are part of the SUPH of Hunter College. EOHS is one of five programs within this unit. Each program at Hunter is headed by a Program Director. The Program Director reports to the Campus Director, who in turn, reports to the Dean. The reporting structure is discussed more fully in Criterion 8.

### **E. Program Delivery Modes**

The MS-EOHS (ABET-IH concentration) degree is offered as a full or part-time course of study. Classes are offered Monday through Thursday in the late afternoon or evening.

## **F. Program Locations**

Nearly all required and elective classes are held at the Silberman Building, 2180 Third Avenue, New York, NY 10035. Select advanced courses may be held at the Graduate Center (GC).

## **G. Deficiencies, Weaknesses, or Concerns Documented in the Final Report from the Previous Review and the Actions Taken To Address Them**

Based on the 2007 visit and self-study, no institutional deficiencies, weaknesses and concerns were identified. However, one program deficiency, two program weaknesses and one program concern were identified. These issues and measures taken to address them are described below.

### Program Deficiency

1. Criterion 8, Program Criteria. The ASAC review noted that, “The title of the program must be shown on the graduating student’s transcript.”

Response:

*Effective January 2008, corrections were made on transcripts to state “ENV OCC HLTH SCI MS” for graduated students. This change was made retroactively for prior students and implemented prospectively. ASAC issued a final statement concluding that this deficiency was resolved.*

### Program Weaknesses

1. Criterion 1, Students. The ASAC criteria state that “the institution must also have and enforce procedures to assure that all students meet all program requirements”. Reviewers noted that documentation of satisfaction of entrance requirements was not available at the time of the visit, and that the required course Supervised Field Studies (EOHS 761) was not on all students’ transcripts.

Response:

*The institution provided complete application materials for selected students to document satisfaction of entrance requirements. Documentation from the Registrar that students were also provided to show that graduates had completed Supervised Field Studies (EOHS 761) or an equivalent course. The ASAC review concluded that this weakness was resolved.*

2. Criterion 3, Program Outcome and Assessment. The ASAC review noted the need for more effective program assessment. Post visit, the institution provided an assessment plan, policies and procedures, along with an implementation timetable to ABET. Documentation of procedures for reviewing student progress (e.g. during faculty meetings), student advisement sessions, student meetings and student course evaluations, minutes from EOHS external

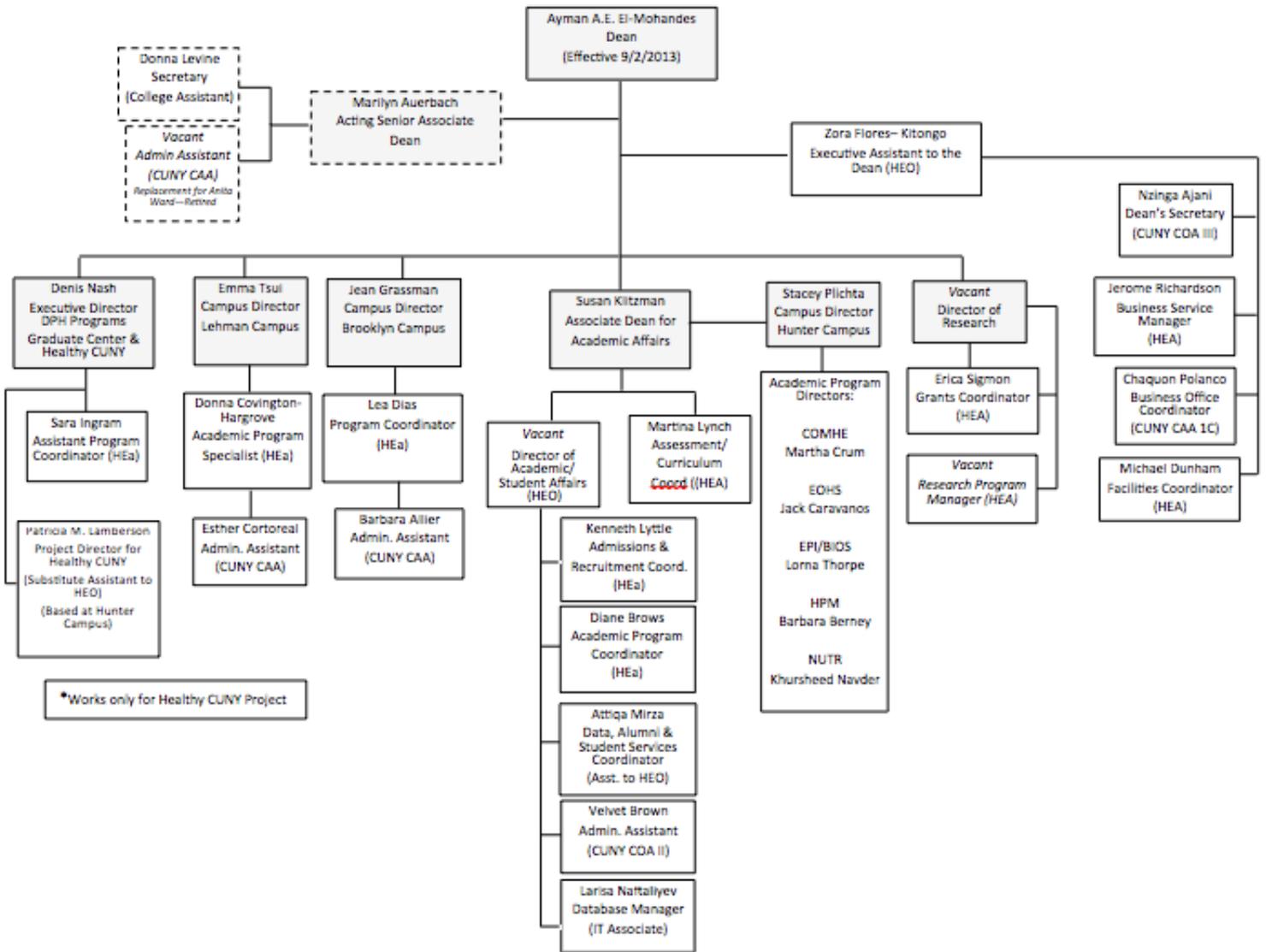
advisory board meetings, and surveys of graduating students, alumni and employers were provided to ABET. These are described in detail in the text for Criterion 4, Continuous Improvement. The weakness, however, remained until the plan documentation that assessment finds are analyzed and used for continuous program improvement are provided to ABET.

### Program Observation

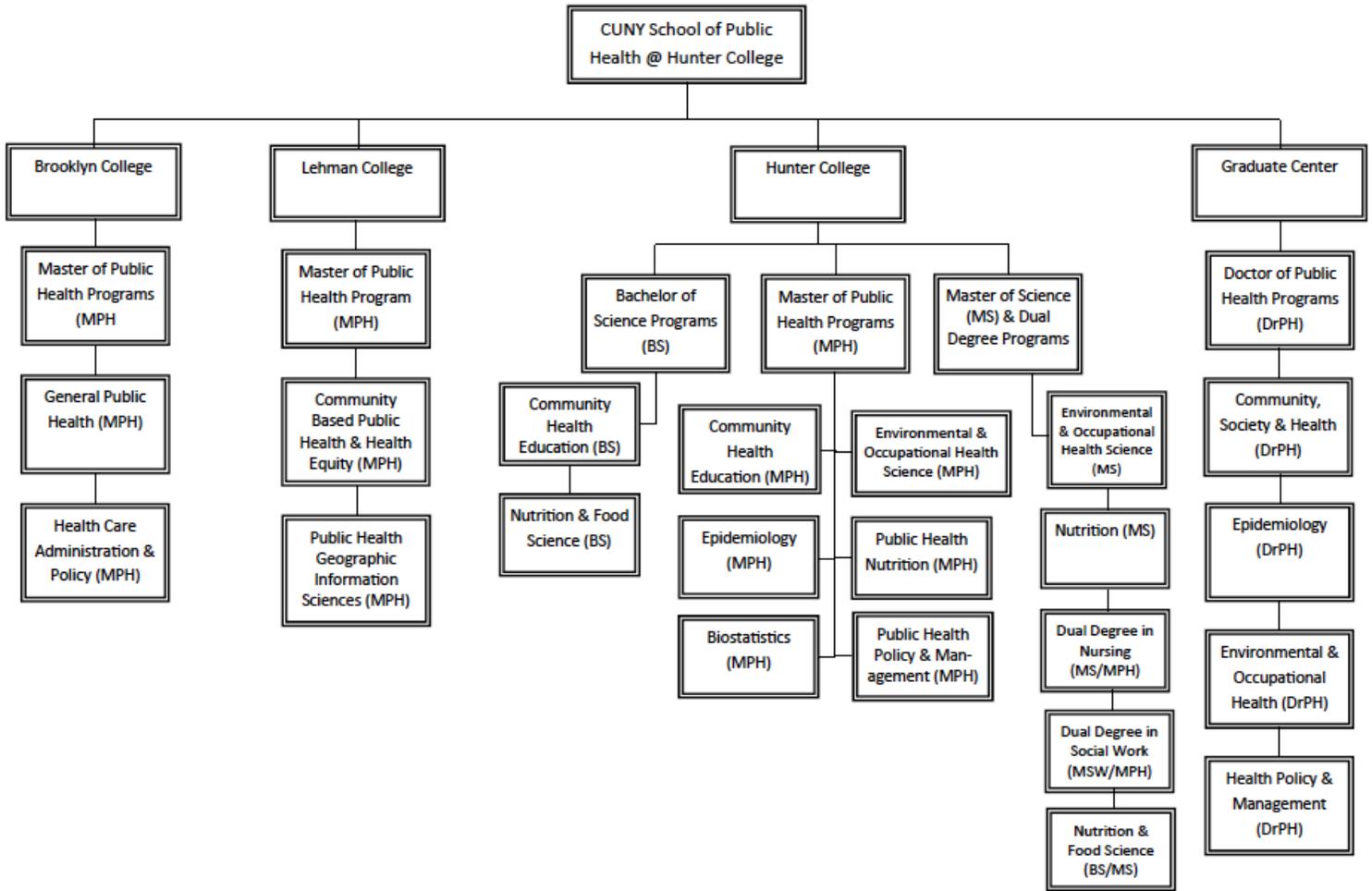
1. Criterion 7, Institutional Support and Financial Resources. The ABET review noted concerns that faculty salaries are well below faculty salaries at comparable programs and national averages for the industrial hygiene field in the face of higher cost of living in the New York City area, and that several faculty were at or beyond normal retirement age.

The current state of the faculty is addressed in Criterion 6, and institutional program support in Criterion 7.

**Figure 1a - Background  
Administrative Structure of CUNY School of Public Health**



**Figure 1b - Background  
School of Public Health Degree Programs by Specialization and Campus**



## CRITERION 1. STUDENTS

### A. Student Admissions

*Summarize the requirements and process for accepting new students into the program.*

As adopted in a resolution by the Hunter College Senate in May 2001, and after review and support by the various Schools, Division and College-wide Curriculum committees, students admitted to the EOHS MS-degree program are required to have completed a B.A. or B.S. degree or its equivalent from an accredited U.S. college or university. (Academic credentials from non-U.S. institutions are evaluated by the Hunter College Office of Admissions in order to establish an equivalency to a U.S. baccalaureate degree.)

Applicants are evaluated according to the following guidelines:

- An undergraduate grade point average of B or better in their major and an overall undergraduate grade point average of B- or better.
- Proof of verbal, quantitative and written GRE scores or a previously-earned Master's degree from an accredited U.S. college or university.
- At least 40 credits of undergraduate or graduate-level basic science and mathematics through one semester of calculus and statistics. Generally, an undergraduate biology, chemistry, environmental sciences or physics major would satisfy these requirements.
- If from a non-English-speaking country, the Test of English as a Foreign Language (TOEFL) examination with a score of 550 or better on the paper-based test or 213 on the computer-based test.
- Two satisfactory letters of reference from persons who have known the applicant in an academic or professional supervisory capacity.

Admissions review is implemented in accordance with the procedure established by SUPH and CUNY SPH for timely application review and reporting of decisions. At the creation of the SPH, the EOHS program (as all programs at the SPH) moved to a single fall semester acceptance system. This application and admissions process was greatly simplified with the adoption of "Hobson's WebApply" a web-based application and admissions review program that digitizes all application data including letters of reference and all college transcripts.

The review process begins with notification from the Office of Graduate Admissions that applicants are "ready to be reviewed" The specific admissions review process at EOHS consists of:

- a) Each EOHS faculty logs into "WebApply" and reviews each application (including letters of reference, admission essay, and all college transcripts.
- b) The faculty member enters online notes for each applicant and makes a recommendation (admit unconditionally, admit with conditions, hold, non-degree admission or reject)

- c) The Program Director reviews each review for each student and enters the final determination.
- d) If the recommendations of two faculty members regarding an individual's admission are in conflict, those faculty members discuss the merits and drawbacks of that candidate at the monthly EOHS program faculty meeting and come to a consensus.
- e) After the Program Director enters a final decision, the Dean (or appropriate representative), reviews the record and either approves or discusses the applicant with the Program Director
- f) Finally, and only after the Dean accepts the decision of the EOHS program, the Office of Graduate admissions sends an applicant official notice.
- g) The Program Director keeps a record of all application reviews

The following applicant data are recorded digitally during this process:

- Name of applicant
- Undergraduate major, overall GPA, school, date degree awarded
- Highest degree earned, major, graduation date
- GRE score (verbal, quantitative, written) and TOEFL score if applicable
- PH courses taken at Hunter or elsewhere (name, dates, grade), total credits
- Related work experience (Title, Employer. Dates)
- Recommendation for acceptance, acceptance with conditions, acceptance as a non-degree student, or rejection

In considering an applicant for admissions to the program, the admissions committee will evaluate a student's undergraduate coursework and performance, standardized exam results, post-baccalaureate coursework and professional experience and other relevant qualifications. It is expected that prior to matriculation, students will satisfy missing undergraduate science and math requirements, which the Admissions Committee considers necessary for the student's admission to the EOHS Program. Foreign students who do not meet the TOEFL requirement will not be admitted under any circumstances. If a student is admitted with conditions, the specific condition (usually a science or math course) and deadline for completion are specified in the admissions notification letter.

Applicants who do not currently meet all admissions requirements, or whose applications are incomplete or late, may be admitted as non-degree students. Non-degree students are permitted to take up to 12 credits of graduate coursework while in this status. If a non-degree student is accepted for matriculation into the EOHS-MS program, credits earned with a grade of B or better as a non-degree student may be counted toward the MS degree. A maximum of 12 out of 46 relevant credits taken at another institution and not counted toward another degree may be transferred to the MS degree.

## **B. Evaluating Student Performance**

*Summarize the process by which student performance is evaluated and student progress is monitored. Include information on how the program ensures and documents that students*

***are meeting prerequisites and how it handles the situation when a prerequisite has not been met.***

Hunter College SUPH has developed written policies and procedures for evaluating student performance. Upon acceptance to the EOHS program, each student is assigned a full-time faculty member as advisor, who meets with him or her at least once a semester to review academic performance, identify and attempt to address academic problems the student may be experiencing, and develop plans for degree completion (See: Section D. below). Students' transcripts are automatically monitored by the College Registrar. Transcript information is available electronically to each student, his/her advisor and full-time faculty members. If a student's graduate GPA falls below 3.0, s/he is automatically placed on academic probation and sent a letter to this effect. The student is notified that s/he must achieve at  $GPA \geq 3.0$  by the end of the following semester or risk debarment for one year. Debarred students must again apply for admission if they seek re-entry into the program.

In addition, SUPH produces a report each semester which identifies students who are on or 'at risk' of being placed on academic probation ( $GPA < 3.0$  or a grade of C or below in two classes). Student performance is regularly discussed at monthly EOHS faculty meetings for the purpose of assessing possible reasons for poor performance and for brainstorming about effective remediation strategies. Faculty advisors are instructed to consult with current instructors and with the EOHS Program Director to better understand possible reasons for poor performance and to devise a plan with the student to address the deficiency. Resolution may consist of a variety of approaches, including reducing course load (especially among those students who are working full-time), advising students to take a combination of analytic and non-analytic courses in one semester to avoid overloading the student with one type of course, and discussing time-management skills. If a student remains on academic probation after one semester, it is customary to allow him/her one additional semester to achieve satisfactory academic standing if he/she demonstrates that she is likely to be successful academically and professionally. In such case, the College requires that the Program Director request permission for such a student to continue taking classes. If a student consistently underperforms (on academic probation for more than two semesters in a row), Program Director must assess the prospects that the student can return to 'good academic standing' and whether s/he should be counseled to leave the program. The College requires students to achieve a  $GPA \geq 3.0$  upon graduation. Students may appeal a debarment to the Program Director.

### **C. Transfer Students and Transfer Courses**

***Summarize the requirements and process for accepting transfer students and transfer credit. Include any state-mandated articulation requirements that impact the program.***

The EOHS-MS Program maintains policies for the acceptance of transfer students and for validating the transfer of graduate course credits from other institutions to Hunter College programs. Students who are enrolled in other graduate programs and then seek admission to a Hunter College graduate program must go through the same application process and be evaluated as any other applicant. During the twelve-year period in which the EOHS-MS

program has been accredited, no students have transferred from graduate programs at other colleges or universities.

Occasionally, students from other graduate programs outside of CUNY seek to take courses in the Hunter EOHS program for elective coursework. They must apply for admission as a non-degree student to do this. Students from other graduate programs in the New York area, such as the Columbia or NYU MPH programs, or the CCNY (CUNY) environmental engineering program, may seek to take specialized courses at Hunter on a non-degree basis. They too must apply just as all other non-degree students do. Also, they are always informally advised to check with their graduate advisor to assure that their program will accept the Hunter course for graduate credit, although most often their faculty advisor was the person who sent them to Hunter in the first place.

Once students have been admitted as candidates for the EOHS-MS degree, they may apply for transfer of credit for courses taken at other graduate institutions. According to Hunter College and regional college and university accreditation agency regulations, such transfers cannot be accepted if the courses in question were used toward a graduate or undergraduate degree elsewhere. If this is determined not to be the case, the student may submit a Hunter College Request for Transfer form requesting transfer of not more than 12 graduate credits from the other institution.

The Program Director handles all of these requests, determines whether or not to approve the request, and, if approved in whole or in part, signs the form for the program. In order to have the transfer approved by the program, the student must submit a copy of her/his transcript from the other institution, showing that the course was taken and the grade received, as well as the course outline and the name the textbook used in the course. If the requested transfer course is one with which the Program Director or other EOHS faculty members are not familiar and is not available at Hunter, the student is asked to provide a copy of the text in question. The Program Director then evaluates the course for similarity to EOHS courses and relevance to the EOHS curriculum and possible transfer of credits to Hunter.

Generally, the student must have received a grade of B or better for the grade to be eligible for transfer of credit. Often in cases of specialty courses taken elsewhere, the Program Director turns to other EOHS faculty members for advice. The Program Director also has the authority to accept the requested transfer, but with fewer credits than the student requested. In case the course was taken at a foreign institution, and this happens rarely at Hunter, the Program Director asks the foreign student division of the Hunter Admissions Office to determine the graduate accreditation status of the institution in question, and the correspondence of credit for courses there to courses at Hunter. The Admissions Office's decision on these matters is final, and they must approve such foreign transfer applications. However, the professional determination of the quality and relevance of these courses remains in the hands of the department faculty. If approved in whole or in part, the Program Director signs the Transfer of Credit form and sends it to the Registrar's Office for processing.

#### **D. Advising and Career Guidance**

***Summarize the process for advising and providing career guidance to students. Include information on how often students are advised, who provides the advising (program faculty, departmental, college or university advisor).***

As soon as students are admitted to the EOHS Program, they are assigned a full-time faculty member as an advisor by the Program Director. Upon the first registration, each student is given an email address and must register on the EOHS listserv. Non-degree students are monitored and advised by the Program Director.

According to the SPH procedure for student advisement, each faculty advisor must schedule at least one meeting each semester for the purpose of registering the student and discussing her/his progress toward the degree, satisfaction with the program and future plans. The administrative staff starts the process by reviewing the list of EOHS students and dividing them amongst the faculty. The administrative staff also posts a spreadsheet with all classes to be offered during the next semester and relevant information, including room location, time, and course identification number. Next, the administrative staff requests faculty availability for advisement hours and then posts those hours by email and on each faculty member's door. At the beginning of each advisement session, the advisor reviews the student's unofficial transcript. If there are no problems in the student's academic performance, then the faculty advisor is required to discuss feasible course options with the student and record the courses for which the student plans to register on a form provided from the program. The faculty advisor must also inquire about the student's plans for internship and post graduation employment. Finally, the advisor must ask if the student is having any academic difficulties at Hunter, and if so, assist the student in developing a plan to address the problem.

All EOHS faculty members must have office hours for at least two hours per week. Advisors' office hours and their office locations, phone numbers and email addresses are distributed to all students at the beginning of each semester.

#### **E. Work in Lieu of Courses**

***Summarize the requirements and process for awarding credit for work in lieu of courses. This could include such things as life experience, Advanced Placement, dual enrollment, test out, military experience, etc.***

There is no provision for allowing work experience to substitute for courses.

#### **F. Graduation Requirements**

***Summarize the graduation requirements for the program and the process for ensuring and documenting that each graduate completes all graduation requirements for the program. State the name of the degree awarded (Master of Science in Safety Sciences, Bachelor of Technology, Bachelor of Science in Computer Science, Bachelor of Science in Electrical Engineering, etc.)***

Students in the EOHS-MS degree program must complete at least 46 credits, including each EOHS required course, two EOHS electives, five public health core courses, Supervised

Fieldwork and Capstone with an average of B. In addition, the student must complete a Capstone paper with a grade of B or better on an industrial hygiene-related topic. The Capstone paper is initially reviewed by the Capstone Course faculty member supervising the student [almost always an EOHS program faculty member] and a second faculty member from the SPH Master's Degree program. The revised and final Capstone paper must be approved and graded by the Capstone faculty member supervising the student. Also, in addition, the student must pass a 100 question comprehensive exam.

Prior to graduation, students' transcripts must be audited by the Registrar's Office to assure that all requirements are met. When students are in the final semester of completing the requirements for graduation, each is required by Hunter College to fill out a Graduation Audit form listing all of the required and elective courses taken to meet the requirements for completion of the Masters degree. This form must be signed by the Program Director. Both the Program Director and the Graduation Audit Division of the Registrar's Office monitor the submission and contents of this form. If the form is not submitted, the student is informed by the Registrar's Office that he or she will not graduate until it is properly filed and completion of all course requirements has been verified. This assures that each graduating student has fulfilled all school and program requirements.

#### **G. Transcripts of Recent Graduates**

*The program will provide transcripts from some of the most recent graduates to the visiting team along with any needed explanation of how the transcripts are to be interpreted. These transcripts will be requested separately by the team chair. State how the program and any program options are designated on the transcript. (See 2013-2014 APPM, Section II.G.4.a.). Masters degree programs under review must also provide copies of the students' undergraduate academic transcripts that were used to make an admission decision.*

Transcripts of EOHS-MS graduates are endorsed to state that the student has received a MS-Env Occ Health Sci Degree. Transcripts and undergraduate transcripts will be provided to the site visit team.

**Table 1-1. Summary of Process Data Collection on Student Admission, Retention, and Graduation Requirements**

| Source  | Data Collected   | Collection Mode                                      | Frequency  |
|---|--|--|--|
| Application review for admissions                   | <ul style="list-style-type: none"> <li>• Undergraduate GPA</li> <li>• Undergraduate course requirements</li> <li>• GRE scores</li> <li>• TOEFL scores (if applicable)</li> <li>• Writing ability</li> <li>• Letters of recommendation</li> </ul> | Review of official materials provided                | Once per semester                                  |
| Student advisement sessions                         | <ul style="list-style-type: none"> <li>• Course satisfaction</li> <li>• Academic success</li> </ul>  | Anecdotal  | Once per semester                                  |
| EOHS student database                               | <ul style="list-style-type: none"> <li>• Student information (list of names for each major, GPA, etc.)</li> <li>• List of students who graduated with semester and year</li> </ul>   | Review of unofficial and official materials provided | Updated each semester                              |
| EOHS faculty meetings                               | <ul style="list-style-type: none"> <li>• Progress of students throughout semester</li> </ul>   | Anecdotal<br>Student grades                          | Scheduled<br>Monthly additional meetings as needed |
| Student meetings                                    | <ul style="list-style-type: none"> <li>• Adequacy of educational objectives</li> <li>• Course satisfaction</li> </ul>  | Anecdotal<br>Oral survey                             | Once per semester                                  |
| Registrar   | <ul style="list-style-type: none"> <li>• Current graduate GPA</li> <li>• Graduation audit form</li> </ul>  | Review of official materials provided                | Once per semester                                  |
| Institutional Research Department at Hunter College | <ul style="list-style-type: none"> <li>• Graduate student enrollment (numbers and FTEs) over last five years</li> <li>• Graduation rates</li> </ul>  | Review of official materials provided                | At least every five years                          |

## **CRITERION 2. PROGRAM EDUCATIONAL OBJECTIVES**

### **A. Mission Statement**

#### ***Provide the institutional mission statement***

The mission of the EOHS Program is to educate professionals to anticipate, identify, and assess environmental and workplace health hazards, recommend corrective measures and institute programs to reduce morbidity and mortality. As a component of the Hunter College School of Urban Public Health (SUPH), EOHS has a specific focus on hazards affecting urban populations.

The core of the EOHS mission is to educate our students to practice the four pillars of environmental and occupational hygiene practice: anticipation, recognition, evaluation, and control of environmental and occupational hazards. The classroom and research experiences are designed to provide students with the comprehensive background to practice environmental health and safety with competency while working with their counterparts in medicine, health education, nutrition, and disciplines in the health sciences to improve environmental conditions and population health.

The EOHS-MS Program mission statement was developed by reviewing both the core pillars of environmental and occupational hygiene practice and the existing mission statements for Hunter College and the CUNY SPH. The mission integrates the philosophy and values reflected in these previous documents with an emphasis on urban populations. This mission statement was reviewed by the EOHS and SUPH faculties, Dean of the CUNY SPH and Hunter College stakeholders and leadership. It is entirely congruent with the College, SPH and SUPH missions, provided below:

#### **Hunter College Mission**

Hunter College is a comprehensive teaching, research and service institution, long committed to excellence and access in the education of undergraduate and graduate students in the liberal arts and sciences, as well as in several professional fields: education, health sciences, nursing and social work.

Founded in 1870, Hunter is one of the oldest public colleges in the country, dedicated from its earliest days to serving a student body which reflects the diversity of New York City. Hunter takes pride in the success it has had over the years in enabling the people of New York to combine the strengths of their varied experiences with the skills they need to participate effectively in the wider society. Committed to the achievement of a pluralistic community, Hunter College offers a curriculum designed to meet the highest academic standards while also fostering understanding among groups from different racial, cultural and ethnic backgrounds. The goal of a Hunter College education is to encourage the fullest possible intellectual and personal growth in each student. While preparation for specific careers is an important objective of many programs, the fundamental aim of the college experience as a whole is to develop a student's rational, critical and creative powers. Such development involves the abilities to conceptualize and analyze, to relate the concrete and particular to the abstract and general, and

to think and write logically and coherently. It also includes a broadening and deepening of outlook: an awareness of one's own and other cultures as well as of the enduring questions and answers concerning being, purpose, and value that confront humanity. Finally, the educational experience at Hunter is intended to inspire a zest for learning as well as to bring the recognition that learning is pleasurable and knowledge is useful.

While teaching and research are its primary missions, community service is also an essential goal of the College. Hunter faculty seek to generate new knowledge and to design programs to address the myriad cultural, social and political needs of New York City and the world.

### **CUNY SPH Mission**

The mission of the CUNY SPH is to engage in teaching, research and service to create and sustain a healthier New York City and promote equitable, efficient, evidence-based solutions to pressing health problems facing urban populations around the world. To realize this mission, the SPH works with communities, non-profit and private organizations and government at all levels to build the capacities that help people to lead healthier and more productive lives. The ultimate goal of these activities is to improve the health of communities in New York City and beyond. During its first decade, the SPH will focus on four key themes that reflect critical public health challenges and that will guide the SPH's education, research and service activities that will (1) Contribute to healthier cities (2) Promote healthy aging through the lifespan (3) Prevent chronic diseases and improve their management and (4) Advance health equity

### **B. Program Educational Objectives**

*List the program educational objectives and state where these can be found by the general public*

The EOHS-MS program's 19 Educational Objectives may be characterized in four categories:

- Hazard Anticipation and Identification,
- Hazard Assessment,
- Hazard Control and Prevention, and
- Professional Development.

A matrix of these objectives and the EOHS-MS required courses that address each objective is presented at the end of this Section in Table 2-1. The general public can find the program educational objectives on the college website.

### **C. Consistency of the Program Educational Objectives with the Mission of the Institution**

*Describe how the program educational objectives are consistent with the mission of the institution*

The educational objectives were developed to fulfill the missions of the EOHS Program. Many are specific to the general mission and practice of environmental and occupational hygiene. Additional objectives reflect the SPH's urban focus, specifically the application of environmental and occupational hygiene practice in urban environments. As noted, the specific objectives can be grouped into four broad categories: hazard anticipation and identification, hazards assessment, hazard control and professional practice and context.

**Table 2-1. EOHS Required Courses and Related Educational Objectives.**

|  | <b>Educational Objective</b>   | <b>Biostat</b> | <b>Health Admin</b> | <b>Env. Hlth. &amp; Safety</b> | <b>Epi</b> | <b>Urban Health Society</b> | <b>Occup. Hlth &amp; Safety</b> | <b>IH Lab</b> | <b>Tox.</b> | <b>Vent.</b> | <b>IH</b> | <b>Field-work</b> | <b>Cap-stone</b> | <b>Physical Hazards</b> |
|--|--|----------------|---------------------|--------------------------------|------------|-----------------------------|---------------------------------|---------------|-------------|--------------|-----------|-------------------|------------------|-------------------------|
| <b><i>Hazard Anticipation and Identification</i></b> |  |                |                     |                                |            |                             |                                 |               |             |              |           |                   |                  |                         |
| 1  | Learn about common industrial processes, operations and manufacturing techniques found in the US.  |                |                     |                                |            |                             | X                               |               | X           |              | X         | X                 | X                | X                       |
| 2  | Study and assess occupational and environmental hazard notification systems such as MSDS and transportation placards.  |                |                     |                                |            |                             | X                               |               | X           |              |           |                   |                  |                         |
| 3  | Develop ability to identify, describe qualitatively, and quantify agents, factors, and stressors generated by and/or associated with defined sources, unit operations, and/or processes.                               |                |                     | X                              |            |                             | X                               |               | X           | X            | X         | X                 |                  | X                       |
| <b><i>Hazard Assessment</i></b>                      |  |                |                     |                                |            |                             |                                 |               |             |              |           |                   |                  |                         |
| 4  | Learn about physiological and/or toxic interactions of physical, chemical, biological, and ergonomic agents, factors, and/or stressors with the human body.  |                |                     | X                              |            |                             | X                               |               | X           |              | X         |                   |                  | X                       |
| 5  | Develop an understanding of the qualitative and quantitative aspects of exposure assessment, dose-response, and risk characterization based on applicable pathways and modes of entry.                                 |                |                     | X                              |            |                             | X                               |               | X           |              | X         |                   |                  | X                       |
| 6  | Learn the principles of operation, calibration, and methodology for using basic sampling instrumentation to detect chemical and physical agents in the work environment.   |                |                     |                                |            |                             |                                 | X             |             |              | X         |                   |                  | X                       |
| 7  | Learn to identify and apply appropriate standard sampling and analytical methods such as those developed by NIOSH, OSHA, and EPA.  |                |                     |                                |            |                             |                                 | X             |             |              | X         |                   |                  | X                       |
| 8  | Study the operation and use of various environmental labs including types of analysis, typical costs, sample submittal processes, quality assurance/quality control programs, and laboratory accreditation procedures. |                |                     |                                |            |                             |                                 | X             |             |              |           |                   |                  |                         |
| 9  | Learn to generate, review, interpret, and apply statistical and epidemiological data from published research.  | X              | X                   | X                              | X          | X                           |                                 | X             |             |              | X         |                   | X                |                         |
| <b><i>Hazard Control and Prevention</i></b>          |  |                |                     |                                |            |                             |                                 |               |             |              |           |                   |                  |                         |
| 10   | Learn the origin, scientific basis, interpretation, and application of various environmental and occupational exposure limits and be able to communicate that information to others.                                   |                |                     | X                              |            |                             | X                               |               | X           |              | X         |                   | X                |                         |

|                                 | <b>Educational Objective</b>  | <b>Biostat</b> | <b>Health Admin</b> | <b>Env. Hlth. &amp; Safety</b> | <b>Epi</b> | <b>Urban Health Society</b> | <b>Occup. Hlth &amp; Safety</b> | <b>IH Lab</b> | <b>Tox.</b> | <b>Vent.</b> | <b>IH</b> | <b>Field-work</b> | <b>Cap-stone</b> | <b>Physical Hazards</b> |
|---------------------------------|---|----------------|---------------------|--------------------------------|------------|-----------------------------|---------------------------------|---------------|-------------|--------------|-----------|-------------------|------------------|-------------------------|
| 11                              | Become skilled at evaluating, recommending, and putting into practice administrative and engineering controls and personal protective equipment to reduce or eliminate occupational hazards.  |                |                     |                                |            |                             |                                 |               | X           | X            | X         | X                 |                  | X                       |
| 12                              | Hone a combination of teamwork, business, and managerial skills to become active in the prudent development, implementation, and management of environmental and occupational hygiene-related programs.   |                | X                   | X                              |            | X                           |                                 |               |             |              |           | X                 |                  |                         |
| <b>Professional Development</b> |   |                |                     |                                |            |                             |                                 |               |             |              |           |                   |                  |                         |
| 13                              | Become proficient at preparing technical summaries and reports using the most current technology for managing and presenting data and incorporating appropriate data and observations from the peer-reviewed environmental and occupational hygiene community.                                      | X              | X                   | X                              | X          | X                           |                                 | X             |             | X            | X         | X                 | X                |                         |
| 14                              | Develop an understanding of the roles of city, state, and federal government in promoting health and preventing disease.  |                | X                   | X                              |            | X                           | X                               |               |             | X            | X         |                   |                  |                         |
| 15                              | Learn the fundamental aspects of safety and environmental health  |                |                     | X                              |            |                             | X                               |               |             |              | X         | X                 |                  |                         |
| 16                              | Develop an understanding of appropriate ethical practices in environmental and occupational hygiene.  |                |                     | X                              |            |                             | X                               |               |             |              | X         | X                 | x                |                         |
| 17                              | Develop a critical understanding of the multi-level problems important to delivery of environmental and occupational health services within a diverse urban community with various special needs and vulnerabilities and the history of those issues.   |                | X                   | X                              |            | X                           | X                               |               |             |              |           |                   | x                |                         |
| 18                              | Develop skills in diagnosing the strengths and problems of the urban environment and fostering programs to improve the health and welfare of urban communities and to influence institutional and public policy with the aim of improving the health of the urban environment and its constituents. |                | X                   | X                              |            | X                           | X                               |               |             |              |           |                   |                  |                         |
| 19                              | Acquire the knowledge needed to attain recognized professional certification.   | X              |                     | X                              | X          |                             | X                               | X             | X           | X            | X         | X                 | X                | X                       |

#### **D. Program Constituencies**

*List the program constituencies. Describe how the program educational objectives meet the needs of these constituencies*

The constituencies of the EOHS-MS program are diverse. First are the EOHS graduate students, who typically are urban young adults who live and went to college in the New York (NY) / New Jersey (NJ) metropolitan region. These students are most often mature college graduates with several years of work experience either in the occupational and/or environmental field or in other science-related occupations.

In addition to our students, the nearly 500 graduates of the EOHS-MS program over the last three decades are an important constituency of the program. Most of our graduates remain in the NY/NJ Metropolitan area after graduation and maintain close contact with the EOHS faculty. Many of these graduates still consult their former faculty members about jobs (the Program maintains an active job board and alumni email listserv), and request letters of support for jobs, certification applications, and doctoral level study. They remain keenly interested in the program and had been very influential in persuading the program to seek ABET accreditation. We also frequently interact with graduates through affiliation with the Metro NYC Chapter of the American Industrial Hygiene Association (AIHA).

Another vital constituency is the group of private and public sector professionals who employ our students for internships (fieldwork) and after graduation. We regularly speak with them while giving references for interns and possible new hires of Hunter graduates and in other professional venues. During those occasions, we take the opportunity to ask the employers how our former students are doing and what skills they either find missing or in need of improvement among our graduates. EOHS faculty believes that the employability of our graduates is a paramount factor in measuring the program's success.

Environmental and occupational health and safety professionals in the NYC metropolitan area are also an important constituency for the program; their collective judgment about the professional abilities and outcomes of our graduates is the reason why they hire our graduates. These professionals include members of the Metro Chapter of AIHA, our colleagues in the National Institute for Occupational Safety and Health (NIOSH) New York-New Jersey Educational Research Center (ERC), the members of the American Society of Safety Engineers (ASSE), and academic colleagues at Mt. Sinai Medical School, Robert Wood Johnson Medical School (RWJ), New York University (NYU), New Jersey Institute of Technology (NJIT), and the University of Medicine and Dentistry (UMDNJ) of New Jersey.

The EOHS Advisory Board (EAB) forms a special component of NYC professionals. The EAB is intended to meet once every 1-2 years with the EOHS faculty to discuss new trends in the field of environmental and occupational hygiene practice, issues in recruitment, retention, and providing internships and full-time employment to students and graduates of the program. In order to become a member of the EAB must have extensive experience in environmental and occupational health and safety in a supervisory position and practice in the metropolitan NYC region. This requirement is essential for EAB members to lend advice regarding the knowledge essential for EOHS graduates to make valuable contributions to their workplace. A potential

EAB member may be nominated by any of the EOHS faculty. The nomination begins with one of the EOHS faculty recommending an environmental and occupational health and safety professional to the rest of the faculty during an EOHS faculty meeting or via email. The faculty will discuss the potential addition to the Board. If the majority of faculty agree with the appointment, the EOHS faculty member who made the nomination will contact that individual and invite them to join the Board. There is no limitation to the term of service on the EAB.

Members of the SUPH and SPH administration and the Hunter College Faculty Senate are also important constituencies. For example, policies regarding student advisement, admission, handling of academic dishonesty cases, student exemptions from the EOHS-MS curriculum, graduation audit, and other faculty responsibilities are established by these bodies. The UPH and SPH administration are advocates for the program; they obtain needed support from the administration of Hunter College and CUNY and support efforts to develop externally funded activities.

Finally, our faculty colleagues within Hunter College and the larger CUNY compose another constituency. They refer students to us, offer courses taken as electives by our students, and work with EOHS faculty on college-wide and university-wide initiatives. For example, Dr. Klitzman has been instrumental in the development of curriculum for the CUNY-wide Doctor of Public Health program and is the Associate Dean for Academic Affairs for the SPH. Dr. Mirer was named a 2007 Hunter College Roosevelt Center for Public Policy Faculty Associate and in this position, maintains intellectual interaction with faculty across the College. These activities help to broaden our impact across CUNY and introduce more individuals to the field of environmental and occupational hygiene.

#### **E. Process for Review of the Program Educational Objectives**

*Describe the process that periodically reviews the program educational objectives including how the program's various constituencies are involved in this process. Describe how this process is systematically utilized to ensure that the program's educational objectives remain consistent with the institutional mission, the program constituents' needs and these criteria*

In the 2006-2007 academic year the EOHS faculty set out 19 broad educational objectives for the program. These objectives are based on the ABET objectives and have remained unchanged as the ABET objectives have remained unchanged. These objectives are classified according to the established environmental and occupational hygiene mission of preparing students to anticipate, recognize, evaluate, and control chemical, biological, physical, and safety hazards and to provide a broad foundation in urban public health and general skills in applied science. The sources of information and processes used for defining, adding and/or modifying educational objectives are described below:

- Existing educational objectives and outcomes published by the dominant professional societies such as American Industrial Hygiene Association, American Board of Industrial Hygiene, American Conference of Governmental Industrial Hygienists, and the Accreditation Board for Engineering and Technology are reviewed.

- Student advisement meetings are conducted each semester. In addition to discussion of appropriate coursework for the student, the faculty member is required by the CUNY SPH advisement procedure to ask the student about his or her personal educational and career objectives. These impressions help faculty identify educational objectives of the EOHS MS.
- Faculty awareness of EOHS trends informs the process. Each faculty member is active in his/her own specialty area and therefore helps to identify new needs in our educational objectives.
- Identification of the objectives and outcomes of similar programs nationwide in environmental and occupational health sciences also guides the process of establishing objectives. Faculty members periodically communicate with professionals in these programs and discuss the merits and disadvantages of the programs and how well the objectives of the programs prepare students for professional practice.
- Employers of EOHS students have several mechanisms for input into the creation or modification of educational objectives. Many of these employers are members of the local Metro New York City American Industrial Hygiene Association, where informal discussions on the caliber of Hunter College EOHS students occur and advice is passed on. Also, since many employers look to Hunter College when positions become available, the EOHS program becomes the major recruitment base for entry-level environmental and occupational hygiene professionals. This mechanism helps to keep the EOHS faculty apprised of the skills and outcomes needed in the changing workplace.
- The EAB provides insight into trends and considerations for the practice of environmental and occupational hygiene. Their specific insight is useful in establishing the broad educational goals of EOHS-MS students.
- SUPH initiatives have played an important role in the development of EOHS-MS educational objectives. The SUPH is accredited by CEPH, and has developed a number of educational objectives for its MPH degree tracks. Some of these educational objectives have been adopted from the MPH degree to ensure that all graduates from the SUPH share a core set of skills and outcomes.
- NIOSH ERC has for the past 30 years specifically reviewed the EOHS-MS degree program every three to five years, as part of its overall evaluation of the NY/ NJ Education and Research Center (ERC). Besides suggestions offered during the site visit, they review results in a written assessment of our program and may include suggestions for amplifying or redefining one or more of the educational objectives.
- The annual one-day meeting of all ERC Industrial Hygiene academic program directors in the U.S allows the Program Director to interact with other leading academics in this field and share goals and objectives.

Information from any of these sources relevant to the development of educational objectives is presented by a faculty member to the rest of the EOHS faculty at monthly meetings. The process for this discussion is as follows: the faculty member with relevant information will inform the Program Director, who will then add the discussion item to the next faculty meeting agenda if he agrees that it is relevant. All EOHS faculty present at that meeting will discuss the merits of the information as relevant to the development of students' broad understanding and technical skills. If the faculty as a whole sees a benefit to pursuing the topic, then one-to-two faculty members may follow up with more detailed study of the issue, suggestions for how that specific consideration may be used to develop an educational objective, and a draft objective. That draft

objective will then be introduced at a subsequent EOHS meeting for further discussion. The faculty discussion will result in three potential outcomes: acceptance, decline, or further study. If further study is elected, then the topic will be added to the next meeting agenda for further discussion.

The EOHS-MS educational objectives are designed to produce graduates who have a core set of outcomes to practice environmental and occupational hygiene and apply general scientific processes. Results obtained from the following short-term and longer-term assessments are used by faculty and administrators to document successes and shortcomings of the educational objectives and to implement changes:

- The EOHS Program Director reviews the performance of each student and asks each faculty member to report on students' progress in meeting educational objectives in the classes he or she is teaching and whether there are any systemic problems in meeting educational objectives (each semester).
- Faculty members seek feedback from students during individual advisement sessions each semester (each semester).
- The College provides the anonymous results of student evaluations to each faculty member and to the Program Director for review (at the end of each semester).
- The Capstone Faculty member and one additional faculty member read each capstone paper and evaluate the extent to which students' demonstrate mastery of EOHS educational objectives. As part of the capstone, students are asked to evaluate the extent to which specific courses prepared them for this experience (each semester). Among the capstone requirements, each student is required to submit a portfolio that includes an evaluation and documentation of achievement of program objectives.
- EOHS faculty members meet with the EAB to provide an update on the program (including evaluation results) and to seek their feedback and advice on a range of issues, including educational objectives. The EAB shares insights regarding how important trends in environmental and occupational hygiene practice should be covered in the curriculum, how the program should respond to changes in the practice of environmental and occupational hygiene and other related issues (once every 1-2 years).
- Comprehensive surveys of students, alumni, and EOHS professionals, including those who hire graduates of the EOHS program, aid in the evaluation of the educational objectives. In the surveys, respondents are asked to rate each program outcome according to whether they perceive it to be "essential", "useful", or "not necessary" for the practice of environmental and occupational hygiene. The results are then compared with nationally published data. Data regarding the importance of each outcome is then used to examine the broad objectives designed to produce those outcomes (every six years).
- Results regarding educational objectives gathered from student surveys are presented to faculty and the EAB for review and discussion.

Discussion of the information obtained through any of the various sources is added to the next EOHS faculty meeting agenda to determine if the discussion items are actionable and, if so, what appropriate measures should be taken. If necessary, discussion of the relevant item is continued over multiple faculty meetings until a decision is made to resolve the matter, gather more information, or dismiss the item.

## CRITERION 3. STUDENT OUTCOMES

### **A. Process for the Establishment and Revision of the Student Outcomes**

*Describe the process used for establishing and revising student outcomes*

#### **Establishing General Program Outcomes (ASAC-ABET General Program)**

The ABET General Outcomes for Applied Science Programs have remained relatively unchanged since the previous 2007 accreditation cycle. Applied science programs must demonstrate that graduates have:

- a. an ability to apply knowledge of mathematics, science, and applied sciences;
- b. an ability to design and conduct experiments, as well as to analyze and interpret data;
- c. an ability to formulate or design a system, process or program to meet desired needs;
- d. an ability to function on multi-disciplinary teams;
- e. an ability to identify and solve applied science problems;
- f. an understanding of professional and ethical responsibility;
- g. an ability to communicate effectively;
- h. the broad education necessary to understand the impact of solutions in a global and societal context;
- i. a recognition of the need for, and an ability to engage in life-long learning;
- j. a knowledge of contemporary issues; and,
- k. an ability to use the techniques, skills, and modern scientific and technical tools necessary for professional practice.

#### **Establishing Specific Program Outcomes (ASAC-ABET Specific Program)**

In addition to the General Program Outcomes listed above, ABET has generated Specific Program Outcomes for Graduate Industrial Hygiene Programs, which have also remained unchanged since 2007. These Outcomes are listed below. Given that the EOHS program is a component of the SPH, the faculty have adopted additional outcomes specific to the mission of the SUPH. These outcomes have been appended and are listed as (k) and (l). Environmental and occupational hygiene graduates must be able to:

- a. describe common industrial processes, operations and manufacturing techniques found in the U.S.;
- b. describe qualitative and quantitative aspects of generation of agents, factors, and stressors;
- c. understand physiological and/or toxicological interactions of physical, chemical, biological, and ergonomic agents, factors, and/or stressors within the human body;
- d. assess qualitative and quantitative aspects of exposure assessment, dose-response, and risk characterization based on applicable pathways and modes of entry;
- e. calculate, interpret, and apply statistical and epidemiological data;
- f. recommend and evaluate engineering, administrative, and personal protective equipment controls and/or other interventions to reduce or eliminate hazards;
- g. demonstrate an understanding of applicable business and managerial practices;

- h. interpret and apply applicable occupational and environmental regulations;
- i. understand fundamental aspects of safety and environmental health;
- j. attain recognized professional certification;
- k. understand the particular public health problems of urban communities; and,
- l. demonstrate an ability to apply public health knowledge to help promote health and prevent disease among urban populations.

### **Revising Program Outcomes**

The majority of the EOHS Program Outcomes originate from ASAC-ABET criteria. All outcomes were left unchanged from our 2007 accreditation report. This was intentionally done to continue to collect experience with current ABET and SUPH outcomes. The faculty agrees that Hunter should at minimum maintain the ASAC-ABET criteria for Program Outcomes, which are designed to produce graduates from accredited programs across the country with a common set of skills. Furthermore, the Hunter EOHS faculty feel that it needs several more years of maintenance of the ABET accreditation, beyond the two cycles through which the program has gone, to determine if changes to the Program Outcomes are necessary. Outcomes specific to the SUPH were added to the ASAC-ABET criteria to prepare Hunter EOHS-MS graduates for serving the unique needs of the metropolitan New York City community. The faculty may consider additional specific program outcomes in the future after reviewing survey data and considering input from the EAB, SUPH and SPH administration, students, and other important constituencies. The process for revising Program Outcomes involves collecting data from diverse sources and consulting with the following persons or groups listed below:

- SUPH/SPH (Interim Dean, Dr. Neal Cohen),
- SPH Associate Dean for Academic Affairs (Dr. Susan Klitzman),
- SUPH Campus Director, Hunter Campus (Dr. Stacy Plichta),
- SUPH Program Directors:
  - Community Health Education (Dr. Martha Crum)
  - Public Health Nutrition (Dr. Khursheed Navder)
  - Epidemiology and Biostatistics (Dr. Lorna Thorpe)
  - Environmental and Occupational Health Sciences (Dr. Jack Caravanos)
  - Health Policy and Management (Dr. Barbara Berney)
- EOHS Program Director (Dr. Jack Caravanos)
- EOHS Advisory Board
- Annual NIOSH sponsored meeting of Industrial Hygiene program directors, and
- Annual Academic Special Interest Group (SIG) at the American Industrial Hygiene Conference and Exposition (AIHCE).

Additionally, we will be monitoring ABET accreditation criteria in the event that ASAC modifies the General and Program-Specific Outcomes.

### **B. Student Outcomes**

*List the student outcomes for the program and describe their relationship to those in Criterion 3 of the general criteria and any applicable program criteria. Display this information in Table 3-1. Indicate where the student outcomes are documented.*

## **Documentation**

At the anticipated site visit, the EOHS Program will make available a number of documents and materials for review. These documents demonstrate achievement of both General and Specific Program Outcomes. At a minimum, the following will be provided:

- EOHS Comprehensive Exam
- A list of the known employment status of alumni of the ABET EOHS-MS program
- Names of EOHS program graduates who have achieved appropriate certifications
- Membership and officer rosters of NYC Metro Chapter of AIHA with designation of Hunter graduates in the chapter
- List of current Advisory Board Members with agendas and minutes from recent meetings
- Results from surveys of environmental and occupational hygiene professionals in the NYC metropolitan area and alumni of the ABET accredited EOHS-MS program (examples of alumni survey questions from 2009 are provided in Appendix E)
- Relevant CUNY SPH and Hunter College SUPH procedures and policies

The SPH employs multiple methods to monitor and evaluate individual student progress in achieving the expected outcomes of the EOHS-MS program. Each program director works closely with the dean, associate dean of academic affairs and the designated assessment coordinator to ensure that a rigorous cycle of assessment occurs annually. Key to this process is the assessment committee established in 2011. Once assessment tools have been developed, the committee conducts routine assessment, evaluations and dissemination of results and makes recommendations for program improvements based on the findings. The elected membership of this committee consists of at least one faculty member and one student representative from each of the degree specializations, in addition to the assessment and curriculum Coordinator. Tables 4-1 and 4-2 in Criterion 4 describe the MS program evaluation tools and benchmarks, including the frequency of assessments, as well as what, how and where outcome assessment data will be collected. In addition, these tables illustrate the feedback process described below for specific evaluation benchmarks and constituencies of the program.

The assessment results have been used by the EOHS faculty to implement changes in degree requirements, curriculum, and course content described in detail in Criterion 4, Continuous Improvement. Examples include:

- Enhancing the culminating experience by adding an additional required Supervised Fieldwork course (PH 737) and realigning the former fieldwork and capstone combined course with the Capstone Seminar (PH 738)
- Adding elements of program planning and management, including lectures, to the Supervised Fieldwork course (PH 737)
- Enhancing the content in ergonomics by adding implementing the ergonomics course (EOHS 714) as an elective in summer 2013 and by adding content on the ergonomic stressors of heat and vibration to the Physical Hazards course (EOHS 762)
- Enhancing the application of legal issues by adding a faculty member with specific legal training and experience

Table 3-3 lists some of the formalized data collection procedures established to ensure that the Program Outcomes are assessed. The purpose of these assessment processes is to identify important pedagogical, programmatic, and professional successes and shortcomings are identified, and that recommendations for improvement are identified and addressed. This is generally referred to as “closing the loop”. This is further discussed in Criterion 4, Continuous Improvement. The data gathering portion of the process involves the following sequence of events:

1. *Identifying an idea, issue, or problem:*

This is largely based on anecdotal information gleaned from a variety of sources, such as a student or an alumni’s comment in an email or professional meeting, discussion during a faculty meeting, observations from professional meetings (e.g. the American Industrial Hygiene Conference and Exposition, NIOSH Annual Program Director’s Meeting), reading from professional journal, from an employer’s or student’s comment, and from ideas generated at EAB or EOHS faculty meetings.

2. *Exploring whether the idea has merit or general faculty/professional support:*

The EOHS faculty member who identifies the issue will first present it to colleagues in a meeting. They will discuss the merits to determine whether more information is needed to make an informed judgment. If necessary, the EOHS faculty will determine a process or method of collecting more information regarding the nature and extent of the issue. This may include seeking input from the EAB; surveying students, alumni or employers; soliciting collegial input; or reviewing data from professional organizations, the peer-reviewed literature, or other appropriate sources.

3. *Analyzing the data:*

One or two faculty members will summarize any qualitative and/or quantitative data obtained regarding the particular issue. These data will first be presented to the EOHS faculty in a meeting. Once the EOHS faculty members have thoroughly discussed the issue, data may also be presented to other constituencies, such as the Campus Director, Dean or Associate Deans or EAB members, and possible action steps (e.g. curriculum revisions) discussed.

Generating a proposal that incorporates the issue or idea as an actionable item constitutes the final step in the feedback loop process. A course of action may vary from incorporation of new subject matter into an existing course, to pursuit of a curricular change. These curricular changes would be made with the intent of producing graduates with the accepted set of outcomes. If minor changes to one or more particular courses are warranted, this can be done under consultation between the various faculty members. If broad curriculum changes are needed, then the EOHS faculty must follow the procedure established by the Office of the Hunter College Senate for Preparing and Submitting Curriculum Proposals for College Approval.

If a decision was made to implement a change related to the issue, then after a prescribed time, to be determined by the EOHS faculty depending on the situation, this decision must be evaluated to assess the course of action taken. This includes gathering and analyzing data of a similar vein to those used to inform the initial decision.

**C. Relationship of Student Outcomes to Program Educational Objectives**

Tables 3-1 and 3-2 demonstrate how the educational objectives delivered by each required course in the curriculum are designed to assure particular outcomes in graduates of the EOHS-MS program. Each table is arranged by course to illustrate expected learning objectives derived from each component of the curriculum. Table 3-1 matches the General Program Criteria, a-k, with the individual course learning objectives. Table 3-2 matches the Program Specific Outcomes, a-I, with the individual course learning objectives.

**Table 3-1. Correlation of Course Learning Objectives with General Program Outcomes**

**EOHS 702 Introduction to Occ Health & Safety 3 cr, Instructor: Sembajwe**

| Course Educational Objectives   | General Program Criteria |   |   |   |   |   |   |   |   |   |   |
|---|--------------------------|---|---|---|---|---|---|---|---|---|---|
|   | a                        | b | c | d | e | f | g | h | i | j | k |
| 1. Learn about common industrial processes, operations and manufacturing techniques found in the US.  | X                        |   | X |   | X |   |   |   |   | X |   |
| 2. Study and assess occupational and environmental hazard notification systems such as MSDS and transportation placards.  |                          |   |   |   |   |   |   |   |   |   | X |
| 3. Develop ability to identify, describe qualitatively, and quantify agents, factors, and stressors generated by and/or associated with defined sources, unit operations, and/or processes.   | X                        | X | X |   | X |   | X |   |   |   | X |
| 4. Learn about physiological and/or toxic interactions of physical, chemical, biological, and ergonomic agents, factors, and/or stressors with the human body.  | X                        | X | X |   | X |   |   | X |   | X | X |
| 5. Develop an understanding of the qualitative and quantitative aspects of exposure assessment, dose-response, and risk characterization based on applicable pathways and modes of entry.   |                          | X | X |   | X | X |   | X |   | X | X |
| 10. Learn the origin, scientific basis, interpretation, and application of various environmental and occupational exposure limits and be able to communicate that information to others.  |                          | X | X | X | X | X | X | X |   | X | X |
| 14. Develop an understanding of the roles of city, state, and federal government in promoting health and preventing disease.  |                          |   | X | X | X | X |   | X | X | X | X |
| 15. Learn the fundamental aspects of safety and environmental health  |                          | X | X | X | X | X |   | X | X | X |   |
| 16. Develop an understanding of appropriate ethical practices in Industrial Hygiene.  |                          | X | X | X | X | X |   | X |   | X | X |
| 17. Develop a critical understanding of the multi-level problems important to delivery of environmental and occupational health services within a diverse urban community with various special needs and vulnerabilities and the history of those issues. |                          |   | X | X | X | X |   | X | X | X |   |

| Course Educational Objectives   | General Program Criteria |   |   |   |   |   |   |   |   |   |   |
|---|--------------------------|---|---|---|---|---|---|---|---|---|---|
|   | a                        | b | c | d | e | f | g | h | i | j | k |
| 18. Develop skills in diagnosing the strengths and problems of the urban environment and fostering programs to improve the health and welfare of urban communities and to influence institutional and public policy with the aim of improving the health of the urban environment and its constituents. |                          |   | X | X | X | X |   | X | X | X |   |
| 19. Acquire the knowledge needed to attain recognized professional certification.   |                          |   |   | X | X | X |   | X | X |   | X |

**EOHS 741 Env & Industrial Hygiene Laboratory 4 cr, Instructors: Caravanos / DeVito**

| Course Educational Objectives  | General Program Criteria |   |   |   |   |   |   |   |   |   |   |
|--|--------------------------|---|---|---|---|---|---|---|---|---|---|
|  | a                        | b | c | d | e | f | g | h | i | j | k |
| 6. Learn the principles of operation, calibration, and methodology for using basic sampling instrumentation to detect chemical and physical agents in the work environment.  | X                        | X |   |   | X | X |   |   |   |   | X |
| 7. Learn to identify and apply appropriate standard sampling and analytical methods such as those developed by NIOSH, OSHA, and EPA.   |                          | X | X | X | X | X |   | X |   |   | X |
| 8. Study the operation and use of various environmental labs including types of analysis, typical costs, sample submittal processes, quality assurance/quality control programs, and laboratory accreditation procedures.  |                          | X | X |   | X | X |   | X |   |   | X |
| 9. Learn to generate, review, interpret, and apply statistical and epidemiological data from published research.   | X                        | X | X |   | X | X |   | X |   |   | X |
| 13. Become proficient at preparing technical summaries and reports using the most current technology for managing and presenting data and incorporating appropriate data and observations from the peer-reviewed environmental and occupational hygiene community. |                          | X |   | X |   |   | X | X |   |   | X |
| 19. Acquire the knowledge needed to attain recognized professional certification.  |                          |   |   | X | X | X |   | X | X |   | X |

**EOHS 754 Environmental & Occupational Toxicology 3 cr, Instructor: Mirer**

| Course Educational Objectives | General Program Criteria |   |   |   |   |   |   |   |   |   |   |
|-------------------------------|--------------------------|---|---|---|---|---|---|---|---|---|---|
|                               | a                        | b | c | d | e | f | g | h | i | j | k |

| Course Educational Objectives  | General Program Criteria |   |   |   |   |   |   |   |   |   |   |
|--|--------------------------|---|---|---|---|---|---|---|---|---|---|
|  | a                        | b | c | d | e | f | g | h | i | j | k |
| 2. Study and assess occupational and environmental hazard notification systems such as MSDS and transportation placards.   |                          |   |   |   |   |   |   |   |   |   | X |
| 4. Learn about physiological and/or toxic interactions of physical, chemical, biological, and ergonomic agents, factors, and/or stressors with the human body.                                   | X                        | X | X |   | X |   |   | X |   | X | X |
| 5. Develop an understanding of the qualitative and quantitative aspects of exposure assessment, dose-response, and risk characterization based on applicable pathways and modes of entry.        |                          | X | X |   | X | X |   | X |   | X | X |
| 10. Learn the origin, scientific basis, interpretation, and application of various environmental and occupational exposure limits and be able to communicate that information to others.         |                          | X | X | X | X | X | X | X |   | X | X |
| 11. Become skilled at evaluating, recommending, and putting into practice administrative and engineering controls and personal protective equipment to reduce or eliminate occupational hazards. | X                        | X | X | X | X | X |   |   |   |   | X |
| 19. Acquire the knowledge needed to attain recognized professional certification.  |                          |   |   | X | X | X |   | X | X |   | X |

**EOHS 755 Industrial Ventilation and Engineering Controls 3 cr, Instructor: Sembajwe**

| Course Educational Objectives  | General Program Criteria |   |   |   |   |   |   |   |   |   |   |
|--|--------------------------|---|---|---|---|---|---|---|---|---|---|
|  | a                        | b | c | d | e | f | g | h | i | j | k |
| 3. Develop ability to identify, describe qualitatively, and quantify agents, factors, and stressors generated by and/or associated with defined sources, unit operations, and/or processes.      | X                        | X | X |   | X |   | X |   |   |   | X |
| 11. Become skilled at evaluating, recommending, and putting into practice administrative and engineering controls and personal protective equipment to reduce or eliminate occupational hazards. | X                        | X | X | X | X | X |   |   |   |   | X |
| 19. Acquire the knowledge needed to attain recognized professional certification.  |                          |   |   | X | X | X |   | X | X |   | X |

**EOHS 757 Principles of Industrial Hygiene 3 cr, Instructor: Goldberg**

| Course Educational Objectives  | General Program Criteria |   |   |   |   |   |   |   |   |   |   |
|--|--------------------------|---|---|---|---|---|---|---|---|---|---|
|  | a                        | b | c | d | e | f | g | h | i | j | k |
| 1. Learn about common industrial processes, operations and manufacturing techniques found in the US. | X                        |   | X |   | X |   |   |   |   | X |   |

| Course Educational Objectives  | General Program Criteria |   |   |   |   |   |   |   |   |   |   |
|--|--------------------------|---|---|---|---|---|---|---|---|---|---|
|  | a                        | b | c | d | e | f | g | h | i | j | k |
| 3. Develop ability to identify, describe qualitatively, and quantify agents, factors, and stressors generated by and/or associated with defined sources, unit operations, and/or processes.  | X                        | X | X |   | X |   | X |   |   |   | X |
| 4. Learn about physiological and/or toxic interactions of physical, chemical, biological, and ergonomic agents, factors, and/or stressors with the human body.   | X                        | X | X |   | X |   |   | X |   | X | X |
| 5. Develop an understanding of the qualitative and quantitative aspects of exposure assessment, dose-response, and risk characterization based on applicable pathways and modes of entry.  |                          | X | X |   | X | X |   | X |   | X | X |
| 6. Learn the principles of operation, calibration, and methodology for using basic sampling instrumentation to detect chemical and physical agents in the work environment.  | X                        | X |   |   | X | X |   |   |   |   | X |
| 7. Learn to identify and apply appropriate standard sampling and analytical methods such as those developed by NIOSH, OSHA, and EPA.   |                          | X | X | X | X | X |   | X |   |   | X |
| 9. Learn to generate, review, interpret, and apply statistical and epidemiological data from published research.   | X                        | X | X |   | X | X |   | X |   |   | X |
| 10. Learn the origin, scientific basis, interpretation, and application of various environmental and occupational exposure limits and be able to communicate that information to others.   |                          | X | X | X | X | X | X | X |   | X | X |
| 11. Become skilled at evaluating, recommending, and putting into practice administrative and engineering controls and personal protective equipment to reduce or eliminate occupational hazards.   | X                        | X | X | X | X | X |   |   |   |   | X |
| 13. Become proficient at preparing technical summaries and reports using the most current technology for managing and presenting data and incorporating appropriate data and observations from the peer-reviewed environmental and occupational hygiene community. |                          | X |   | X |   |   | X | X |   |   | X |
| 14. Develop an understanding of the roles of city, state, and federal government in promoting health and preventing disease.   |                          |   | X | X | X | X |   | X | X | X | X |
| 15. Learn the fundamental aspects of safety and environmental health   |                          | X | X | X | X | X |   | X | X | X |   |
| 16. Develop an understanding of appropriate ethical practices in Industrial Hygiene.   |                          | X | X | X | X | X |   | X |   | X | X |
| 19. Acquire the knowledge needed to attain recognized professional certification.  |                          |   |   | X | X | X |   | X | X |   | X |

**EOHS 762 Physical Hazards 3 cr, Instructor: Sembajwe**

| Course Educational Objectives  | General Program Criteria |   |   |   |   |   |   |   |   |   |   |
|--|--------------------------|---|---|---|---|---|---|---|---|---|---|
|  | a                        | b | c | d | e | f | g | h | i | j | k |
| 1. Learn about common industrial processes, operations and manufacturing techniques found in the US.   | X                        |   | X |   | X |   |   |   |   | X |   |
| 3. Develop ability to identify, describe qualitatively, and quantify agents, factors, and stressors generated by and/or associated with defined sources, unit operations, and/or processes.      | X                        | X | X |   | X |   | X |   |   |   | X |
| 4. Learn about physiological and/or toxic interactions of physical, chemical, biological, and ergonomic agents, factors, and/or stressors with the human body.                                   | X                        | X | X |   | X |   |   | X |   | X | X |
| 5. Develop an understanding of the qualitative and quantitative aspects of exposure assessment, dose-response, and risk characterization based on applicable pathways and modes of entry.        |                          | X | X |   | X | X |   | X |   | X | X |
| 6. Learn the principles of operation, calibration, and methodology for using basic sampling instrumentation to detect chemical and physical agents in the work environment.                      | X                        | X |   |   | X | X |   |   |   |   | X |
| 7. Learn to identify and apply appropriate standard sampling and analytical methods such as those developed by NIOSH, OSHA, and EPA.   |                          | X | X | X | X | X |   | X |   |   | X |
| 11. Become skilled at evaluating, recommending, and putting into practice administrative and engineering controls and personal protective equipment to reduce or eliminate occupational hazards. | X                        | X | X | X | X | X |   |   |   |   | X |
| 19. Acquire the knowledge needed to attain recognized professional certification.  |                          |   |   | X | X | X |   | X | X |   | X |

**PH 737 Supervised Fieldwork 3 cr, Instructor: Mirer**

| Course Educational Objectives  | General Program Criteria |   |   |   |   |   |   |   |   |   |   |
|--|--------------------------|---|---|---|---|---|---|---|---|---|---|
|  | a                        | b | c | d | e | f | g | h | i | J | k |
| 1. Learn about common industrial processes, operations and manufacturing techniques found in the US.   | X                        |   | X |   | X |   |   |   |   | X |   |
| 9. Learn to generate, review, interpret, and apply statistical and epidemiological data from published research.   | X                        | X | X |   | X | X |   | X |   |   | X |
| 10. Learn the origin, scientific basis, interpretation, and application of various environmental and occupational exposure limits and be able to communicate that information to others.   |                          | X | X | X | X | X | X | X |   | X | X |
| 13. Become proficient at preparing technical summaries and reports using the most current technology for managing and presenting data and incorporating appropriate data and observations from the peer-reviewed environmental and |                          | X |   | X |   |   | X | X |   |   | X |

| Course Educational Objectives   | General Program Criteria |   |   |   |   |   |   |   |   |   |   |
|---|--------------------------|---|---|---|---|---|---|---|---|---|---|
|   | a                        | b | c | d | e | f | g | h | i | J | k |
| occupational hygiene community.   |                          |   |   |   |   |   |   |   |   |   |   |
| 19. Acquire the knowledge needed to attain recognized professional certification. |                          |   |   | X | X | X |   | X | X |   | X |
|   |                          |   |   |   |   |   |   |   |   |   |   |

**PH 738 Capstone Seminar 3 cr, Instructor: Mirer**

| Course Educational Objectives  | General Program Criteria |   |   |   |   |   |   |   |   |   |   |
|--|--------------------------|---|---|---|---|---|---|---|---|---|---|
|  | a                        | b | c | d | e | f | g | h | i | J | k |
| 1. Learn about common industrial processes, operations and manufacturing techniques found in the US.   | X                        |   | X |   | X |   |   |   |   | X |   |
| 9. Learn to generate, review, interpret, and apply statistical and epidemiological data from published research.   | X                        | X | X |   | X | X |   | X |   |   | X |
| 10. Learn the origin, scientific basis, interpretation, and application of various environmental and occupational exposure limits and be able to communicate that information to others.   |                          | X | X | X | X | X | X | X |   | X | X |
| 13. Become proficient at preparing technical summaries and reports using the most current technology for managing and presenting data and incorporating appropriate data and observations from the peer-reviewed environmental and occupational hygiene community. |                          | X |   | X |   |   | X | X |   |   | X |
| 19. Acquire the knowledge needed to attain recognized professional certification.  |                          |   |   | X | X | X |   | X | X |   | X |

**PH 750 / 752 Intro Biostatistics & Intro Epidemiology 3 cr each, Instructor: Yang/Dowd**

| Course Educational Objectives  | General Program Criteria |   |   |   |   |   |   |   |   |   |   |
|--|--------------------------|---|---|---|---|---|---|---|---|---|---|
|  | a                        | b | c | d | e | f | g | h | i | j | k |
| 9. Learn to generate, review, interpret, and apply statistical and epidemiological data from published research.   | X                        | X | X |   | X | X |   | X |   |   | X |
| 13. Become proficient at preparing technical summaries and reports using the most current technology for managing and presenting data and incorporating appropriate data and observations from the peer-reviewed environmental and occupational hygiene community. |                          | X |   | X |   |   | X | X |   |   | X |
| 19. Acquire the knowledge needed to attain recognized professional certification.  |                          |   |   | X | X | X |   | X | X |   | X |

**PH 754 Environmental Health & Safety 3 cr, Instructor: Caravanos / Geltman**

| Course Educational Objectives   | General Program Criteria |   |   |   |   |   |   |   |   |   |   |
|---|--------------------------|---|---|---|---|---|---|---|---|---|---|
|   | a                        | b | c | d | e | f | g | h | i | j | k |
| 3. Develop ability to identify, describe qualitatively, and quantify agents, factors, and stressors generated by and/or associated with defined sources, unit operations, and/or processes.   | X                        | X | X |   | X |   | X |   |   |   | X |
| 4. Learn about physiological and/or toxic interactions of physical, chemical, biological, and ergonomic agents, factors, and/or stressors with the human body.  | X                        | X | X |   | X |   |   | X |   | X | X |
| 5. Develop an understanding of the qualitative and quantitative aspects of exposure assessment, dose-response, and risk characterization based on applicable pathways and modes of entry.   |                          | X | X |   | X | X |   | X |   | X | X |
| 9. Learn to generate, review, interpret, and apply statistical and epidemiological data from published research.  | X                        | X | X |   | X | X |   | X |   |   | X |
| 10. Learn the origin, scientific basis, interpretation, and application of various environmental and occupational exposure limits and be able to communicate that information to others.  |                          | X | X | X | X | X | X | X |   | X | X |
| 12. Hone a combination of teamwork, business, and managerial skills to become active in the prudent development, implementation, and management of Industrial Hygiene-related programs.   |                          |   | X | X | X | X | X | X | X | X | X |
| 13. Become proficient at preparing technical summaries and reports using the most current technology for managing and presenting data and incorporating appropriate data and observations from the peer-reviewed environmental and occupational hygiene community.                                      |                          | X |   | X |   |   | X | X |   |   | X |
| 14. Develop an understanding of the roles of city, state, and federal government in promoting health and preventing disease.  |                          |   | X | X | X | X |   | X | X | X | X |
| 15. Learn the fundamental aspects of safety and environmental health  |                          | X | X | X | X | X |   | X | X | X |   |
| 16. Develop an understanding of appropriate ethical practices in Industrial Hygiene.  |                          | X | X | X | X | X |   | X |   | X | X |
| 17. Develop a critical understanding of the multi-level problems important to delivery of environmental and occupational health services within a diverse urban community with various special needs and vulnerabilities and the history of those issues.   |                          |   | X | X | X | X |   | X | X | X |   |
| 18. Develop skills in diagnosing the strengths and problems of the urban environment and fostering programs to improve the health and welfare of urban communities and to influence institutional and public policy with the aim of improving the health of the urban environment and its constituents. |                          |   | X | X | X | X |   | X | X | X |   |
| 19. Acquire the knowledge needed to attain recognized professional certification.   |                          |   |   | X | X | X |   | X | X |   | X |

**PH 755 Urban Health and Society 3 cr, Instructor: Roberts**

| Course Educational Objectives   | General Program Criteria |   |   |   |   |   |   |   |   |   |   |
|---|--------------------------|---|---|---|---|---|---|---|---|---|---|
|   | a                        | b | c | d | e | f | g | h | i | J | K |
| 9. Learn to generate, review, interpret, and apply statistical and epidemiological data from published research.  | X                        | X | X |   | X | X |   | X |   |   | X |
| 12. Hone a combination of teamwork, business, and managerial skills to become active in the prudent development, implementation, and management of Industrial Hygiene-related programs.   |                          |   | X | X | X | X | X | X | X | X | X |
| 13. Become proficient at preparing technical summaries and reports using the most current technology for managing and presenting data and incorporating appropriate data and observations from the peer-reviewed environmental and occupational hygiene community.                                      |                          | X |   | X |   |   | X | X |   |   | X |
| 14. Develop an understanding of the roles of city, state, and federal government in promoting health and preventing disease.  |                          |   | X | X | X | X |   | X | X | X | X |
| 17. Develop a critical understanding of the multi-level problems important to delivery of environmental and occupational health services within a diverse urban community with various special needs and vulnerabilities and the history of those issues.   |                          |   | X | X | X | X |   | X | X | X |   |
| 18. Develop skills in diagnosing the strengths and problems of the urban environment and fostering programs to improve the health and welfare of urban communities and to influence institutional and public policy with the aim of improving the health of the urban environment and its constituents. |                          |   | X | X | X | X |   | X | X | X |   |

**PH 756 Health Care Administration 3 cr, Instructor: Himmelstein**

| Course Educational Objectives  | General Program Criteria |   |   |   |   |   |   |   |   |   |   |
|--|--------------------------|---|---|---|---|---|---|---|---|---|---|
|  | a                        | b | c | d | e | f | g | h | i | j | k |
| 9. Learn to generate, review, interpret, and apply statistical and epidemiological data from published research.   | X                        | X | X |   | X | X |   | X |   |   | X |
| 12. Hone a combination of teamwork, business, and managerial skills to become active in the prudent development, implementation, and management of Industrial Hygiene-related programs.  |                          |   | X | X | X | X | X | X | X | X | X |
| 13. Become proficient at preparing technical summaries and reports using the most current technology for managing and presenting data and incorporating appropriate data and observations from the peer-reviewed environmental and occupational hygiene community. |                          | X |   | X |   |   | X | X |   |   | X |
| 14. Develop an understanding of the roles of city, state, and federal government in promoting health and preventing disease.   |                          |   | X | X | X | X |   | X | X | X | X |
| 17. Develop a critical understanding of the multi-level problems important to delivery of environmental and occupational health services within a diverse urban community with various special needs and vulnerabilities and the history                           |                          |   | X | X | X | X |   | X | X | X |   |

| Course Educational Objectives   | General Program Criteria |   |   |   |   |   |   |   |   |   |   |
|---|--------------------------|---|---|---|---|---|---|---|---|---|---|
|   | a                        | b | c | d | e | f | g | h | i | j | k |
| of those issues.  |                          |   |   |   |   |   |   |   |   |   |   |
| 18. Develop skills in diagnosing the strengths and problems of the urban environment and fostering programs to improve the health and welfare of urban communities and to influence institutional and public policy with the aim of improving the health of the urban environment and its constituents. |                          |   | X | X | X | X |   | X | X | X |   |

**Table 3-2. Correlation of Course Learning Objectives with Specific Program Outcomes**

**EOHS 702 Introduction to Occupational Health & Safety 3 cr, Instructor: Sembajwe**

| Course Educational Objectives   | Program-Specific Outcomes |   |   |   |   |   |   |   |   |   |   |   |
|---|---------------------------|---|---|---|---|---|---|---|---|---|---|---|
|   | a                         | b | c | d | e | f | g | h | i | j | k | l |
| 1. Learn about common industrial processes, operations and manufacturing techniques found in the US.  | X                         | X |   | X |   | X |   | X | X | X |   |   |
| 2. Study and assess occupational and environmental hazard notification systems such as MSDS and transportation placards.  | X                         |   | X | X |   | X |   | X | X |   |   |   |
| 3. Develop ability to identify, describe qualitatively, and quantify agents, factors, and stressors generated by and/or associated with defined sources, unit operations, and/or processes.   | X                         | X |   | X | X | X |   | X |   | X | X | X |
| 4. Learn about physiological and/or toxic interactions of physical, chemical, biological, and ergonomic agents, factors, and/or stressors with the human body.  | X                         | X | X | X |   | X |   | X | X | X | X | X |
| 5. Develop an understanding of the qualitative and quantitative aspects of exposure assessment, dose-response, and risk characterization based on applicable pathways and modes of entry.   | X                         | X | X | X | X | X |   | X | X | X | X | X |
| 10. Learn the origin, scientific basis, interpretation, and application of various environmental and occupational exposure limits and be able to communicate that information to others.  |                           |   |   | X |   |   |   | X |   | X |   |   |
| 14. Develop an understanding of the roles of city, state, and federal government in promoting health and preventing disease.  |                           |   |   |   |   |   | X | X | X |   | X | X |
| 15. Learn the fundamental aspects of safety and environmental health  | X                         | X | X | X |   | X |   | X | X | X | X |   |
| 16. Develop an understanding of appropriate ethical practices in Industrial Hygiene.  |                           |   |   |   |   |   | X | X |   |   |   | X |
| 17. Develop a critical understanding of the multi-level problems important to delivery of environmental and occupational health services within a diverse urban community with various special needs and vulnerabilities and the history of those issues. |                           |   |   | X |   |   |   |   |   |   | X | X |

| Course Educational Objectives   | Program-Specific Outcomes |   |   |   |   |   |   |   |   |   |   |   |
|---|---------------------------|---|---|---|---|---|---|---|---|---|---|---|
|   | a                         | b | c | d | e | f | g | h | i | j | k | l |
| 18. Develop skills in diagnosing the strengths and problems of the urban environment and fostering programs to improve the health and welfare of urban communities and to influence institutional and public policy with the aim of improving the health of the urban environment and its constituents. |                           |   |   | X |   | X |   |   | X |   | X | X |
| 19. Acquire the knowledge needed to attain recognized professional certification.   | X                         | X | X | X | X | X |   | X | X | X |   | X |

**EOHS 741 Env & Industrial Hygiene Laboratory 4 cr, Instructors: Caravanos / DiVito**

| Course Educational Objectives  | Program-Specific Outcomes |   |   |   |   |   |   |   |   |   |   |   |
|--|---------------------------|---|---|---|---|---|---|---|---|---|---|---|
|  | a                         | b | c | d | e | f | g | h | i | j | k | l |
| 6. Learn the principles of operation, calibration, and methodology for using basic sampling instrumentation to detect chemical and physical agents in the work environment.  |                           | X |   | X |   | X |   |   |   | X |   |   |
| 7. Learn to identify and apply appropriate standard sampling and analytical methods such as those developed by NIOSH, OSHA, and EPA.   | X                         |   |   | X | X | X |   | X |   | X |   |   |
| 8. Study the operation and use of various environmental labs including types of analysis, typical costs, sample submittal processes, quality assurance/quality control programs, and laboratory accreditation procedures.  |                           |   |   | X | X |   |   | X |   | X |   |   |
| 9. Learn to generate, review, interpret, and apply statistical and epidemiological data from published research.   |                           |   |   | X | X | X |   | X | X | X |   | X |
| 13. Become proficient at preparing technical summaries and reports using the most current technology for managing and presenting data and incorporating appropriate data and observations from the peer-reviewed environmental and occupational hygiene community. |                           |   | X | X | X |   |   |   |   | X |   | X |
| 19. Acquire the knowledge needed to attain recognized professional certification.  | X                         | X | X | X | X | X |   | X | X | X |   | X |

**EOHS 754 Environmental & Occupational Toxicology 3 cr, Instructor: Mirer**

| Course Educational Objectives  | Program-Specific Outcomes |   |   |   |   |   |   |   |   |   |   |   |
|--|---------------------------|---|---|---|---|---|---|---|---|---|---|---|
|  | a                         | b | c | d | e | f | g | h | i | j | k | l |
| 2. Study and assess occupational and environmental hazard notification systems such as MSDS and transportation placards.                                 | X                         |   | X | X |   | X |   | X | X |   |   |   |
| 4. Learn about physiological and/or toxic interactions of physical, chemical, biological, and ergonomic agents, factors, and/or stressors with the human | X                         | X | X | X |   | X |   | X | X | X | X | X |

| Course Educational Objectives  | Program-Specific Outcomes |   |   |   |   |   |   |   |   |   |   |   |
|--|---------------------------|---|---|---|---|---|---|---|---|---|---|---|
|  | a                         | b | c | d | e | f | g | h | i | j | k | l |
| body.  |                           |   |   |   |   |   |   |   |   |   |   |   |
| 5. Develop an understanding of the qualitative and quantitative aspects of exposure assessment, dose-response, and risk characterization based on applicable pathways and modes of entry.        | X                         | X | X | X | X | X |   | X | X | X | X | X |
| 10. Learn the origin, scientific basis, interpretation, and application of various environmental and occupational exposure limits and be able to communicate that information to others.         |                           |   |   | X |   |   |   | X |   | X |   |   |
| 11. Become skilled at evaluating, recommending, and putting into practice administrative and engineering controls and personal protective equipment to reduce or eliminate occupational hazards. | X                         |   | X | X |   | X |   | X |   | X |   | X |
| 19. Acquire the knowledge needed to attain recognized professional certification.  | X                         | X | X | X | X | X |   | X | X | X |   | X |

**EOHS 755 Industrial Ventilation & Engineering Controls 3 cr, Instructor: Sembajwe**

| Course Educational Objectives  | Program-Specific Outcomes |   |   |   |   |   |   |   |   |   |   |   |
|--|---------------------------|---|---|---|---|---|---|---|---|---|---|---|
|  | a                         | b | c | d | e | f | g | h | i | j | k | l |
| 3. Develop ability to identify, describe qualitatively, and quantify agents, factors, and stressors generated by and/or associated with defined sources, unit operations, and/or processes.      | X                         | X |   | X | X | X |   | X |   | X | X | X |
| 11. Become skilled at evaluating, recommending, and putting into practice administrative and engineering controls and personal protective equipment to reduce or eliminate occupational hazards. | X                         |   | X | X |   | X |   | X |   | X |   | X |
| 19. Acquire the knowledge needed to attain recognized professional certification.  | X                         | X | X | X | X | X |   | X | X | X |   | X |

**EOHS 757 Principles of Industrial Hygiene 3 cr, Instructor: Goldberg**

| Course Educational Objectives   | Program-Specific Outcomes |   |   |   |   |   |   |   |   |   |   |   |
|---|---------------------------|---|---|---|---|---|---|---|---|---|---|---|
|   | a                         | b | c | d | e | f | g | h | i | j | k | l |
| 1. Learn about common industrial processes, operations and manufacturing techniques found in the US.  | X                         | X |   | X |   | X |   | X | X | X |   |   |
| 3. Develop ability to identify, describe qualitatively, and quantify agents, factors, and stressors generated by and/or associated with defined sources, unit | X                         | X |   | X | X | X |   | X |   | X | X | X |

| Course Educational Objectives  | Program-Specific Outcomes |   |   |   |   |   |   |   |   |   |   |   |
|--|---------------------------|---|---|---|---|---|---|---|---|---|---|---|
|  | a                         | b | c | d | e | f | g | h | i | j | k | l |
| operations, and/or processes.  |                           |   |   |   |   |   |   |   |   |   |   |   |
| 4. Learn about physiological and/or toxic interactions of physical, chemical, biological, and ergonomic agents, factors, and/or stressors with the human body.   | X                         | X | X | X |   | X |   | X | X | X | X | X |
| 5. Develop an understanding of the qualitative and quantitative aspects of exposure assessment, dose-response, and risk characterization based on applicable pathways and modes of entry.  | X                         | X | X | X | X | X |   | X | X | X | X | X |
| 6. Learn the principles of operation, calibration, and methodology for using basic sampling instrumentation to detect chemical and physical agents in the work environment.  |                           | X |   | X |   | X |   |   |   | X |   |   |
| 7. Learn to identify and apply appropriate standard sampling and analytical methods such as those developed by NIOSH, OSHA, and EPA.   | X                         |   |   | X | X | X |   | X |   | X |   |   |
| 9. Learn to generate, review, interpret, and apply statistical and epidemiological data from published research.   |                           |   |   | X | X | X |   | X | X | X |   | X |
| 10. Learn the origin, scientific basis, interpretation, and application of various environmental and occupational exposure limits and be able to communicate that information to others.   |                           |   |   | X |   |   |   | X |   | X |   |   |
| 11. Become skilled at evaluating, recommending, and putting into practice administrative and engineering controls and personal protective equipment to reduce or eliminate occupational hazards.   | X                         |   | X | X |   | X |   | X |   | X |   | X |
| 13. Become proficient at preparing technical summaries and reports using the most current technology for managing and presenting data and incorporating appropriate data and observations from the peer-reviewed environmental and occupational hygiene community. |                           |   | X | X | X |   |   |   |   | X |   | X |
| 14. Develop an understanding of the roles of city, state, and federal government in promoting health and preventing disease.   |                           |   |   |   |   |   | X | X | X |   | X | X |
| 15. Learn the fundamental aspects of safety and environmental health   | X                         | X | X | X |   | X |   | X | X | X | X |   |
| 16. Develop an understanding of appropriate ethical practices in Industrial Hygiene.   |                           |   |   |   |   |   | X | X |   |   |   | X |
| 19. Acquire the knowledge needed to attain recognized professional certification.  | X                         | X | X | X | X | X |   | X | X | X |   | X |

**EOHS 762 Physical Hazards 3 cr, Instructor: Sembajwe**

| Course Educational Objectives   | Program-Specific Outcomes |   |   |   |   |   |   |   |   |   |   |   |
|---|---------------------------|---|---|---|---|---|---|---|---|---|---|---|
|   | a                         | b | c | d | e | f | g | h | i | j | k | l |
| 3. Develop ability to identify, describe qualitatively, and quantify agents, factors, and stressors generated by and/or associated with defined sources, unit operations, and/or processes. | X                         | X |   | X | X | X |   | X |   | X | X | X |

| Course Educational Objectives  | Program-Specific Outcomes |   |   |   |   |   |   |   |   |   |   |   |
|--|---------------------------|---|---|---|---|---|---|---|---|---|---|---|
|  | a                         | b | c | d | e | f | g | h | i | j | k | l |
| 4. Learn about physiological and/or toxic interactions of physical, chemical, biological, and ergonomic agents, factors, and/or stressors with the human body.                                   | X                         | X | X | X |   | X |   | X | X | X | X | X |
| 5. Develop an understanding of the qualitative and quantitative aspects of exposure assessment, dose-response, and risk characterization based on applicable pathways and modes of entry.        | X                         | X | X | X | X | X |   | X | X | X | X | X |
| 6. Learn the principles of operation, calibration, and methodology for using basic sampling instrumentation to detect chemical and physical agents in the work environment.                      |                           | X |   | X |   | X |   |   |   | X |   |   |
| 7. Learn to identify and apply appropriate standard sampling and analytical methods such as those developed by NIOSH, OSHA, and EPA.   | X                         |   |   | X | X | X |   | X |   | X |   |   |
| 11. Become skilled at evaluating, recommending, and putting into practice administrative and engineering controls and personal protective equipment to reduce or eliminate occupational hazards. | X                         |   | X | X |   | X |   | X |   | X |   | X |
| 19. Acquire the knowledge needed to attain recognized professional certification.  | X                         | X | X | X | X | X |   | X | X | X |   | X |

**PH 737 Supervised Fieldwork 3 cr, Instructor: Mirer**

| Course Educational Objectives  | Program-Specific Outcomes |   |   |   |   |   |   |   |   |   |   |   |
|--|---------------------------|---|---|---|---|---|---|---|---|---|---|---|
|  | a                         | b | c | d | e | f | g | h | i | j | k | l |
| 1. Learn about common industrial processes, operations and manufacturing techniques found in the US.   | X                         | X |   | X |   | X |   | X | X | X |   |   |
| 9. Learn to generate, review, interpret, and apply statistical and epidemiological data from published research.   |                           |   |   | X | X | X |   | X | X | X |   | X |
| 10. Learn the origin, scientific basis, interpretation, and application of various environmental and occupational exposure limits and be able to communicate that information to others.   |                           |   |   | X |   |   |   | X |   | X |   |   |
| 13. Become proficient at preparing technical summaries and reports using the most current technology for managing and presenting data and incorporating appropriate data and observations from the peer-reviewed environmental and occupational hygiene community. |                           |   | X | X | X |   |   |   |   | X |   | X |
| 19. Acquire the knowledge needed to attain recognized professional certification.  | X                         | X | X | X | X | X |   | X | X | X |   | X |

**PH 750 / 752 Intro Biostatistics & Intro Epidemiology 3 cr each, Instructors: Yang/Dowd**

| Course Educational Objectives  | Program-Specific Outcomes |   |   |   |   |   |   |   |   |   |   |   |
|--|---------------------------|---|---|---|---|---|---|---|---|---|---|---|
|  | a                         | b | c | d | e | f | g | h | i | j | k | l |
| 9. Learn to generate, review, interpret, and apply statistical and epidemiological data from published research.   |                           |   |   | X | X | X |   | X | X | X |   | X |
| 13. Become proficient at preparing technical summaries and reports using the most current technology for managing and presenting data and incorporating appropriate data and observations from the peer-reviewed environmental and occupational hygiene community. |                           |   | X | X | X |   |   |   |   | X |   | X |
| 19. Acquire the knowledge needed to attain recognized professional certification.  | X                         | X | X | X | X | X |   | X | X | X |   | X |
|  |                           |   |   |   |   |   |   |   |   |   |   |   |

**PH 754 Environmental Health and Safety 3 cr, Instructor: Caravanos**

| Course Educational Objectives   | Program-Specific Outcomes |   |   |   |   |   |   |   |   |   |   |   |
|---|---------------------------|---|---|---|---|---|---|---|---|---|---|---|
|   | a                         | b | c | d | e | f | g | h | i | j | k | l |
| 3. Develop ability to identify, describe qualitatively, and quantify agents, factors, and stressors generated by and/or associated with defined sources, unit operations, and/or processes.   | X                         | X |   | X | X | X |   | X |   | X | X | X |
| 4. Learn about physiological and/or toxic interactions of physical, chemical, biological, and ergonomic agents, factors, and/or stressors with the human body.  | X                         | X | X | X |   | X |   | X | X | X | X | X |
| 5. Develop an understanding of the qualitative and quantitative aspects of exposure assessment, dose-response, and risk characterization based on applicable pathways and modes of entry.   | X                         | X | X | X | X | X |   | X | X | X | X | X |
| 9. Learn to generate, review, interpret, and apply statistical and epidemiological data from published research.  |                           |   |   | X | X | X |   | X | X | X |   | X |
| 10. Learn the origin, scientific basis, interpretation, and application of various environmental and occupational exposure limits and be able to communicate that information to others.  |                           |   |   | X |   |   |   | X |   | X |   |   |
| 12. Hone a combination of teamwork, business, and managerial skills to become active in the prudent development, implementation, and management of Industrial Hygiene-related programs.   |                           |   |   | X |   |   | X |   | X | X | X | X |
| 13. Become proficient at preparing technical summaries and reports using the most current technology for managing and presenting data and incorporating appropriate data and observations from the peer-reviewed environmental and occupational hygiene community.                                      |                           |   | X | X | X |   |   |   |   | X |   | X |
| 14. Develop an understanding of the roles of city, state, and federal government in promoting health and preventing disease.  |                           |   |   |   |   |   | X | X | X |   | X | X |
| 15. Learn the fundamental aspects of safety and environmental health  | X                         | X | X | X |   | X |   | X | X | X | X |   |
| 16. Develop an understanding of appropriate ethical practices in Industrial Hygiene.  |                           |   |   |   |   |   | X | X |   |   |   | X |
| 17. Develop a critical understanding of the multi-level problems important to delivery of environmental and occupational health services within a diverse urban community with various special needs and vulnerabilities and the history of those issues.   |                           |   |   | X |   |   |   |   |   |   | X | X |
| 18. Develop skills in diagnosing the strengths and problems of the urban environment and fostering programs to improve the health and welfare of urban communities and to influence institutional and public policy with the aim of improving the health of the urban environment and its constituents. |                           |   |   | X |   | X |   |   | X |   | X | X |
| 19. Acquire the knowledge needed to attain recognized professional certification.   | X                         | X | X | X | X | X |   | X | X | X |   | X |

**PH 755 Urban Health and Society 3 cr, Instructor: Roberts**

| Course Educational Objectives   | Program-Specific Outcomes |   |   |   |   |   |   |   |   |   |   |   |
|---|---------------------------|---|---|---|---|---|---|---|---|---|---|---|
|   | a                         | b | c | d | e | f | g | h | i | j | k | l |
| 9. Learn to generate, review, interpret, and apply statistical and epidemiological data from published research.  |                           |   |   | X | X | X |   | X | X | X |   | X |
| 12. Hone a combination of teamwork, business, and managerial skills to become active in the prudent development, implementation, and management of Industrial Hygiene-related programs.   |                           |   |   | X |   |   | X |   | X | X | X | X |
| 13. Become proficient at preparing technical summaries and reports using the most current technology for managing and presenting data and incorporating appropriate data and observations from the peer-reviewed environmental and occupational hygiene community.                                      |                           |   | X | X | X |   |   |   |   | X |   | X |
| 14. Develop an understanding of the roles of city, state, and federal government in promoting health and preventing disease.  |                           |   |   |   |   |   | X | X | X |   | X | X |
| 17. Develop a critical understanding of the multi-level problems important to delivery of environmental and occupational health services within a diverse urban community with various special needs and vulnerabilities and the history of those issues.   |                           |   |   | X |   |   |   |   |   |   | X | X |
| 18. Develop skills in diagnosing the strengths and problems of the urban environment and fostering programs to improve the health and welfare of urban communities and to influence institutional and public policy with the aim of improving the health of the urban environment and its constituents. |                           |   |   | X |   | X |   |   | X |   | X | X |

**PH 756 Health Care Administration 3 cr, Instructor: Himmelstein**

| Course Educational Objectives  | Program-Specific Outcomes |   |   |   |   |   |   |   |   |   |   |   |
|--|---------------------------|---|---|---|---|---|---|---|---|---|---|---|
|  | a                         | b | c | d | e | f | g | h | i | j | k | l |
| 9. Learn to generate, review, interpret, and apply statistical and epidemiological data from published research.   |                           |   |   | X | X | X |   | X | X | X |   | X |
| 12. Hone a combination of teamwork, business, and managerial skills to become active in the prudent development, implementation, and management of Industrial Hygiene-related programs.  |                           |   |   | X |   |   | X |   | X | X | X | X |
| 13. Become proficient at preparing technical summaries and reports using the most current technology for managing and presenting data and incorporating appropriate data and observations from the peer-reviewed environmental and occupational hygiene community. |                           |   | X | X | X |   |   |   |   | X |   | X |
| 14. Develop an understanding of the roles of city, state, and federal government in promoting health and preventing disease.   |                           |   |   |   |   |   | X | X | X |   | X | X |
| 17. Develop a critical understanding of the multi-level problems important to delivery of environmental and occupational health services within a diverse urban community with various special needs and vulnerabilities and the history                           |                           |   |   | X |   |   |   |   |   |   | X | X |

| Course Educational Objectives   | Program-Specific Outcomes |   |   |   |   |   |   |   |   |   |   |   |
|---|---------------------------|---|---|---|---|---|---|---|---|---|---|---|
|   | a                         | b | c | d | e | f | g | h | i | j | k | l |
| of those issues.  |                           |   |   |   |   |   |   |   |   |   |   |   |
| 18. Develop skills in diagnosing the strengths and problems of the urban environment and fostering programs to improve the health and welfare of urban communities and to influence institutional and public policy with the aim of improving the health of the urban environment and its constituents. |                           |   |   | X |   | X |   |   | X |   | X | X |

## CRITERION 4. CONTINUOUS IMPROVEMENT

### A. Student Outcomes.

*It is recommended that this section include (a table may be used to present this information):*

- 1. A listing and description of the assessment processes used to gather the data upon which the evaluation of each student outcome is based. Examples of data collection processes may include, but are not limited to, specific exam questions, student portfolios, internally developed assessment exams, senior project presentations, nationally-normed exams, oral exams, focus groups, industrial advisory committee meetings, or other processes that are relevant and appropriate to the program*
- 2. The frequency with which these assessment processes are carried out*

### 1 and 2 – Processes and Frequencies

The SPH currently has a solid structure in place to allow for the frequent monitoring and evaluation of student progress in achieving the expected program outcomes, in addition to assessing the quality of each program. The assessment committee has primary responsibility for on-going school-wide self-evaluation. With the help of the assessment coordinator hired in 2008, the committee administers and analyzes the results of surveys and draft a report, summarizing the key findings and recommendations. The report is shared with faculty, students, and staff, with the goal of developing an implementation plan. The processes for assessing student outcomes are summarized in Tables 4-1 and 4-2 at the end of this Section, including the name of the process, data collected, collection mode, and frequency. Observations will be discussed under A3 below. Responses to findings will be discussed under paragraph B, Continuous Improvement.

Other well-established methods for monitoring and evaluating student progress and the extent to which they meet their program specific outcomes are:

- Academic advisement;
- Practice experience;
- Comprehensive exam;
- Portfolios;
- Culminating experience;
- Professional certification, and
- Post-graduate employment.

#### a. EOHS Faculty Meetings.

EOHS faculty meetings are held to address issues and needs in enrollment, recruitment, admissions, performance, retention, and curriculum review. EOHS faculty meetings are routinely scheduled monthly on Wednesday during the semester from 11:30 AM-1:00 PM, although additional meetings may be called to address critical issues. These meetings are scheduled in advance of the semester because Hunter College reserves Wednesday afternoons for administrative activities, and no EOHS classes are held in the morning. The agenda for these meetings is drafted by the Program Director and circulated among the faculty for additions and corrections. Old action items and if possible, resolutions are incorporated into the agenda to

maintain discussion of issues requiring timely resolution. Examples of actions taken are described in 4.B., Continuous Improvement. During each EOHS faculty meeting, current problems and issues are included in the agenda and discussed. Depending on the issue, conversations between involved faculty and the EOHS Program Director or CUNY SPH Campus Director may be needed to assess the viability of various remediation approaches. The Program Director usually takes responsibility in these areas.

The faculty regularly discuss the progress of students, often discussing individual performance in courses now being given. Fieldwork and Capstone progress is also reviewed as issues come up. Performance of non-matriculated students on problem sets and in course examinations is discussed to inform potential admission as matriculated students. These evaluations reflect back on the adequacy of educational objectives and the adequacy of curriculum for meeting course objectives. Applications, admissions decisions and requisite recruiting needs are discussed.

#### b. Comprehensive Exam

Each year, the questions on the comprehensive exam are reviewed between the Program Director and the faculty member(s) most recently instructing key courses, such as toxicology, ventilation, and physical hazards. The Program Director, who is responsible for grading the exams, also notes apparent weak points in student performance in the sections of the exam; if a problem is noted, the faculty member determines whether the problem lies with the actual question, or with the student.

#### c. Student advisement sessions

Each student is assigned a faculty advisor. Each semester the faculty advisor meets with the student to approve registration in courses and discuss progress and any academic difficulties the student may be experiencing. This anecdotal information is shared in faculty meetings. Actions needed, which largely related to course content or student preparation, are carried forward on the agenda for future meetings.

#### d. Student meetings

Each semester, graduate students in all programs are required to attend a meeting where program information is supplied and questions and comments are solicited. EOHS program faculty attend and address any student concerns or questions that arise.

#### e. Fieldwork and Capstone evaluation

As the student's culminating experience, evaluation here reflects the individual student's accomplishments and also reflects on the Program's having achieved the objectives through teaching. Students and faculty both offer assessments: students submit a portfolio including detailed assessment of their capstone experience that include how well met their goals to develop specific learning objectives in public health; and EOHS faculty review students capstone papers to determine, among other things, how well prepared the students were for their capstone.

#### f. Student evaluations

There are two evaluations conducted for each course, and a student exit survey for achievement of overall objectives. Hunter College administers a standardized survey to each student in each course of how well educational objectives were defined and met in each course by the instructor

and course content. These data are now available to the Program Director, the faculty member and, in summary for all students on a college website.

The EOHS faculty implement a second paper-and-pencil evaluation of the achievement of the specific objectives. This is administered by EOHS faculty for each of the EOHS-MS ABET courses at the last class meeting before the final exam. Finally, a student exit survey is administered electronically by the SPH Assessment and Curriculum Coordinator. Shortly before graduation in January and May, EOHS students (and all other SPH students) scheduled to graduate are requested to complete an exit survey. For each program, this standardized survey collects information on-line regarding student's assessment of achievement of program outcomes, on course satisfaction, educational objectives and overall assessment of their educational experience. The data are stored on the Survey Monkey website, downloaded, and monitored by EOHS faculty and the EAB. The survey includes questions specifically targeting ABET general and program specific outcomes. Table 4-1 describes the methods of student assessment and the type of data collected to inform program development and improvement.

g. EOHS Advisory Board

The EOHS Advisory Board discusses, among other areas, the appropriate educational objectives of the program in light of changes in the practice of environmental health and safety. The membership will be reviewed annually and adjusted accordingly to be representative of environmental and occupational hygiene professions in government, service, and private industry.

h. Professional Certified Industrial Hygienists and Employers of Hunter graduates

An electronic survey was conducted in 2010, and will be repeated on a 6-year basis.

i. Alumni of the ABET-accredited Hunter College EOHS-MS program

Alumni surveys were conducted in 2009 and again in spring 2012 for all Hunter SPH graduates. Survey results are described in 4.A.4 below.

j. Current students within the ABET-accredited Hunter College EOHS-MS program

The primary purpose of the current student survey is to learn more about students' experiences, concerns and / or issues while enrolled in the program. Survey results are described in criterion 4.A.4 below. The survey focuses on areas such as: goals and expectations; projected timetable for completing the degree, program improvements; and advising. Survey results are used to bring about program change in a quick turn-around time. Students' level of satisfaction increases when concerns are addressed by the School's administration. For example, results from the last survey highlighted several areas in need of improvement; these concerns informed the assessment committee's key recommendations, including: 1) strengthening the school community (the CUNY SPH is located at four campuses, across 3 boroughs, within a large urban, commuter university), such as by holding more-cross campus events and course offerings; 2) strengthening opportunities for student engagement research, such as by creating a school-wide faculty-student research day that would include student poster presentations from field work, capstone and/or doctoral dissertation; and more opportunities for grant-writing workshop/seminars, especially for doctoral students; the DPH program; 3) strengthening the master's level fieldwork and capstone experiences across campuses; and 4) improving professional mentorship and advisement.

### **3. The expected level of attainment for each of the student outcomes.**

The College requires all graduate students to maintain a GPA of 3.0 or better, which is equivalent to a grade of B or better in each course. This is considered to be the minimum level of knowledge required for proficiency. Laboratory reports from the laboratory course are expected to reflect the understanding of an entry level professional in IH. More integrative outcomes are assessed through the Fieldwork reflections and the Capstone paper. The expected level of attainment for the capstone paper is a paper in scientific format where content is at the level of a new master's level industrial hygienist, with appropriate description of the purpose, methods, presentation of results in tabular and graphic form, summary and interpretation of data and containing references.

### **4. Summaries of the results of the evaluation process and an analysis illustrating the extent to which each of the student outcomes is being attained**

This section summarizes the results of the survey evaluation processes.

#### a. Alumni of the ABET-accredited Hunter College EOHS-MS program

A Hunter College alumni survey was conducted in 2009 and again in spring 2012 for all CUNY SPH graduates. Of the 44% who responded in 2009, 12 (about 17%) were EOHS-MS alumni. When asked how strongly they agreed with the statement: "My first job after graduation was directly related to the skills and content of my field of study," six responded that they "Strongly Agree" with the statement, and five responded that they "Agree" with the statement. Only one person disagreed. 100% of MS alumni were employed full-time: four at a city or county agency; three for a for-profit company; three with a federal or state agency; and two in a hospital or school. 100% of MS alumni "Strongly Agree" or "Agree" that the training they received from their graduate program prepared them well for their current work.

In spring 2012, a second alumni survey was administered, this time, targeting students who graduated 12-18 months prior (or those who graduated between 2010 and 2011). Ninety-four alumni responded. Of those who responded, five were graduates of the EOHS-MS program. Results showed that all five (100%) were employed full time at the time of the survey; two were employed in education, one in government and one in healthcare (the fifth MS respondent skipped this question). Four alumni (80%) would recommend the program to a friend; and three either "Strongly Agree" or "Agree" that the training they received in their graduate program prepared them well for their current work.

ABET Reviewers will have access to all survey results during the site visit.

#### b. Current students within the ABET-accredited Hunter College EOHS-MS program

The primary purpose of the current student survey is to learn more about students' experiences, concerns and /or issues while enrolled in the program. The survey focuses on areas such as: goals and expectations; projected timetable for completing the degree, program improvements; and advising. Survey results are used to bring about program change in a quick turn-around time.

Students' level of satisfaction increases when concerns are addressed by the School's administration. For example, results from the last survey highlighted several areas in need of improvement; these concerns informed the Assessment Committee's key recommendations, including: 1) strengthening the school community (the CUNY SPH is located at four campuses, across 3 boroughs, within a large urban, commuter university), such as by holding more-cross campus events and course offerings; 2) strengthening opportunities for student engagement research, such as by creating a school-wide faculty-student research day that would include student poster presentations from fieldwork, Capstone and/or doctoral dissertation; and more opportunities for grant-writing workshop/seminars, especially for doctoral students; the DPH program; 3) strengthening the master's level fieldwork and Capstone experiences across campuses; and 4) improving professional mentorship and advisement.

### c. Student Exit Survey

The SPH began administering student exit surveys electronically in spring 2008. Once a student submits an "intent to graduate" form, and their academic adviser confirms that they have satisfied all program degree requirements, the students' name is added to a list of graduating students. Three weeks prior to graduation, the SPH Assessment and Curriculum Coordinator sends an email to the students with a link to the survey. Students are encouraged to provide feedback on their experience in their program, time it took to complete the degree and post graduate employment prospects. However, the primary purpose of the student exit survey is to measure the extent to which students have attained their program competencies. Students' response to the exit surveys has remained constant at 76-78% over the last two to three cycles.

In spring 2013, the response rate was slightly lower at 69% due to last minute review and update of the instrument which prevented it from being emailed to students until one week prior to graduation. Approximately eight (about 80%) of the EOHS-MS graduating students completed the survey. Of those who responded, 80% either "Strongly Agreed" or "Agreed" that they had achieved both the 13 core program-wide competencies, expected of all SPH students graduating from a master's level degree program, and the 19 IH specific learning objectives. Other findings showed that 6 students (80%) of those who responded were interested in pursuing the following exams over the next five years: the Certified Industrial Hygienist (CIH), Certified Safety Professional (CSP), Registered Environmental Health Specialist (REHS), and the Certificate in Public Health (CPH). Students responded that "Quality of the faculty," "Cost of the program, and "Mission and focus of the program" were the three main strengths of the program. Only one student disagreed that they had achieved the learning objectives, for ergonomics. A few neutral responses were received for the objectives regarding management and for ergonomics

### d. Employer and Industrial Hygienists Survey.

An employer survey was launched in November 2009, using Survey Monkey software. The results were reported to ABET in 2010. The results are summarized here, and the report is supplied in Appendix E.

In total, 44 environmental / industrial hygiene employers responded to the survey with 36% of respondents representing Consulting Engineering and Environmental firms, 18% city, state or federal regulatory agencies and 14 % representing private employers (i.e. corporations). More

than 50% had some type of certification (i.e. CIH, CSP, CHMM etc.), 17% were CIH's. Finally 69% had employed at least one Hunter EOHS graduate and 17% had employed 4-6 EOHS graduates. Overall, the respondents ranked the Hunter EOHS program very positively with 93% responding "very well" or "well" to the question: "Overall, how well do you think the Hunter Master's program prepared our graduates for their work in your agency?" With regard to EOHS / ABET defined outcomes, the program appears to be addressing these in a satisfactory fashion. The majority of responses to each outcome were answered very well or well. The only outcome that respondents' felt still needs continuing work is "demonstrate an understanding of applicable business and managerial practices". At the time, a new course "Managing EOHS Programs and Projects" was considered. Beginning in Spring 2013, content on program planning and management previously covered in PH 738 lectures was expanded and formally introduced into the newly required fieldwork course (PH 737), as described below under B.2, Continuous improvement.

The survey also assessed the respondents opinions of the curriculum changes mandated by the creation of the CUNY SPH which reduced the number of credits by 3 (49 to 46) to be consistent with other degree programs in the SUPH and to add a distinct 3 credit "Fieldwork" course. Survey respondents stated that the reduced number of credits were either unlikely to have a significant impact on quality of EOHS graduates (67.9%) or a slight impact (25%). They also concurred that the number of electives should be preserved by changing Site Visits and Industrial Processes (EOHS 759) from required to elective.

## **5. How the results are documented and maintained**

Survey results are maintained on our Survey Monkey account (website), and also downloaded to faculty computers. Quantitative data are tallied and summarized by one or two EOHS faculty, with strengths and weaknesses highlighted. Detailed and summarized results are reported first in EOHS and, as appropriate, in SUPH faculty meetings for feedback. Comments and questions regarding the results are collected during these meetings. The results are presented to the EOHS EAB for discussion during the annual meeting. Perceptions from the faculty and questions raised during the internal discussion are presented to the EAB at the same time.

Recommendations of the EAB are then noted and summarized. Finally, the EOHS faculty convenes to determine if any resulting plans are needed to address shortcomings. Some changes may be addressed at the EOHS level through small changes to course syllabi. If more substantial needs for changes are identified, the EOHS faculty will then develop a formal proposal for curricular change for approval by the SUPH. The proposal will proceed to the Hunter Faculty Senate for final approval.

## **B. Continuous Improvement**

*Describe how the results of evaluation processes for the student outcomes and any other available information have been systematically used as input in the continuous improvement of the program. Describe the results of any changes (whether or not effective) in those cases where re-assessment of the results has been completed. Indicate any significant future program improvement plans based upon recent evaluations. Provide a brief rationale for each of these planned changes*

This section will enumerate changes to curriculum and approaches implemented during the period since the last accreditation.

- a. The alignment of the EOHS-MS curriculum with the masters programs at the consorial campuses resulted in a reduction of credits from 49 to 46, and the addition of supervised fieldwork (PH 737) as a 3 credit course for EOHS Students. The previous EOHS 761 course was renamed PH 738, Capstone Seminar. The reduction in 3 credits and the addition of 3 additional credits (fieldwork course) resulted in EOHS-MS students with only 1 elective course.

After input from various groups (i.e. students, faculty, administration and select alumni) the EOHS-MS Program determined the content of EOHS 759 Site Visits and Industrial Processes could readily be integrated into other industrial hygiene courses and experiences. The faculty submitted a curriculum revision to make “Site Visits and Industrial Processes” (EOHS 759) an elective rather than required course.

The course continues to be offered as an elective; however, enrollment has been very low and continuation is unlikely. The NY/NJ ERC continues to offer a Site Visits Course and interested EOHS students can enroll in this course as an “Independent Study” class. During spring 2013, 4 EOHS students took the ERC sponsored course and received independent credit.

In addition, EOHS-MS students are given priority to attend the “NY-NJ ERC Historical Perspectives Tour” each summer. The tour includes students preparing a report, including a PowerPoint presentation to be given during the course of the tour before each site entry on the industry associated with the site to be visited. The report is prepared by a team consisting of one industrial hygiene, occupational medicine, engineering and biomechanics/ergonomics student from each program in the ERC, thus addressing the objective of working in multidisciplinary teams.

In short, the EOHS-MS program feels the content and educational objectives of EOHS 759 Site Visits have been adequately transferred to other courses. Where possible, various courses take students on site visits (EOHS 757, 741) or when such a tour is announced, students are advised and encouraged to attend. The program continues to value real world industrial hygiene tours and has adopted numerous online instructional media (i.e. YouTube, OSHA, NTSB and EPA videos) to supplement these objectives.

- b. Surveys of students, alumni and employers identified concerns for meeting the objective of understanding applicable business and managerial practices. The newly revised Supervised Fieldwork (PH 737) starting in Spring 2013 contains increased didactic material on management, to supplement the direct involvement of the student during a fieldwork placement. The ergonomics elective (EHOS 714) also contains substantial material addressing the management of an ergonomics program, which is integral to an overall EOHS program at a workplace.

- c. The material in the Noise and Radiation course (EOHS 762) was expanded to include heat and vibration and the course was renamed physical hazards. Heat Stress and vibration are elements of ergonomic risk factor assessments.
- d. An ergonomics course (EOHS 714) was offered as an elective. The new version of this course is being taught for the first time this summer (2013). The course includes elements of management systems and interpretation of epidemiological data regarding injury distribution in workplaces.
- e. The alumni survey, as well as regular discussions with current students, demonstrates that substantial numbers of graduates are placed in non-factory institutions such as health care and educational institutions. For example, students work in the EHS departments of hospitals and universities, as well as EHS operations for the NYC Department of Environmental Protection. To address the needs of professionals in these settings, the curriculum in Ventilation (EOHS755) was expanded to address non-factory ventilation methods are standards, including ASHRAE standards.
- f. Content on occupational and environmental regulations has been enhanced in two courses. Toxicology (EOHS 754) now includes comparisons of environmental exposure recommendations (EPA Reference Concentrations and ATSDR minimal risk levels) with occupational limits (OSHA PEL's, NIOSH REL's and ACGIH TLV's.) A course in Risk Assessment, Management and Communication (EOHS 770.20, Env Risk Communication) has been launched, cross-listed with the DPH program.
- g. To enhance students' ability to interpret epidemiological data, EOHS has launched a course in environmental and occupational epidemiology (EOHS 730) that is cross-listed with the DPH program.

### **C. Additional Information**

*Copies of any of the assessment instruments or materials referenced in 4.A. and 4.B must be available for review at the time of the visit. Other information such as minutes from meetings where the assessment results were evaluated and where recommendations for action were made could also be included*

Assessment instruments will be made available to reviewers during the site visit.

**Table 4-1. Evaluation Tools used for Program Development and Improvement**

| <b>Methods of Assessment</b>                              | <b>Data Collected/ Assessed</b>   | <b>Frequency</b>                     |
|---|---|--------------------------------------|
| <b>Current Student Survey</b>                             | <ul style="list-style-type: none"> <li>○ Student attainment of <i>core</i> program learning objectives</li> <li>○ Academic rigor of the program</li> <li>○ Student professional development (presentations &amp; pubs)</li> <li>○ Course load – time to completion</li> <li>○ Advising and home responsibility</li> <li>○ Employment and scholarship/financial assistance</li> <li>○ Career and educational goals</li> <li>○ Membership in professional public health organizations</li> </ul>  | Once a semester<br>(late March)      |
| <b>Student Exit Survey</b>                                | <ul style="list-style-type: none"> <li>○ Student attainment of core and degree specific learning objectives</li> <li>○ Time to graduation &amp; reasons why degree was completed within that time</li> <li>○ Methods of paying for tuition &amp; financial assistance</li> <li>○ Employed while enrolled in the program</li> <li>○ Employment upon graduation</li> <li>○ Name of employer upon graduation</li> <li>○ Further graduate training upon graduation</li> <li>○ Current professional certifications/ plans to pursue certifications over the next 5 years</li> <li>○ Main strengths &amp; weaknesses of the program</li> <li>○ Rating aspects of program resources</li> </ul> | Once a semester<br>(upon graduation) |
| <b>Alumni Survey</b>                                      | <ul style="list-style-type: none"> <li>○ Employment rate (Current employment status)</li> <li>○ Employment status upon graduation</li> <li>○ Time it took to find employment</li> <li>○ Program training prepared student for current work</li> <li>○ Potential internship opportunities for students at place of work</li> <li>○ Current salary</li> <li>○ Training at SUPH – most useful and useless</li> <li>○ Suggested new skills incorporated into the curriculum to meet emerging public health needs</li> <li>○ Professional certifications taken and passed</li> <li>○ Volunteer to be an ambassador for prospective public health students</li> <li>○ Race data</li> </ul>    | Every 2-3 years                      |
| <b>Observation &amp; Evaluation of Teaching (faculty)</b> | <ul style="list-style-type: none"> <li>○ Evaluated all teaching based on commonly applied criteria</li> </ul>   | Once a semester                      |
| <b>Student Course Evaluations</b>                         | <ul style="list-style-type: none"> <li>○ Evaluates faculty teaching &amp; gauges adequacy of classroom practices</li> </ul>   | End of every course                  |

**Table 4-2. Processes for Evaluating Educational Objectives and Curriculum**

| Evaluation Tool                       | Responsible Person(s)   | Frequency of Assessment                           | Description and Analysis   | Feedback and Action Plan  |
|---------------------------------------|---|---|--|---|
| <b>Internal Methods of Assessment</b> |   |   |  |   |
| EOHS Faculty meetings                 | All EOHS faculty  | At least monthly during Fall and Spring semesters | Faculty collect information regarding student performance in classes by reading transcripts and interviewing students. Class instructors use standard assessment methods (examinations, papers, assignments, and class participation) to gauge if the objectives of the class are being met.   | The EOHS Program Director and faculty discuss students' performance during a faculty meeting late in the semester to determine a) which students are eligible for a scholarship and b) which students are in academic jeopardy and require additional help or counseling. The Program Director awards scholarships based on this discussion, and a plan is devised for the most appropriate faculty member (varies case-by-case) to approach the student.                                       |
| Current Student Survey                | All EOHS faculty / Assessment & Curriculum Coordinator                            | Annually  | Once a year, current students are requested to complete an online survey which allows them to assess the quality of their program. Survey questions include topics such as: academic support; quality of advising; academic rigor of the program; current employment and time to degree completion.  | Results from the current student survey help bring about program change almost immediately. For example, last year's (spring 2013) survey findings noted that there was no opportunity for students to showcase their research ideas. In May 2013, the Acting Research Director organized a school-wide faculty-student research day that included student poster presentations from Fieldwork and Capstone. At least three EOHS-MS students participated, with one student receiving an award. |
| Student Exit Survey                   | Program Director / Assessment & Curriculum Coordinator                            | Semi-annually (or upon graduation)                | Before graduation in January and May, EOHS students are asked to complete an exit survey. This survey collects data to help measure students' attainment of educational objectives, on course satisfaction, and overall assessment of their educational experience. The data are stored on Survey Monkey, downloaded, and monitored by EOHS faculty and discussed at EAB meetings. | Given the consistency of data collection, this tool aids in the observation of trends and identification of problem areas. The data are reviewed at EOHS faculty meetings and presented to the EAB.   |
| Required Student Meetings             | All EOHS faculty / Associate Dean for Academic Affairs                            | Once per semester                                 | These required meetings are used for faculty to communicate the requirements of the program to students. At this time, students have the opportunity to comment about the adequacy of educational objectives and curriculum and how well they are fulfilled by the instructors.  | Faculty members take note of any problems raised by students with respect to the objectives and discuss at the next EOHS faculty meeting. If needed, 1-2 faculty may undertake further investigation and propose a plan or action for the faculty to discuss and decide if actionable.  |
| Student Course Evaluations            | All EOHS faculty/ Hunter College  | Every course every semester                       | Hunter College administers a standardized survey to each student of how well educational objectives were defined and met in each course by the instructor and course content.  | The Campus Director and EOHS Program Directors and faculty receive tallied results of student evaluations for review and provide any necessary counsel or development of an action plan to improve teaching and course development.   |
| Fieldwork and Capstone Evaluation     | EOHS Fieldwork & Capstone faculty member; Capstone paper 2 <sup>nd</sup> reviewer | Once per semester                                 | Students and faculty both offer assessments. Students submit a portfolio including detailed assessment of their Capstone experience including how well met were their goals to develop specific competencies in PH and EOHS. Faculty review students Capstone papers to determine, among other things, how well prepared the students were for their Capstone.                     | The fieldwork faculty member uses this information to adjust the requirements of PH 737 (fieldwork) and PH 738 (Capstone Seminar), the way in which the requirements are communicated to students, and the course content as necessary based on the combination of faculty observations and student feedback.   |

| Evaluation Tool                       | Responsible Person(s)                                       | Frequency of Assessment          | Description and Analysis   | Feedback and Action Plan  |
|---------------------------------------|---|----------------------------------|--|---|
| <b>External Methods of Assessment</b> |   |                                  |  |   |
| EOHS Advisory Board                   | 1-2 EOHS Faculty  | Once every 1-2 years (as needed) | The EOHS Advisory Board discusses, among other areas, the appropriate educational objectives of the program in light of changes in the practice of environmental health and safety. The membership will be reviewed annually and adjusted accordingly to be representative of environmental and occupational hygiene professions in government, service, and private industry.   | Meeting agendas and minutes will be distributed to and discussed among all faculty and EAB members.   |
| Professional CIH and Employer Survey  | 1-2 EOHS Faculty, EAB, and office staff                     | Every 6 years                    | The survey is designed to assess employer satisfaction with EOHS graduates, what competencies are desirable in EOHS graduates, and to provide a mechanism for environmental and occupational hygiene professionals to make recommendations for improving the program. Following a previously published industrial hygiene's program survey effort (Brosseau et al., 2005); professionals are selected from the list of regionally Certified Industrial Hygienists. | Professional survey data are reviewed by EOHS faculty and EAB members to identify graduates' strengths and deficiencies and to develop and implement recommendations for improving course content and graduate competencies.  |
| Alumni Survey                         | 1-2 EOHS Faculty, EAB / Assessment & Curriculum Coordinator | Every 2-3 years                  | This survey is designed to assess how the objectives of the EOHS-MS program are met by assessing satisfaction with the objectives and curriculum for preparing students for professional practice. Results from this survey also include graduate employment rates which measure the success of the students and the program.  | Alumni survey data are reviewed by EOHS faculty and EAB members to identify strengths and deficiencies in the program and to develop and implement recommendations for improving course content and graduate competencies. Results help guide future curriculum review and change       |
| NIOSH Annual Renewal                  | Program Director / 1 EOHS Faculty                           | Annually                         | NIOSH now requires a brief renewal application, which includes demographic and program specific data.  | As part of completing this report, the EOHS faculty meet, discuss budget needs, and review student records.   |
| NIOSH 5 year Grant Renewal            | NIOSH ERC Director / Program Director                       | Every 5 years                    | A NIOSH ERC review team visits Hunter College at least once every 5 years to evaluate the environmental and occupational hygiene graduate program (EOHS-MS). The last site visit was in 2005, upon which the program was approved for a full 5 years.  | An evaluation score and a written report on all aspects of the EOHS-MS program were provided to the faculty. They contained an evaluation of the programs' strengths and recommendations for improvements, which are currently being implemented (e.g. further development of research) |

## CRITERION 5. CURRICULUM

### A. Program Curriculum

***1. Complete Table 5-1 that describes the plan of study for students in this program including information on course offerings in the form of a recommended schedule by year and term along with average section enrollments for all courses in the program over the two years immediately preceding the visit. State whether you are on quarters or semesters and complete a separate table for each option in the program***

The plan of study, course offerings, a recommended schedule by year and term along with average section enrollments is provided in Table 5-1.

***2. Describe how the curriculum aligns with the program educational objectives***

The core curriculum is designed to prepare graduates for professional practice by developing their competencies in general science and environmental and occupational hygiene. Students are also provided with competencies in the core public health knowledge areas (biostatistics, epidemiology, health policy and management and social and behavioral sciences), to deepen their problem-solving skills relevant to the practice of environmental and occupational hygiene. Given that the EOHS-MS Program is housed within the SUPH, an urban context is woven into much of the educational experience. The curriculum has five components: 1) required public health core coursework, 2) required program courses, 3) elective coursework, 4) supervised fieldwork, leading to the development of the capstone project and/or master's essay, and 5) comprehensive examination. The entire curriculum is shown in Table 5-1.

***3. Describe how the curriculum and its associated prerequisite structure support the attainment of the student outcomes***

All matriculated students must complete a prescribed course of study designed to ensure completion of the educational objectives listed in Criterion 2. These ultimately address the program's desired outcomes.

#### a. Required Coursework

The 40 credits of required coursework are shown in Table 5-1. The curriculum includes courses that introduce students to basic chemical, physical, and biological hazards, and their anticipation, recognition, evaluation, and control. These include introductory courses in Occupational and Environmental Health and Safety, as well as courses in Industrial Hygiene, Ventilation, Physical Hazards, Toxicology, and Environmental and Industrial Hygiene Laboratory. The extent and some details of coverage of the various types of health and safety hazards and controls are indicated in the syllabi for each of the required courses. The core curriculum also includes Public Health and Applied Science courses for development of problem-solving skills and depth in urban public health issues.

The EOHS curriculum is designed to impart skills in and knowledge of mathematics and basic and applied sciences. The information transfer occurs in several settings that are described below:

Many courses require students to extend and apply basic mathematics and statistics skills, such as Biostatistics (PH 750), Epidemiology (PH 752), Environmental & Industrial Hygiene Lab (EOHS 741), Industrial Hygiene (EOHS 757) and Physical Hazards (EOHS 762). For example, in Biostatistics (PH 750) and Epidemiology (PH 752), the graduate courses in Biostatistics and Epidemiology, students apply their mathematical skills to calculate basic measures of exposure and disease incidence, prevalence and risk, as indicated in the attached syllabi. In the lab course Environmental and Industrial Hygiene Lab (EOHS 741), students apply statistical methods to characterize and analyze data generated in experimental studies. Physical Hazards (EOHS 762) makes extensive use of exponentials and logarithms in studying decibel noise units, exponential decay over time of radionuclides, and exponential loss of gamma-ray beam intensity in shielding.

Other courses require students to extend and apply basic knowledge of biology, chemistry and physics, such as Environmental Health and Safety (PH 754), Occupational Safety and Health (EOHS 702), Environmental and Industrial Hygiene Lab (EOHS 741), Toxicology (EOHS 754), Industrial Hygiene and Environmental Controls (EOHS 755), Industrial Hygiene (EOHS 757), and Physical Hazards (EOHS 762). For example, PH 754 and EOHS 702, the introductory courses in environmental and occupational health and safety, respectively, extend students' knowledge of human physiology in studying human response, defense mechanisms and symptoms of overexposure to toxic chemicals. In Toxicology (EOHS 754) students learn about human physiology and biochemical processes in the body through study of the metabolism of exogenous chemicals. Applications and extensions of basic physics knowledge take place in Industrial Ventilation and Environmental Controls (EOHS 755), Industrial Hygiene (EOHS 757) and Physical Hazards (EOHS 762), the EOHS courses in ventilation, industrial hygiene and physical hazards; in Environmental Health and Safety (PH 754) and Environmental and Industrial Hygiene Lab (EOHS 741), Toxicology (EOHS 754) and Industrial Hygiene (EOHS 757), the courses in environmental health and safety, laboratory, toxicology and industrial hygiene, various studies of chemical reactions, the perfect gas laws and chemical equilibrium and kinetics are pursued. Indoor air quality (EOHS 775), an elective, also introduces material on the physics of airflow and temperature change, and on the properties, transmission and control of airborne biohazards.

Homework assignments in many of the required core courses and in the elective courses help assure that each individual student has assimilated the math and science concepts presented in the classroom. For example, in Biostatistics (PH 750) students must complete seven individual homework assignments involving characterization and analysis of public health data, which are graded and discussed with them in recitation sections. A written report for each laboratory session in Environmental and Industrial Hygiene Lab (EOHS 741) is required, in which the students must present their calculations and results. Three sets of homework problems are submitted by each student, graded and discussed in class in Physical Hazards (EOHS 762).

Term papers in most required and elective courses provide students with an opportunity to enhance research, critical analysis and writing skills. Such term papers are a requirement in the

core courses Environmental Health and Safety (PH 754), Epidemiology (PH 752), Urban Health and Safety (PH 755) and Public Health Care Policy and Management (PH 756), and Occupational Health and Safety (EOHS 702), Toxicology (EOHS 754) and Industrial Hygiene (EOHS 757). In Industrial Ventilation (EOHS 755), students are required to research and write a plan for designing a ventilation system.

#### b. Fieldwork and Capstone – Culminating Experience

All students in the MS-EOHS program are required to complete 3 credits of Supervised Fieldwork (PH 737) and a 3 credit Capstone Seminar (PH 738). The practical, field experience supplements the didactic and theoretical experience of the classroom, allows students to apply and refine their skills in environmental and occupational health, and helps them meet their career goals. The information sheet found in the syllabus explains the prerequisites and requirements for Supervised Fieldwork (PH 737). Before registering for the course, students meet individually with the EOHS faculty Fieldwork Coordinator to develop their fieldwork plan. As part of this process, the students must complete an assessment, indicating their employment history, career goals and work site and project preferences for the fieldwork. Students must identify at least four – seven learning objectives or competencies they wish to master through the fieldwork. At the meeting with the EOHS Fieldwork faculty member, possible work settings and project ideas for field placement are discussed. Based on this discussion, the Fieldwork faculty member then makes several specific recommendations of possible internship sites. The student then contacts the possible fieldwork supervisors and arranges to be interviewed. A follow-up plan and timetable are then mutually agreed upon.

After agreeing upon a work setting and project, students are required to submit a fieldwork contract. Fieldwork may consist of implementation of a program, such as a training course or audit, or it may consist of data collection and analysis. This contract must include a specific work plan with details regarding the nature of data to be obtained, the number and locations of samples to be obtained, how data are to be analyzed, and/or the specific steps for the project to be implemented. The Fieldwork faculty member recognizes that the terms may change after the start of the project. The specific contract guides students to give careful prior consideration to the factors that influence data or project quality. The plan is reviewed and must be approved by the Fieldwork Faculty member before the students' work can officially begin. If some change to the study plan occurs, the EOHS Fieldwork Faculty member, site supervisor and student may agree upon a new contract. The Fieldwork Faculty member remains available to provide assistance to students, as necessary. During the fieldwork course, the student submits a literature summary, a written reflection on the fieldwork experience, and receives an evaluation by their site supervisor. Starting Summer 2013, the student will end the fieldwork with a proposal for the Capstone paper. The fieldwork course is graded as pass/ fail.

After completing fieldwork PH 737, those students allowed to register must complete a Capstone course (PH 738) (formerly EOHS 761). The capstone course requires students to attend a Capstone Seminar, which is designed to assist them in writing a professional quality scientific paper and deliver an oral presentation on some aspect of their fieldwork. The paper and presentation may focus on collection and analysis of data or project implementation. At the start of the course, the student is assigned a capstone faculty member, almost always from the EOHS program. As part of the course, the student submits a proposal for the paper, a literature review,

sections of the paper and ultimately a complete draft capstone paper for review. The draft then reviewed by the student's Capstone faculty member and second SUPH faculty member. The student is provided with written comments, asked to revise the paper based on the comments and resubmitted it for final approval by the Capstone faculty member. If the student achieves at least a grade of B on the paper, the student is deemed to have completed the Capstone and receives a letter grade for PH 738.

Some EOHS-MS students are employed in jobs in which they routinely perform or may obtain permission to perform environmental and occupational hygiene activities. These students may seek conduct a Supervised Fieldwork project at their place of employment, as long as the specific project is not part of their normal duties and is designed to enhance specific EOHS knowledge and skills. Whether the student conducts the fieldwork at his or her place of employment or another organization, the student must obtain approval from the Fieldwork Faculty for the proposed project and follow the steps as described above.

Each year a number of students work on environmental and occupational hygiene research projects either with EOHS faculty, NIOSH ERC faculty, or other health and safety professionals. All ERC scholarship students are specifically encouraged to participate in research studies with EOHS faculty, although this is not and cannot be a term or condition of the scholarship award.

### c. Elective Curriculum

In addition to the 40 credits of required coursework, students must take six credits (2 courses) of elective coursework. See Table 5-2 for a list of potential electives. The number of courses taken, and the particular courses chosen, are decided by the student in consultation with his/her faculty advisor. These courses serve to deepen and broaden the student's grasp of the educational objectives and help to prepare a student for employment. It should be noted that while the two safety courses are electives, students are strongly encouraged by their advisors to take Industrial Safety (EOHS 710) as part of their IH training. To encourage enrollment, safety courses are generally the only EOHS elective courses offered during alternating summer sessions. Thus students who wish to take summer courses, and many of our students do, are guided toward one of the safety courses.

Environmental Chemistry (EOHS 705) is required as a condition of admission for those students who enter the program with a limited background in chemistry. The course presents materials on chemistry as applied to the environment; for example, water quality issues are covered, with an emphasis on quantitative approaches.

Finally, those MS students who focus on Hazardous Substance Management (this focus has been supported by a NIOSH Hazardous Substance Academic Training grant since 1993) must take three specified elective courses. They are Hazardous Waste Management (EOHS 745), Biohazards and Emergency Response (EOHS 770.25) and Environmental Site Assessment and Remediation (EOHS 765). NIOSH trainees are also required to take a 40-hour HAZWOPER course or equivalent, and to take a student fieldwork related to this concentration. All students in the MS-EOHS track are required to complete 3 credits of Supervised Fieldwork (PH 737) and a 3 credit Capstone Seminar (PH 738). The practical, field experience supplements

the didactic and theoretical experience of the classroom, allows students to apply and refine their skills in environmental and occupational health, and helps them meet their career goals.

d. Comprehensive Examination

The questions presented on the comprehensive exam are designed to teach students what to expect when taking the Board examination to become a Certified Industrial Hygienist. Likewise, the conditions maintained while students take the exam are similar to those of the actual Board Certification examination. About 10-15 percent of the questions in the EOHS comprehensive examination involve quantitative calculations. Most of the questions in the exam also involve applications of knowledge in inorganic and organic chemistry, biochemistry, physics, human physiology and other aspects of the biological sciences. For example, as noted above, the sections of the current comp exam cover:

- Environmental Health and Safety
- Environmental and Occupational Toxicology
- Occupational Health
- Industrial Hygiene
- Industrial Ventilation and Engineering Controls
- Noise and Radiation (Physical Hazards)

Describe by example how the review team will be able to relate the display materials, i.e. course syllabi, textbooks, sample student work, etc., to each student outcome. (See the 2013-2014 APPM section II.G.6.b.(2) regarding display materials.)

**4. Attach a flowchart or worksheet that illustrates the prerequisite structure of the program’s required courses**

|          |                                 |   |
|----------|---------------------------------|---|
| PH 754   | Environmental Health and Safety | none  |
| EOHS 702 | Occupational Hlth & Safety      | Prereq: PH 754 or equivalent or EOHS advisor approval |
| EOHS 741 | Env / IH Laboratory             | Co-prereq: EOHS 705 & 757                             |
| EOHS 755 | Ventilation                     | Pre/co-requisite EOHS 702                             |
| EOHS 754 | Toxicology                      | Prereq: PH 754 & EOHS 702                             |
| EOHS 757 | Industrial Hygiene              | Prereq: PH 754 & EOHS 702                             |
| EOHS 762 | Physical Hazards                | none  |
| PH 737   | Fieldwork                       | 18 credits including 3 core courses                   |
| PH 738   | Capstone                        | PH 737  |

**5. For each curricular area specifically addressed by either the general criteria or the program criteria as shown in Table 5-1, describe how your program meets the specific requirements for this program area in terms of hours and depth of study.**

These are described in section 3 above, under (a.) required courses and (c.) elective courses.

**6. If your program has a capstone or other culminating experience for students specifically addressed by either the general or program criteria, describe how this project or experience is based upon the cumulative knowledge and skills acquired in earlier course work.**

This is described in section 3 above, under (b) fieldwork capstone culminating experience.

**7. If your program allows cooperative education to satisfy curricular requirements specifically addressed by either the general or program criteria, describe the academic component of this experience and how it is evaluated by the faculty.**

Not applicable

**8. Describe by example how the review team will be able to relate the display materials, i.e. course syllabi, textbooks, sample student work, etc., to each student outcome. (See the 2013-2014 APPM section II.G.6.b.(2) regarding display materials.)**

Course syllabi, which include the textbooks, include the student outcomes expected from the course. In addition, the student outcomes are listed in Tables 3-1 and 3-2. Sample student work is related to the courses.

Documentation for Fieldwork and Capstone refers to the student outcomes.

## **B. Course Syllabi**

***In Appendix A, include a syllabus for each course used to satisfy the mathematics, science, and discipline-specific requirements required by Criterion 5 or any applicable program criteria. For required courses with multiple sections that do not use a common syllabus, please include a syllabus for each of the different sections.***

**Table 5-1 Curriculum 2013 – EOHS-MS**

| Course<br>(Department, Number, Title)<br>List all courses in the program by term starting with the first term of the first year<br>and ending with the last term of the final year. | Indicate<br>Whether Course<br>is Required,<br>Elective, or a<br>Selective<br>Elective by an R,<br>an E or an SE <sup>1</sup> | Curricular Area (Credit Hours) |                                  |                      |       | Last Two Terms<br>the Course was<br>Offered:<br>Year and,<br>Semester, or<br>Quarter | Average<br>Section<br>Enrollment<br>for the Last Two<br>Terms the<br>Course was<br>Offered <sup>2</sup> |
|---|--|--------------------------------|----------------------------------|----------------------|-------|--|---|
|   |  | Math &<br>Basic<br>Sciences    | Discipline<br>Specific<br>Topics | General<br>Education | Other |  |   |
| PH 754 Environmental Health Safety  | R  |                                | 3                                |                      |       | F12, S13   | 30+   |
| EOHS 702 Occupational Health & Safety   | R  |                                | 3                                |                      |       | F12  | 18  |
| PH 750 Intro to Biostatistics (or PH751 Principles of Biostatistics)  | R  | 3                              |                                  |                      |       | F12, F13   | 30+   |
| EOHS 754 Toxicology   | R  |                                | 3                                |                      |       | S13  | 25  |
| PH 752 Intro to Epidemiology (or PH753 Principles of Epidemiology)  | R  | 3                              |                                  |                      |       | F12, S13   | 30+   |
| EOHS 757 Industrial Hygiene   | R  |                                | 3                                |                      |       | S13  | 10  |
| EOHS 741 Env / Industrial Hygiene Laboratory (4cr)  | R  |                                | 4                                |                      |       | S13  | 12  |
| EOHS 762 Physical Hazards   | R  |                                | 3                                |                      |       | S13  | 15  |
| EOHS 755 Industrial Ventilation / Engineering Controls  | R  |                                | 3                                |                      |       | S13  | 12  |
| PH 755 Urban Health and Society   | R  |                                | 3                                |                      |       | F12  | 12  |
| PH 756 Public Health & Health Care Policy and Management  | R  |                                | 3                                |                      |       | F12, S13   | 30+   |
| Elective Course 1 (Industrial Safety or Env Chemistry suggested)  | E  |                                |                                  | 3                    |       | F12, S13   | 14  |
| Elective Course 2 (Hazardous Materials or Env Audits suggested)   | E  |                                |                                  | 3                    |       | F12, S13   | 15  |
| Comprehensive Exam  | R  |                                |                                  |                      |       | F12, S13   | 6   |
| PH737 Fieldwork (IH)  | R  |                                | 3                                |                      |       | F12, S13   | 10  |
| PH738 Capstone Project (IH)   | R  |                                | 3                                |                      |       | F12, S13   | 12  |
| <b>OVERALL TOTAL CREDIT HOURS FOR THE DEGREE</b>  |  | 6                              | 34                               | 6                    |       |  |   |
| <b>PERCENT OF TOTAL</b>   |  | 13                             | 74                               | 13                   | 0     |  |   |

**Table 5-2 Elective Courses for EOHS-MS Students**

|             |   |
|-------------|---|
| EOHS 705    | Environmental Chemistry                                 |
| EOHS 710    | Industrial Safety and Safety Management                 |
| EOHS 714    | Ergonomics  |
| EOHS 728    | Seminar / Topics in EOHS                                |
| EOHS 743    | Air Resource Management                                 |
| EOHS 745    | Hazardous Waste Management                              |
| EOHS 746    | Water Resources   |
| EOHS 759    | Industrial Processes and Plant Visits                   |
| EOHS 765    | Environmental Audits and Remediation                    |
| EOHS 770.20 | Env and Occ Risk Assessment, Management & Communication |
| EOHS 770.25 | Biohazards and Emergency Response                       |
| EOHS 770.84 | Construction Industry Safety and Health                 |
| EOHS 775    | Indoor Air Quality                                      |

## CRITERION 6 - FACULTY

### A. Faculty Qualifications

*Describe the qualifications of the faculty and how they are adequate to cover all the curricular areas of the program and also meet any applicable program criteria. This description should include the composition, size, credentials, and experience of the faculty. Complete Table 6-1. Include faculty resumes in Appendix B*

During the 2012-13 academic year, the EOHS program employed four full-time and several adjunct EOHS faculty members, who contribute over 150 years of combined experience in teaching, research and practice in labor, government, and private industry. Of the core EOHS faculty, two are tenured, one of whom has been with the program for over 30 years and one has been with the program for eight years. Drs. Caravanos and Mirer are Certified Industrial Hygienists (Caravanos renewal pending). The faculty members have been principal or co-principal investigators in over \$1.8 million of research and training grants since 2001, including about \$150,000 annually in NIOSH Education and Research Center support for the Hunter environmental and occupational hygiene program. They are also actively involved in a variety of regional and national professional organizations. Over the past six years, the faculty has worked towards its goal of increasing student participation in research through NIOSH stipend support and involvement in funded research.

**Dr. Jack Caravanos** has directed the EOHS-MS program since 1997 and led the initial ABET accreditation effort in 2001 and the reaccreditation in 2007. He also directs the EOHS-MPH program, which is accredited by CEPH and oversees the NIOSH Education and Research Center support for the EOHS program. In addition to managing day-to-day activities within the program, Dr. Caravanos teaches 4 courses per year, including Environmental Health and Safety and the Environmental and Industrial Hygiene Laboratory. He was honored in 2006 by the College with the Presidential Award for Excellence in Teaching. His areas of specialty are hazard recognition, instrumentation, exposure assessment, and environmental health. Dr. Caravanos is on the Technical Advisory Board of the Global Alliance on Health and Pollution, of which the Blacksmith Institute is the secretariat, and continues to work on global environmental and occupational health issues. His work with the Blacksmith Institute involves extensive international environmental assessments of hazardous waste sites and the quantification of the global burden of disease due to toxic waste sites. Over the past few years he has traveled to more than 8 countries and has projects in Indonesia, Ghana and India. He was an invited guest to a World Bank sponsored environmental management symposium in Bellagio, Italy in the fall of 2007. Most recently (June 2013) Dr. Caravanos was an invited member to the World Health Organization's first meeting on eWaste and Children's Health in Geneva. In the past, he has worked with UNEP on an air quality modeling project and was invited to present at a regional UN-Basel Conference in Trinidad on lead battery recycling. He continues to do international EHS work and is commonly sought for expert witness testimony in toxic torts litigation nationally. He has testified on behalf of plaintiffs in asbestos, indoor air, workplace poisonings (FELA), and adult and childhood lead poisoning cases. Most recently his expertise was sought on using XRF technology to identify specific elements as part of a large toxic tort claim against

the manufacturers of Chinese Wallboard (major environmental health problem is newly remodeled homes in the Southeast USA).

**Dr. Franklin Mirer** is a toxicologist and certified industrial hygienist. His primary scientific interest is exposure and risk assessment in the occupational environment, and regulatory policy. He brings over 30 years of experience outside academia, many of which were spent as director of the United Auto Workers (UAW) Health and Safety Department. While at the UAW, he co-authored a dozen research papers in peer reviewed journals, and a similar number of review and policy papers, served on many governmental and professional committees and testified before Congress and OSHA on many issues related to occupational health and safety and risk assessment practice and policy. His current active research concerns the scientific and policy issues regarding promulgation of OSHA chemical exposure and other standards. He is also interested in evaluation of facility injury and illness records for targeting prevention programs and measuring progress. His teaching interests include toxicology, environmental chemistry, occupational and environmental health law, noise and radiation. Dr. Mirer was appointed Professor of Environmental and Occupational Health in September 2006. Previously, he served as Director of the UAW Health and Safety Department from 1982 to 2006, and participated in each round of automobile industry collective bargaining since 1976. He joined the UAW staff in 1975 as an industrial hygienist. Among other results, those negotiations established major labor management administered funds for research and training. Dr. Mirer participated in the distribution of close to \$20 million in funding to university-based investigators since 1984. Dr. Mirer also administered training grants to the UAW from NIEHS, OSHA and the State of Michigan. These grants totaled about \$12 million over two decades. He co-authored 12 papers reporting morbidity and mortality in the U.S. auto industry in peer reviewed journals, including the American Journal of Industrial Medicine, Journal of Occupational Medicine and the American Journal of Public Health. He has published peer reviewed papers on risk assessment and regulatory policy, and reviewing health studies in the auto industry. He authored two chapters in the ILO Encyclopedia of Occupational Safety and Health.

**Dr. Grace Sembajwe** is an industrial hygienist and epidemiologist and has been working in clinical sciences and exposure assessment for the past 19 years. Dr. Sembajwe joined the CUNY SPH faculty just over a year ago and in that time additionally developed 2 new courses in Ergonomics and Environmental Occupational Epidemiology. Her research interests include investigating the multi-factorial contributors to early mortality in occupational cohorts by integrating qualitative and quantitative information about the environment, physiological burden, and exposure modeling with multilevel analysis. To date, her work has focused on the social patterning of physical, chemical and psychosocial exposures in retail workers, bus drivers, electrical light fixture manufacturers, and meatpackers, by developing job exposure matrices (JEMs) for the participating industries. She is also currently working on another large cohort study of over 20,000 gas and electricity workers employed by EDF-GDF in France, through GAZEL (a prospective study of gas and electrical workers in France) with INSERM, the French national institute of health and medical research. In this study the aim generally is to understand the joint impacts or interactions among toxic, ergonomic and psychosocial exposures. She is also evaluating biological markers of chemical exposure and pain among direct patient care workers in two Boston hospitals. Dr. Sembajwe is co-Principal Investigator with Dr. Dean Hashimoto, Chief of Partners Occupational Health in Boston, on a Robert Wood Johnson

Foundation grant for biomarkers of pain and cardiovascular disease. She is also Principal Investigator for a project examining employee biological monitoring for exposures to antineoplastic drugs, funded by the Massachusetts General Hospital Council for Technology Adoption and Innovative Process. Based on this exposure study, she aims to investigate designing and implementing a surveillance system that takes into account the (a) days of exposure; (b) mechanisms of uptake; (c) bio-physiological burden and ways in which to measure this burden; (d) policies and organizational factors that influence the implementation of an intervention (long-term surveillance system); (e) physical/engineering factors; and (f) that recognizes that options for personal protective equipment should be a last resort and that point source as well as environmental controls are preferred. In a recently funded study with Dr. Mirer, she is also conducting an analysis of injury and illness records in the United States, in relation to inspection information from the Department of Labor. Her continued pursuits include building upon current research to evaluate the impacts on public health and health disparities of environmental conditions such as air pollution, climate, noise, housing-related and workplace exposures, especially as they relate to health and safety problems for workers and their families.

**Elizabeth Glass Geltman** was a Visiting Associate Professor in the EOHS program over the past year, and will be joining the faculty on a tenure-track line beginning in September 2013. She joins the faculty with over twenty-five years' experience in environmental policy. Prof. Geltman is the author of dozens of journal articles and numerous books on issues concerning energy, the environment and natural resources, including *Recycling Land*, *Modern Environmental Law* and *A Complete Guide to Environmental Audits*. She began her career working on domestic and international energy and hazardous waste issues and was active in drafting implementation regulation for both Superfund and the Clean Air Act Amendments of 1990. She helped draft state, federal and international Brownfields, environmental audit privilege, and lead legislation and regulation. She has extensive experience designing environmental audits, environmental compliance programs and conducting environmental risk assessment in both public and private settings. This past year she organized three panel symposiums at the CUNY School of Public Health on the public health implications of climate change and shale gas extraction (aka fracking). Her current research interests include a book on the public health implications of fracking and market based mechanisms for improving environmental compliance. Prof. Geltman teaches Environmental Health & Safety, Environmental Public Health Problems, Environmental Law, Environmental Audits, Hazardous Waste and Health Law.

**Dr. Susan Klitzman**, previously a tenured professor in the EOHS program is now the Associate Dean for Academic Affairs of the CUNY School of Public Health. She has numerous peer-reviewed publications in occupational and environmental health and epidemiology, in high-impact journals including *American Public Health Association Journal* and *Journal of Environmental and Occupational Hygiene*. She was formerly Assistant Commissioner for Environmental Risk Assessment and Communication in the New York City Department of Health. The CUNY School of Public Health is conducting a search to fill the open line vacated by Dr. Klitzman.

### ***Adjunct Faculty***

Our adjunct faculty members, who have collectively many years of specialized practical experience in the field, are an important source of strength to the EOHS program.

**Mr. Philip Hauck** has nearly 30 years of experience in environmental and occupational hygiene and environmental health and safety with expertise in biological hazards. He currently works at Mt. Sinai School of Medicine, where he oversees the Institutional Biosafety Program. In addition to his work as an adjunct faculty in the EOHS program, Mr. Hauck also served on the faculty of the Hunter College Bioterrorism Certificate program. He teaches EOHS 770.25: Biohazards and Emergency Response.

**Dr. Ben Sallemi** has been teaching the Environmental Audits and Remediations course since 2009. Though EOHS 765 is not required of industrial hygiene students, this well designed and popular course is taken for elective credit by IH students. Dr. Sallemi is an experienced environmental assessment professional and works full time for the firm, GZA Environmental Inc. in New Jersey.

**Dr. K. Koshy** works full time as a program manager at Rutgers University School of Public Health; Center for Education and Training, where he oversees the continuing education program at the ERC funded site (formally UMDNJ). Dr. Koshy is a hazardous materials training specialist and has taught the elective course, EOHS 745 Hazardous Materials and Waste Management, since 2008. Completion of this course allows students to ultimately earn their *40 hr HZWOPER Training certificate as per 29 CRF 1910.120*.

**Mr. Richard Mendelson** is Assistant Administrator for US DOL OSHA Region 2 and a Hunter College MS graduate. He regularly teaches EOHS 710 Industrial Safety and Safety Management and EOHS 770 Construction Industry Safety and Health. These are very popular electives and Mr. Mendelson has received exceptional praise by students. These courses are usually well subscribed and offered alternatively every other year. Mr. Mendelson is also a CSP and CIH.

**Dr. Mark Goldberg** has retired from Hunter College EOHS program but periodically returns to teach courses in industrial hygiene. Most recently he taught EOHS 757 Ind. Hygiene with eight students attending and one from Mount Sinai School of Medicine. We are very fortunate to have Prof. Goldberg available to provide his many years of expertise to our EOHS students.

In addition to adjunct faculty, EOHS draws upon colleagues in ERC sister institutions (Mount Sinai School of Medicine, UMDNJ, NJIT) for participation in particular courses. This represents a sizable pool of respected professionals in occupational medicine, nursing, and safety, covering many specialties. For example, the Site Visits class is taught by faculty from Hunter College and UMDNJ and has students from Hunter, UMDNJ, NJIT, NYU, and Mt. Sinai.

### **B. Faculty Workload**

***Complete Table 6-2, Faculty Workload Summary and describe this information in terms of workload expectations or requirements for the current academic year***

CUNY faculty members at the rank of Assistant, Associate and Full Professors are contractually obligated to teach seven courses (21 hours) per academic year. Most courses are worth 3 contact hours. Released time may be granted for administrative duties or research, if the faculty member receives research grants to fund his/her replacements with adjuncts. In addition, new faculty members (i.e. Professors Sembajwe and Geltman) receive 24 credits of released time from teaching, to be utilized within the first five years to support their research. The Program Director, Professor Caravanos receives 9 contact hours of released time, which is offered, on occasion, to individual faculty members to cover extraordinary administrative tasks. The faculty workload for 2012-2013 is shown in Table 6-2. All fulltime EOHS faculty were given some release time for research, administrative activities, or both.

A typical teaching load for faculty is two courses per semester. Research responsibilities vary by faculty and range from tens to hundreds of thousands of dollars per project within EOHS. Publication of one or two papers per year is currently expected for tenure and promotion. Additionally, service to the Program, School, College, University, and to professional organizations is expected. Table 6-1 shows the experience and level of technical involvement of each faculty member

The EOHS program relies on its four full-time professional environmental and occupational hygiene faculty members and a group of specialist adjunct faculty members to teach EOHS core and elective courses. Public Health curricular requirements are taught by faculty in all programs within the SUPH. Faculty members are well qualified to teach their courses; they have diverse academic and professional backgrounds and diverse interests. In addition to their academic training, the experience and skills that faculty members bring to their classrooms have been gleaned from work within trade unions, local and federal government, and major health care institutions; from training of professionals at major regional training institutes; as well as from consulting to a broad variety of private and public organizations on environmental and occupational health and hygiene issues. The faculty are active in, and have major ties with, numerous health and safety and public health organizations in this country and abroad. This diversity enables them to synthesize for EOHS students the principal competencies of industrial hygiene with technical and policy issues. The faculty provides students with an excellent mix of theory and practice geared to real-world industrial hygiene practice. Faculty qualifications are documented in detail in their curriculum vita attached in Appendix B.

### **C. Faculty Size**

***Discuss the adequacy of the size of the faculty and describe the extent and quality of faculty involvement in interactions with students, student advising, and oversight of the program***

We believe that our current four faculty members have sufficient background to teach our broad curriculum, establish an adequate research base and provide a critical mass for intellectual and academic support for faculty and students. The additional faculty member for whom we are now searching will add further to our capabilities. EOHS faculty members are continuously and energetically involved with their students. Advisors monitor their advisee's progress toward fulfilling all their course requirements for graduation, and they alert students about fulfilling their internship responsibilities. All EOHS faculty members must hold office hours for at least two

hours per week, and these must be posted on their office door. Also, advisor's office hours and their office locations, phone numbers and email addresses are distributed in class to all SUPH students at the beginning of each semester.

Dr. Frank Mirer supervises all EOHS-MS student fieldwork (PH737) and Capstone (PH 738). The field placement involves intermittent interaction and the Capstone continuous interaction with faculty. At minimum, the Fieldwork faculty member is in contact with students at several key junctions, for the following purposes: 1) to conduct an assessment of students' individual academic and professional skills and objectives for the fieldwork; 2) to agree upon a specific field placement and project; 3) to respond to specific questions and problems during the conduct of the fieldwork; and 4) to review and provide feedback to students on a draft and final report, summarizing the fieldwork experience. Dr. Mirer is also the faculty member assigned to Capstone (PH 738), in which a student writes a paper either describing activities during fieldwork, or analyzing data.

As Program Director, Dr. Caravanos is responsible for providing day-to-day oversight of the EOHS program. This involves monitoring the admission of new students, progress of current students, course planning scheduling, student and program assessment, and other related duties.

#### **D. Professional Development**

*Provide detailed descriptions of professional development activities for each faculty member*

EOHS faculty are encouraged by the Program Director to take professional development courses to enhance or update their skills. Funding from the NIOSH ERC helps to support these efforts as well as periodic allocations from the Dean or President's office. Each fall semester, the President's Office announces several initiatives to support travel to conferences and specialized development in instructional technology practices. Professors Caravanos and Mirer have received such travel awards in the past and Caravanos was awarded funds to create a hybrid version of the required core course PH 754. New faculty are given "start-up" funds (upwards of \$30,000) that can be used at their discretion for equipment, education or attending conferences. Professor's Geltman and Sembajwe have received such start up funds.

All faculty are involved in their respective professional associations (AIHA, APHA, legal forums) and attend both national and regional meetings. The faculty are particularly involved in the Metropolitan AIHA chapter which is also very well represented by our alumni. Finally, the Continuing Education Program of the ERC, based at Rutgers University, offers dozens of courses. EOHS faculty are eligible to take any of these courses for a nominal fee. For example, Professor Sembajwe will be taking the OSHA 511/501 course sequence in 2013/2014 so she can become a certified provider of the OSHA 10 and 30 hr. courses. This will enable our students to receive this certification when she teaches EOHS 702.

#### **E. Authority and Responsibility of the Faculty**

*Describe the role played by the faculty with respect to course creation, modification, and evaluation, their role in the definition and revision of program educational objectives and*

***student outcomes, and their role in the attainment of the student outcomes. Describe the roles of others on campus, e.g., dean or provost, with respect to these areas.***

Contractually, all faculty are required to account for 21 hours of student contact per semester. Given each course is 3 hours, this equates to 7 courses per academic year. New faculty (Geltman and Sembajwe) have been given a permanent 3 hour release for unsponsored research thereby reducing their teaching load to 6 courses per year. Furthermore, new tenure track faculty (Geltman and Sembajwe) are given 8 course releases to be used during the first 4 years so as to stimulate and allow time for sponsored research. This reduces the teaching load of new faculty to approximately 4 courses per academic year during the first 4 years.

In addition to teaching, all faculty are required to provide at least 4 hours / week of office time for student advisement. Finally, faculty are required to participate on committees and various activities in the School.

The Program Director has the authority to schedule classes and assign teaching loads. He also monitors the progress of new faculty and conducts yearly evaluations. For a faculty member to be promoted and/or tenured, they must demonstrate a sustained effort and excellence in teaching, scholarly activities and service. It is the responsibility of the faculty to adhere to the mission of the SPH and ensure the program outcomes of all accrediting agencies are met.

**Table 6-1. Faculty Qualifications**  
EOHS-MS (Hunter)

| Faculty Name             | Highest Degree Earned- Field and Year | Rank <sup>1</sup> | Type of Academic Appointment <sup>2</sup><br>T, TT, NTT | FT or PT <sup>3</sup> | Years of Experience |          |                  | Professional Registration/<br>Certification | Level of Activity <sup>4</sup><br>H, M, or L |                          |                                    |
|--------------------------|---------------------------------------|-------------------|---|-----------------------|---------------------|----------|------------------|---|--|--------------------------|------------------------------------|
|                          |                                       |                   |   |                       | Govt./Ind. Practice | Teaching | This Institution |   | Professional Organizations                   | Professional Development | Consulting/summer work in industry |
| Caravanos, Jack          | DrPH, env health, 1984                | ASC               | T   | FT                    | 1                   | 36       | 36               | CIH (r)                                     | M  | M                        | H                                  |
| Bhaduri, Sikha           | PhD, 1991                             | O                 | TT  | FT                    | 0                   | 3        | 3                |   | M  | M                        | L                                  |
| Mirer, Franklin E.       | PhD, organic chemistry, 1972          | P                 | T   | FT                    | 31                  | 7        | 7                | CIH   | H  | M                        | M                                  |
| Geltman, Elizabeth Glass | J.D., 1986; LL.M., 1988               | ASC               | TT  | FT                    | 30                  | 12       | 1                | Law license                                 | L  | L                        | M                                  |
| Goldberg, Mark           | PhD, 1969                             | ASC               | NTT   | PP                    | 8                   | 29       | 23               | CIH   | M  | M                        | M                                  |
| Hauck, Philip            | MS, Industrial Hygiene, 1989          | I                 | NTT   | PT                    | 20                  | 6        | 6                | CIH, RBP, CBSP, SM, CPEA                    | H  | H                        | M                                  |
| Koshy, Koshy             | PhD, Env Science 1997                 | AST               | NTT   | PT                    | 15                  | 5        | 5                |   | M  | M                        | M                                  |
| Mendelsohn, Richard      | MS, Industrial Hygiene 1995           | I                 | NTT   | PT                    | 20                  | 4        | 4                | CIH, CSP                                    | H  | M                        | L                                  |
| Sallemi, Benjamin        | PhD, Env Science 2012                 | AST               | NTT   | PT                    | 5                   | 4        | 4                | Env Auditor                                 | H  | M                        | H                                  |
| Sembajwe, Grace          | ScD. Epidemiology, 2007               | ASC               | TT  | FT                    | 14                  | 6        | 1.5              |   | H  | H                        | M                                  |

1. Code: P = Professor ASC = Associate Professor AST = Assistant Professor I = Instructor A = Adjunct O = Other

2. Code: TT = Tenure Track T = Tenured NTT = Non Tenure Track

3. At the institution

4. The level of activity, high, medium or low, should reflect an average over the year prior to the visit plus the two previous years.

**Table 6-2. Faculty Workload Summary**  
EOHS MS (Hunter)

| Faculty Member (name)    | PT or FT <sup>1</sup> | Classes Taught (Course No./Credit Hrs.)<br>Term and Year <sup>2</sup>  | Program Activity Distribution <sup>3</sup> |                         |                    |                                   |
|--------------------------|-----------------------|--|--|-------------------------|--------------------|-----------------------------------|
|                          |                       |  | Teaching                                   | Research or Scholarship | Other <sup>4</sup> | % of Time Devoted to the Programs |
| Caravanos, Jack          | FT                    | PH 754 (3/3) fall/spring 2012-13; EOHS 705 (3/3) fall 2012, EOHS 741 (4/6) fall 2012, EOHS 747 (3/3) spring 2013   | 50   | 15                      | 35                 | 100                               |
| Geltman, Elizabeth Glass | FT                    | PH 754 (3/3) fall/spring 2012-2013, COME325 3cr, spring 2012   | 57   | 14                      | 29                 | 100                               |
| Goldberg, Mark           | PT                    | EOH 757 (3/3) spring 2013  |  |                         |                    |                                   |
| Mirer, Franklin E.       | FT                    | PH 737 (3/3) fall/spring 2012-13, PH 738 (3/3) fall/spring 2012-13, EOHS 754 (3/3) spring 2013   | 57   | 43                      | 0                  | 100                               |
| Hauck, Philip            | PT                    | EOHS 770.25 (3/3) spring 2013  | 100  | 0                       | 0                  | 14                                |
| Koshy, Koshy             | PT                    | EOHS 745 (3/3) spring 2013   | 100  | 0                       | 0                  | 14                                |
| Mendelsohn, Richard      | PT                    | EOHS 710 (3/3) summer 2012   | 100  | 0                       | 0                  | 14                                |
| Sallemi, Benjamin        | PT                    | EOHS 765 (3/3) fall 2012   | 100  | 0                       | 0                  | 14                                |
| Sembajwe, Grace          | FT                    | EOHS 755 (3/3) fall 2012, EOHS 762 (3/3) spring 2012, EOHS 702 (3/3) fall 2012, EOHS 714 (3/3) sum 2013, EOHS 730/ (3/3) (also listed as EPI 759 and PUBH 851) spring 2013, PUBH 890 (3/3fall 2012, COMHE 325(3/3) spring 2011 | 80   | 15                      | 5                  | 100                               |

1. FT = Full Time Faculty or PT = Part Time Faculty, at the institution
2. For the academic year for which the Self-Study Report is being prepared.
3. Program activity distribution should be in percent of effort in the program and should total 100%.
4. Indicate sabbatical leave, etc., under "Other."
5. Out of the total time employed at the institution.

## CRITERION 7. FACILITIES

### ***A. Offices, Classrooms and Laboratories:***

***Summarize each of the program's facilities in terms of their ability to support the attainment of the student outcomes and to provide an atmosphere conducive to learning***

#### ***OFFICES:***

In August 2011, the SPH moved to a new 147,000-square-foot state-of-the-art LEED certified building in East Harlem on 119th Street and Third Avenue. The SPH/SSW building consists of eight stories, a basement and houses an auditorium, academic science classrooms, a cafeteria, scientific laboratories and ample room for faculty and staff offices. A student/faculty common area encourages faculty and students to meet, converse and socialize. The new facility is also the new home of the Hunter College School of Social Work.

The SUPH/SPH faculty occupy the 5<sup>th</sup>, 6<sup>th</sup>, and 7<sup>th</sup> floors, with the 3<sup>rd</sup> floor allocated to student services (admissions, registrar, etc.) - A total of 40 faculty offices, 5 senior administrative staff offices and 11 support staff offices are designated to the SPH. The EOHS faculty have offices on the 5<sup>th</sup> floor (Geltman and Sembajwe) and on the 7<sup>th</sup> floor (Caravanos and Mirer). Each faculty office is approximately 180 square feet and contains bookcases, a full size desk, computer and printer. In addition to faculty space, the EOHS program has 4 designated workstations (cubicles) on the 5<sup>th</sup> floor for use by EOHS adjuncts, students and/or research staff. Each station contains a computer and is wired to a shared printer.

#### ***CLASSROOMS:***

All classrooms are located on the 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> floors and at a minimum have an integrated computer station with permanently attached LCD ceiling projectors and full size white board. Two classrooms are labeled "Smart" and contain completely digital boards with the ability to save written text and audio. Finally, two classrooms (217, 220) are completely digital and designed for distance learning. A summation of the available rooms for EOHS instruction is presented below:

- 14 large classroom (38-48)
- 6 small classrooms (25-30 seats) of which 3 are "smart"
- 8 small conference rooms (8-16)
- 2 distance learning classrooms (20, 50)
- 1 large auditorium (160)
- Faculty lounge
- Gallery and Terrace

#### ***LABORATORIES:***

The laboratory facility, which totals 5 rooms, is located on the commons level (basement) and is shared by the Nutrition and Food Science Programs. The EOHS program has a large fully equipped wet chemistry laboratory (Room C-14) with 18 student workstations. Each station has access to water, gas, electrical and vacuum. The main teaching lab is fully digital and contains two large LCD monitors and a Smart Board for forward projection. The lab also has a chemical fume hood, laminar flow hood, Revco freezer, microbial incubator/oven, wash station and an emergency shower.

In addition to the teaching lab, the EOHS program has a 500 square foot practice/research lab whereby all equipment is stored, calibrated and managed. This room (C-14b) also contains a chemical fume hood, sink, autoclave, work tables and numerous storage racks. The laboratory is managed by Dr. Sikha Bhaduri, a full-time college laboratory technician assigned to the EOHS and Nutrition program. Dr. Bhaduri is responsible for laboratory maintenance, ordering, and recordkeeping.

### **B. Computing Resources:**

*Describe any computing resources (workstations, servers, storage, networks including software) in addition to those described in the laboratories in Part A, which are used by the students in the program. Include a discussion of the accessibility of university-wide computing resources available to all students via various locations such as student housing, library, student union, off-campus, etc. State the hours the various computing facilities are open to students. Assess the adequacy of these facilities to support the scholarly and professional activities of the students and faculty in the program*

As is common to all large colleges and university, Hunter College has a comprehensive computing office called ICIT (Instructional Computing and Information Technology). ICIT manages all computer hardware, software and networking services at the college including the School of Public Health. The specific services provided by ICIT are:

- Blackboard® course management services
- CUNYfirst (registration and student records management system)
- Email
- Software
- Telephone
- Wireless
- Workshops and trainings

The college has an extensive network of computer labs and public access computer stations throughout all its buildings. At the SPH such facilities and equipment is state of the art (given it was recently built). All areas of the building have 24/7 secure Wi-Fi Internet access. In addition, all classrooms have a ceiling-mounted data/video projector and a media-control panel. There are also facilities for video conferencing and distance learning.

The main computer labs are on level-C. There are four large computer labs, each having 24 modern computer stations as well as a Smart Board at the front of each lab. Commonly used software is installed on each computer such as Word, Excel, PowerPoint, Adobe Reader, QuickTime, Google Earth as well as program specific software such as SPSS, SAS, ArcGIS, Mathematica, EndNote and Refworks. EOHS specific software such as CAMEO, ALOHA, MARPLOT, IEUBK, and industrial hygiene exposure modeling software are distributed and taught during the appropriate courses. These computer classrooms are reserved for courses needing computer software training (Biostatistics, Epidemiology, GIS etc.) but when not used are open labs for students to complete their assignments, conduct data analysis, research or practice various skills. The computer rooms are open at all times when the building is open (7am-11pm M-F and 9am-5pm on Saturday).

The faculty and staff have up-to-date computers and printers in their offices and access to college emails and the Blackboard™ platform for courses. Access from off campus is available for all these resources, either directly to the campus communications server or through the web. Given the modern nature of the building, the computing and library facilities more than adequately address the needs of EOHS students. ICIT is continuously improving bandwidth, software options, educational hardware and has instituted a 3 year replacement policy with all faculty computers. Such commitments ensure EOHS students will have access to all necessary resources to complete their degrees.

### **C. Guidance:**

*Describe how students in the program are provided appropriate guidance regarding the use of the tools, equipment, computing resources, and laboratories*

Each ABET IH student must complete the environmental and industrial hygiene laboratory class (EOHS 741). At the first meeting of the class, students are presented with the laboratory guidelines and instructions as well as given a tour. Since these are health and safety students, reviewing the emergency procedures and devices in a chemistry laboratory, not only makes good practice, but also educates them as to the nuances of laboratory safety (i.e. smoke detectors, eye wash stations, drains, medical waste containers, ventilation systems and negative airflow, emergency shut off valves, etc.).

For computing education and guidance, instructors implement this as needed during the applicable courses. Since our students are graduate students, their computer skills are already polished and supplemental education is usually not necessary. Finally, the Office of Instructional Computing offers numerous workshops and trainings on most every topic and software application. Students are eligible to register for any of these trainings should their skills need refreshing.

**D. Maintenance and Upgrading of Facilities:**

*Describe the policies and procedures for maintaining and upgrading the tools, equipment, computing resources, and laboratories used by students and faculty in the program*

As stated earlier, the program has a full-time college laboratory technician assigned to manage the laboratory facility, equipment and supplies. Dr. Bhaduri has been at Hunter College for several years and works closely with the laboratory instructors (Caravanos and Devito) to ensure equipment is properly maintained and stored. Dr. Bhaduri works closely with Professor Caravanos to ensure laboratory supplies are ordered and everything needed by students is available during the laboratory classes.

The SPH has a modest budget for ordering expendable supplies which is supplemented with NIOSH funding. Between the college and NIOSH ERC funding, approximately \$7000 is available annually for equipment repair and maintenance, new equipment, and expendable supplies. To date this seems to be adequate, however, as old equipment reaches its shelf life, new and modern equipment will have to be ordered. Miscellaneous training and research grants have provided additional funds for new equipment purchase; however, additional funds may be needed in years to come to ensure an adequate collection of state-of-the-art air monitoring equipment.

**E. Library Services:**

*Describe and evaluate the capability of the library (or libraries) to serve the program including the adequacy of the library's technical collection relative to the needs of the program and the faculty, the adequacy of the process by which faculty may request the library to order books or subscriptions, the library's systems for locating and obtaining electronic information, and any other library services relevant to the needs of the program*

All CUNY students, faculty and staff have full access to all libraries in the CUNY system. The combined libraries of the University's 23 colleges house more than 8.0 million volumes: 41,000 journal subscriptions, and numerous other works in a variety of formats including CD-ROMs, slides, films, electronic books, and licensed electronic resources. Increasingly, the CUNY libraries operate as a single, coordinated system.

The Social Work and Public Health library's collection includes 50,000 monographs, a wide array of electronic books, print and electronic reference materials, over 200 print journals, 100,000 electronic journals, and over 200 electronic databases. Students and faculty can access electronic resources on-campus with computers in the library and the computer lab as well as off-campus through remote online access using their Hunter NetID.

The library is a delivery / pick up site for CLICS, which facilitates the sharing of books between all of the CUNY system libraries at the request of CUNY faculty and staff directly through the catalog. Books can be requested from another CUNY library, using the “Request” option on the CUNY+ catalog page. If a book that is not available through any CUNY library or an article not available through SWPHL is needed, the student or faculty member may request it from Inter-library Loan - a national consortium of libraries with which Hunter libraries share resources. Books are sent by mail and articles are sent electronically.

On the main floor of the library, there are seven group study rooms, individualized study areas, access to the print reference and periodical collections, a printing station, photocopiers, scanners and adaptive technologies. Group study rooms can be reserved up to a week in advance. Group study rooms must be reserved at the circulation desk in person for a group of at least two persons. The library’s lower level is accessible by stairway and elevator. It contains the library's freely browse-able print collection.

**F. Overall Comments on Facilities:**

*Describe how the program ensures the facilities, tools, and equipment used in the program are safe for their intended purposes (See the 2013-2014 APPM II.G.6.b.(1))*

The Environmental Health and Safety Office of Hunter College is charged with ensuring the campus complies with all federal, state and local environmental and occupational health and safety requirements. The office has three full-time staff and is directed by Ricardo Franco (a Hunter College EOHS graduate). All laboratories are inspected on a periodic basis by the EHS office. Fire permits, hazardous materials labeling and storage, safety showers, venting, as well as fume hood testing are just some of the issues monitored by this office. In addition, according to NYC Fire Department regulations, each lab must have a person designated with a “Certificate of Fitness”. Dr. Sikha Bhaduri has a FDNY Certificate of Fitness and operates as the designated person for lab safety at SPH. We are confident that the college and program operate in a safe and healthful manner.

## CRITERION 8. INSTITUTIONAL SUPPORT

### A. Leadership

*Describe the leadership of the program and discuss its adequacy to ensure the quality and continuity of the program and how the leadership is involved in decisions that affect the program*

The EOHS program is one of five programs within the SUPH. Under Program Director Jack Caravanos, and the SUPH Interim Dean, Neal Cohen, the EOHS Program has the proper combination of institutional support, financial resources and constructive leadership to assure the continued strength and viability of this program.

The current ABET-IH program is housed in the EOHS program of the newly established CUNY SPH. This school is comprised of four consortial campuses: Hunter College, Brooklyn College, Lehman College and the Graduate Center. In 2011, the SPH was granted an initial 5-year accreditation by CEPH. The Dean of the SPH reports directly to the Chancellor allowing access to members of the Chancellery and the Board of Trustees via a variety of formal meetings as well as on an as-needed basis. Reporting to the SPH Dean is an Associate Dean for Academic Affairs and a Senior Vice Dean. Each consortial campus in the SPH has a campus director who reports to the SPH Dean and oversees the degree offerings and other public health components on their respective campus. The administrative structure for the CUNY SPH is shown in Figure 1a, Background Information.

The EOHS-MS program was first accredited by ABET in 2001 and was re-accredited in 2007. While the administrative structure of the School has changed over the years, the ABET-accredited MS program has remained largely intact and unchanged. The present Program has five academic lines of which two are occupied with tenured faculty (Caravanos and Mirer) and two with tenure track faculty (Geltman and Sembajwe). We are currently searching for a fifth EOHS faculty member. For more information on EOHS faculty, see Criteria 6, Faculty.

With regard to leadership, Prof. Jack Caravanos has been Program Director since 1997 and continues to work with faculty to (1) ensure its students are strong and well prepared for EOHS careers (2) provide community and professional EOHS service and (3) contribute to the scholarship of industrial hygiene. As per SUPH by-laws, program directors are elected every three years from within the program. Professor Caravanos was recently unanimously elected by the faculty of EOHS for another three year term ending in August 2016. The Program Director works collaboratively with his/her faculty, the Campus Director and school administration to assure continuity and consistency and to optimize college and school goals.

The schools of public health accrediting agency CEPH, mandates that each of the core public health knowledge areas, including EOHS, maintain five full time faculty members. This means that at least five faculty lines are assigned to EOHS. Together with an experienced staff, the college commitment of five full time faculty in the EOHS program will also guarantee that administrative and academic requirements are satisfied. A search is currently underway for a fifth full time EOHS faculty member. Associate Dean for Academic Affairs Susan Klitzman, a former EOHS Program faculty member, currently maintains close ties to EOHS Program activities, including attending some EOHS faculty meetings and is heading the search committee for the open faculty line.

## **B. Program Budget and Financial Support**

### ***1. Describe the process used to establish the program's budget and provide evidence of continuity of institutional support for the program. Include the sources of financial support including both permanent (recurring) and temporary (one-time) funds***

The funds to support the EOHS program are derived from several sources:

- Tax-levy dollars, which are approved by the New York State Legislature and Governor, assigned to Hunter College by the CUNY Chancellor and Board of Trustees, and allocated to the Public Health Program by the Hunter College President, Provost and Dean. Tuition from students goes into a general fund that returns to New York State; it is not allocated directly to the Program or School.
- Support for training, research and service projects from external sources (and to a lesser extent from within CUNY) that are allocated either to a specific faculty member(s) to accomplish specific goals, or as in the case of Hunter's NIOSH ERC funds to support the program through scholarships and adjunct faculty salaries.
- Endowment and scholarship funds, which are used to support student scholarships, research awards or other specific functions, designated by the donor. Some funds provide only interest income; for others the principal also can be spent. Presently there is approximately \$30,000 available in 3 scholarship / endowment accounts.
- Contributions from alumni: Currently the EOHS program has an account balance of about \$1,200 with about \$250 in contributions coming in each year.

The process by which the tax-levy funds are allocated is straightforward and collegial. First, the needs of each program that make up the CUNY SPH are discussed with the Dean of the SPH. These proposals are then moved up the ladder of authority to the Provost and President of Hunter College, and then to the Chancellor of CUNY. With the needs of all State agencies before them and their own collective sense of economic perspectives and social priorities, the Governor of the State of New York and the NYS Legislature then determine the budget for the State, and State agencies such as CUNY. The State took over responsibility for CUNY during the fiscal crisis of the 70's, and currently provides all the public, tax-levy funds for CUNY's four-year colleges and graduate programs, including Hunter.

With the State budget for CUNY allocated, the Chancellor distributes a dollar amount to each CUNY institution including the SUPH. In addition, the President of Hunter College in consultation with the Provost allocates Hunter's monies to the different Hunter programs (i.e. public health). The Dean then allocates resources to the each SUPH program.

***2. Describe how teaching is supported by the institution in terms of graders, teaching assistants, teaching workshops, etc.***

There is no contractual or other formal agreement to provide teaching assistants or graders to faculty. But given the relative small size of EOHS courses, teaching assistants are usually not necessary. The course management system Blackboard ® is extremely powerful and has made managing day-to-day course activities simpler and more efficient. To assist faculty in learning and maximizing this complex software, the college has extensive training programs offered through ICIT. In addition, the Provost's office launch a "Tech Thursday" instructional series whereby faculty meet for lunch at a 2 hour presentation by a panel of experts on various instructional technologies. In the past, these have included such topics as making "YouTube" style videos, recording lectures, online exams and automatic grading systems. Professor Caravanos, generally regarded as a first adopter and a proficient user of instructional technology, has been invited to present three times at these sessions. In short, if faculty wish to explore instructional technology, an educational specialist will be assigned to them and help them reach their objectives.

In addition to workshops on instructional technology, the college offers several options for faculty to improve their teaching and communication skills. The Teaching and Learning Lab at the main campus offers personalized sessions and periodic workshops to help faculty improve.

***3. To the extent not described above, describe how resources are provided to acquire, maintain, and upgrade the infrastructures, facilities, and equipment used in the program***

There are several other options for bringing in resources to the college. Firstly, all new faculty are offered start-up packages. These funds are unrestricted and can be spent to hire student teaching assistants, purchase equipment or take continuing education courses. The funds do not expire and offer new faculty the opportunity to evaluate their own needs and spend accordingly. Secondly, training and research grants together with contracts offer the ability to purchase equipment, supplies or hire assistants. During the past cycle, EOHS received training, research and contracts from NYC Department of Environmental Protection, NIOSH, Mount Sinai, NYC Mayor's Fund, Professional Staff Congress and numerous other agencies or groups. These awards allow faculty to supplement college funds.

***4. Assess the adequacy of the resources described in this section with respect to the students in the program being able to attain the student outcomes***

Presently, the University commitment to resources adequately allows the program to provide all necessary elements to ensure graduates attain stated outcomes. However, given the aging nature of our direct sampling industrial hygiene equipment, supplemental funding is actively being sought.

**C. Staffing**

***Describe the adequacy of the staff (administrative, instructional, and technical) and institutional services provided to the program. Discuss methods used to retain and train staff***

The EOHS program has always had an adequate budget to hire adjunct faculty. With funding from NIOSH, the EOHS Program has funded specialist adjunct faculty for three-four environmental and occupational hygiene-related courses per year. Thus during the past academic year 2012-2013, the EOHS program, through NIOSH IH funding, contributed \$9,000 to fund courses taught by adjunct faculty. NIOSH ERC funding levels have recently been reduced (10% for 2013), however, the college has been able to accommodate added adjunct resources as needed. At this time, no course has ever been canceled or not offered due to budget restrictions. The college has consistently supported all ABET required courses so students may graduate in a timely manner.

Areas where resources have historically been weak in the CUNY system, as in many public systems, are in funding of support staff and services. However, the recent creation of the CUNY SPH has brought with it an influx of resources and administrative support. For example, during the last accreditation cycle, the SUPH had two full-time secretaries for all three tracks and part-time access to several administrative staff. Currently, excluding senior SPH administrators, the CUNY SPH consists of 13 full-time professional and support staff. Namely:

SPH Leadership

- Neal L. Cohen            Interim Dean
- Marilyn Auerbach      Acting Senior Associate Dean
- Susan Klitzman        Associate Dean for Academic Affairs

Professional Administrative Staff

- Diane Brows            Administrator, Student and Academic Services
- Michael Dunham        Coordinator, Facilities
- Zora Flores-Kitongo    Executive Assistant to the Dean
- Martina Lynch          Coordinator, Curriculum and Assessment

- Attiqa Mirza                      Coordinator, Alumni and Student Services
- Larissa Naftali                      Database and IT Support
- Chaquon Polanco                      Coordinator, Business Office
- Jerome Richardson                      Manager, Business Office
- Erica Sigmon                      Coordinator, Grants office
- *vacancy*                      Director, Grants Office
- *vacancy*                      Director, Office of Student Services

Support Staff

- Nzinga Ajani                      Secretary to the Dean
- Velvet Brown                      Academic Program Secretary

In addition, several part-time staff are employed as needed. The EOHS Program has had support from NIOSH for over three decades to provide it with the secretarial support and grant management. Lori Bukiewicz has managed the NIOSH ERC grant (since 2009) and ensures students receiving funding are processed quickly and accurately. Lori also manages various EOHS program activities as needed. She has an assigned cubicle on the 5<sup>th</sup> floor.

Having access to more administrative resources means that managing and tracking EOHS students has become more efficient. Additionally, hiring a designated assessment and evaluation coordinator has meant that a continuous cycle of assessment takes place on a regular basis. EOHS has benefited greatly from the development of the CUNY SPH. For example, the assessment coordinator has been instrumental in managing the numerous assessments required by ABET and other accrediting groups.

All professional, administrative and support staff are offered access to college workshops and training programs. Whether computer software or tutorials on hardware, the college has implemented programs available during work hours for employee improvement. The college also has two IT individuals at the SSW/SPH building to address Wi-Fi, computer and other technology issues. Often this involves personalized training and retraining of both faculty and staff.

**D. Faculty Hiring and Retention**

***1. Describe the process for hiring of new faculty***

The hiring process for new or replacement faculty begins with the determination by the Dean and Provost, after consultation with the Program Director of EOHS, that a position is available. The Program Director is instructed to create a balanced search committee, adhering to SPH by-laws, and to invite participants. The newly established committee meets and creates the Personnel Vacancy Notice (PVN) that needs to be approved by the Dean, the Provost and the Dean of

Diversity. Once this has been completed, a PVN# is issued and the position advertised as per the submitted search plan.

After a prescribed amount of time (or the deadline as specified in the PVN) the list of candidates is submitted to the Dean of Diversity and HR office to ensure a qualified and diverse pool of candidates. When approved, the search committee is given the authority to schedule either phone or in-person interviews. Phone interviews are done only when candidates seem marginal and long distances prevent cost-effective travel. Finally, a pool of three-to-five candidates is brought in for full day visits. The general agenda for such a day is: (1) formal Search Committee interview, 1.5 hours; (2) meeting with Associate Dean; (3) meeting with Dean; (4) research presentation (all SPH faculty, staff and students are invited); and, (5) lunch or dinner as appropriate. When all candidates are interviewed, the committee submits its recommendation to the Dean. If the candidate is acceptable, the Dean recommends the rank and negotiates salary and a start-up package. The College Personnel and Budget Committee must review and ultimately approve the appointment. Starts dates usually coincide with the beginning of a semester (i.e. Sept or Feb 1).

## ***2. Describe strategies used to retain current qualified faculty***

Recently, new faculty have been offered a variety of strategies to ensure a smooth transition and success in higher education. The college offers all new full-time tenure track faculty appointments 24 hours of release time to be used during the first 4 years. Given each course is 3 hours, this equates to 8 course releases or 2 course releases per semester for the first 4 years of employment. During this time, new faculty are encouraged to submit grants for research funding and develop their teaching skills and service networks. This new program has been well received and improves both retention of faculty and increases in research funding. For tenured faculty, the SPH has several options to be released from the contractual 21 hour/year teaching load. Faculty are periodically released for doing advanced committee work, accreditation report writing, assessments, community service and inter-agency agreements. The retention of senior faculty is also augmented with the recently enhanced fellowship leave (sabbatical) rules. Prior to 2007, the sabbatical rate was 50% of salary. Presently the value has been increased to 80% of annual salary. This benefit has improved retention of tenured faculty.

## **E. Support of Faculty Professional Development**

***Describe the adequacy of support for faculty professional development, how such activities such as sabbaticals, travel, workshops, seminars, etc., are planned and supported***

The EOHS program is fortunate that NIOSH provides funds for professional development, travel and student support (internships). During the last funding cycle, NIOSH provided approximately \$2000 for professional travel and continuing education courses. This funding, while not guaranteed, has continued for over 30 years and is in place until June 2014.

In addition to NIOSH funding, the college has several programs to support faculty development. Each year, faculty are asked to submit travel budgets for presenting papers at national and international conferences. Prof's Caravanos and Mirer have received such college funded travel awards in the past to attend and present at international EOHS meetings. The College and SPH have also provided resources, in the form of released time, to develop on-line, hybrid versions of large courses. Prof. Caravanos has twice been given financial awards to produce on-line versions of the required course, PH 754 Environmental Health and Safety.

## **PROGRAM CRITERIA**

The ABET criteria for master's level programs in Industrial Hygiene are enumerated in the ABET document to include master's level admission requirement, curriculum and faculty. These have been stated variously in other parts of the self study, but are summarized here.

### **A. Master's-Level Admission Requirements (unchanged since 2007)**

In order for students to be admitted to the EOHS-MS program, they must satisfy the following criteria, according to the Hunter College Catalog:

1. General admission requirements to the graduate programs in arts and sciences are observed.
2. The aptitude section of the Graduate Record Examination or a master's degree from an accredited U.S. university. An undergraduate major in science or engineering is desirable. Students are expected to have completed at least 40 credits in undergraduate or graduate-level basic science and math courses such as courses in organic chemistry (with labs), general chemistry, general physics, biology, and environmental or health sciences. Generally, an undergraduate major in biology, chemistry, environmental sciences or physics would satisfy these requirements. Students must also have completed one semester of calculus and one of statistics. Students with a good academic record who do not meet the above requirements may be admitted with conditions upon recommendation of the program admissions committee.

The EOHS-MS program meets the ABET Master's-level admissions requirements through requirement of an undergraduate degree. The requirement of a minimum of 40 credits in undergraduate or graduate-level science and math satisfies the requirement that matriculants must have had preparation in basic college-level mathematics, chemistry, physics, and biology. In the case where a student enters the program without minimum preparation in mathematics and science, the student and his/her advisor will work together to develop a plan to address any deficiencies in the student's transcript. This is usually accomplished by having the student take undergraduate courses at Hunter or elsewhere in the CUNY system.

### **B. Master's-Level Curriculum**

Students in the EOHS-MS program must complete the following requirements, according to the Hunter College Catalog:

46 credits chosen as follows: All courses in Group A (15 credits) Public Health Core courses (see below under Course Distribution); Group B (19 credits) Specialization courses within environmental and occupational health sciences;

Group C (6 credits) Elective courses; and Group D (6 credits) Supervised Fieldwork and Capstone Project.

The capstone project consists of a comprehensive examination, a professional portfolio and either: A seminar, and paper and oral presentation based on an aspect of the student's fieldwork; or, for student's with GPA's  $\geq 3.7$  and strong independent research and writing skills, a master's essay. The Capstone Project allows students to synthesize academic knowledge with practical skills and experiences. It is designed to assess student skills and competencies in industrial hygiene and public health.

These requirements exceed the ABET requirements of a minimum of one year of study beyond the basic-level, consisting of courses with increased depth and rigor; an adequate foundation in statistics, applied sciences, and/or related professional practice; and, (iv) advanced qualitative and quantitative problem-solving skills. The fieldwork and capstone courses meet the requirements for an applied science project or research activity resulting in a report that demonstrates both mastery of the subject matter and a high level of professional and public communication skills. The required courses include two semesters of biostatistics and epidemiology. Advanced quantitative and qualitative skills are honed in many of the applied science courses, including:

- EOHS 702 Introduction to Occupational Safety and Health (3 cr)
- EOHS 741 Environmental and Industrial Hygiene Laboratory (4 cr)
- EOHS 754 Environmental and Occupational Toxicology (3 cr)
- EOHS 755 Industrial Ventilation (3 cr)
- EOHS 757 Industrial Hygiene (3 cr)
- EOHS 762 Physical Hazards (3 cr)
- PH 754 Environmental Health and Safety (3 cr)

### **C. Master's-Level Faculty**

The ABET criteria requirement the faculty be lead by a full time faculty member, that one member of the faculty be a CIH, that the majority of the faculty have an earned doctorate, and that faculty must also demonstrate external professional activity, including, but not limited to, participation on national, regional, state, and/or local committees and advisory boards, professional practice, and/or editorial reviews of professional publications. Information showing this has been achieved is outlined in Criterion 5.

## APPENDIX A – COURSE SYLLABI

- [EOHS 702 Introduction to Occupational Health and Safety](#)
- [EOHS 705 Environmental Chemistry](#)
- [EOHS 741 Env and Industrial Hygiene Laboratory](#)
- [EOHS 755 Industrial Ventilation and Environmental Controls](#)
- [EOHS 757 Principles of Industrial Hygiene](#)
- [EOHS 762 Physical Hazards: Assessment and Control](#)
- [PH 737 Fieldwork](#)
- [PH 738 Capstone](#)
- [PH 750 Biostatistics](#)
- [PH 752 Epidemiology](#)
- [PH 754 Environmental Health and Safety](#)
- [PH 755 Urban Health and Society](#)
- [PH 756 Health Care Administration](#)

1. **EOHS 702 Introduction to Occupational Health and Safety**

2. 3 credits / 3 hours

3. Franklin Mirer / Grace Sembajwe / Mark Goldberg

4. Textbooks (required)

- Levy and Wegman, eds., *Occupational and Environmental Health: Recognizing and Preventing Disease and Injury*, Lippencott, 5th edition, 2006.
- Jimmy Breslin, *The Short Sweet Dream of Eduardo Gutierrez*, Three Rivers Press, 2003
- David Von Drehle, *Triangle: The Fire That Changed America*, Grove Press, 2003

5. Specific course information

- Introduction to basic concepts and issues of occupational safety and health, including recognition and control of chemical and physical hazards, and the regulations governing these hazards. Required MS, no pre-requisites

6. Specific goals for the course

Identify and classify chemical, biological and physical hazards.

- Identify the origins and scientific basis of various environmental and occupational exposure limits
- Explain environmental and occupational health laws and regulations and be able to suggest appropriate legislative controls.
- Identify local and regulatory organizations that can play a role in environmental monitoring and disease prevention within communities and the workplace.
- Apply ethical principles to Public Health activities and endeavors.
- Explain the sources of inequality in disease risk factors, exposures and outcomes and effective community and regulatory-based interventions for addressing them.

7. Brief list of topics to be covered

- Introduction: The Historical Background
- The Social and Political Context
- The Occupational Health Professions
- Recognition of Occupational Disease
- Toxicology and Epidemiology, Industrial Hygiene and Occupational Safety
- Legal and Regulatory Framework
- Worker's Compensation, Tort Litigation, Federal and State OSHA
- The OSHAct, NIOSH, Consensus Organizations
- Regulatory Framework, Health and Safety Standards
- Criteria and Standards for select substances: Fibrogenic dusts: Asbestos and silica

- Criteria and Standards of select substances: Heavy metals: lead and mercury
- Criteria and Standards of select substances: Org solvents: MEK, methylene chloride
- Physical hazards in the workplace: noise, heat stress, radiation
- Industry Safety and Health Profiles: Construction
- Industry Safety and Health Profiles: Health Care
- The Role of Labor Unions in Occupational Health
- Emerging occupational groups and implications for safety and health: Immigrants

**1. EOHS 705 Environmental Chemistry**

2. 3 credits / 3 hours

3. Jack Caravanos, Associate Professor (also taught by F. Mirer)

4. Textbooks

a. Principles of Environmental Chemistry, JE Girard, 2<sup>nd</sup> Edition, 2010

b. Quantitative Industrial Hygiene, J. Caravanos, ACGIH, 1991

c. Various web resources ([www.cdc.gov/niosh/](http://www.cdc.gov/niosh/) [www.nlm.nih.gov/toxnet/hsdb](http://www.nlm.nih.gov/toxnet/hsdb))

5. Specific course information

- Basic review of inorganic and organic chemistry using environmental (air and water) examples
- No prerequisites or co-requisites (admission to MS program qualifies student)
- Strongly recommended elective for students who need a review of chemistry principles and/or have not had any pollution sciences coursework.
- Course Description: Survey of chemical and physical concepts essential for understanding environmental and occupational health sciences, including study of the atmosphere, air and water pollution, and energy resources. Physical principles of heat and energy, and radioactivity will be discussed.

6. Specific goals for the course

- a. The student will be able to describe the chemistry and migration of contaminants through various environmental compartments, such as air, water and soil, for purposes of determining the nature of the environmental and/or occupational health risk
- b. Will be able to apply basic industrial hygiene formulas and understand their usage.
- c. Will be able to use a computer spreadsheet program for data presentation and graphing

7. Brief list of topics to be covered

- a. Review of basic chemistry (reactions, moles, formulas, solubility)
- b. Chemistry of Air Pollution (atmospheric sciences, photochemical oxidants, greenhouse gases, acid rain)
- c. Industrial Hygiene Chemistry (major formulas, analytical conversions, gas laws, stokes law)
- d. Chemistry of Water Pollution (dissolved oxygen, BOD, nitrogen cycle, phosphorous cycle, sulfur cycles, chlorine chemistry)
- e. The Chemistry of Inorganic Toxics (environmental mercury, lead, chromium, cadmium and arsenic)
- f. The Chemistry of Organic Toxics (PCB, Pesticides, Dioxins and other POPs)
- g. The Chemistry of Hazardous Materials and Waste (vapor pressure, flash point, deflagration, pyrolysis, waste treatment methods)



1. **EOHS 741 Environmental and Industrial Hygiene Laboratory**

2. 4 credits / 6 hours

3. Jack Caravanos, (together with Anthony DeVito, MS)

4. Required Textbooks

- a. Plog, B. and Quinlan, P. (eds) Fundamentals of Industrial Hygiene, 5<sup>th</sup> Edition, National Safety Council. 2002. ISBN: 9780879122164
- b. Quantitative Industrial Hygiene, J. Caravanos, ACGIH, 1991
- c. NIOSH Manual of Analytic Methods (<http://www.cdc.gov/niosh/docs/2003-154>)
- d. Various web resources ([www.epa.gov/clp](http://www.epa.gov/clp))

5. Specific course information

This course will familiarize students with accepted industrial hygiene procedures for assessing chemical, biological and physical hazards in the workplace and ambient environment. Evaluation of ventilation systems using various air flow measuring devices will enable students to evaluate the effectiveness of engineering controls for airborne hazards. Additional topics include: calibration and maintenance of instruments; microscopy for asbestos identification and counting; noise measurements; application of direct reading instruments; and collection and analysis of samples mold and other biological hazards. Students prepare detailed laboratory reports. Required MS, Pre-requisites: EOHS 702,705,757 and PH 754

6. Specific goals for the course

- a. Develop ability to identify, describe qualitatively, and quantify agents, factors, and stressors generated by and/or associated with defined sources, unit operations, and/or processes.
- b. Develop an understanding of the qualitative and quantitative aspects of exposure assessment, dose-response, and risk characterization based on applicable pathways and modes of entry.
- c. Learn the principles of operation, calibration, and methodology for using basic sampling instrumentation to detect chemical and physical agents in the work environment.
- d. Learn to identify and apply appropriate standard sampling and analytical methods such as those developed by NIOSH, OSHA, and EPA.
- e. Study the operation and use of various environmental labs including types of analysis, typical costs, sample submittal processes, quality assurance/quality control programs, and laboratory accreditation procedures
- f. Learn to generate, review, interpret, and apply statistical and epidemiological data from published research

- g. Become proficient at preparing technical summaries and reports using the most current technology for managing and presenting data and incorporating appropriate data and observations from the peer-reviewed environmental and occupational hygiene community
  - h. Acquire the knowledge needed to attain recognized professional certification
7. Brief list of topics to be covered
- a. General Principles (sampling considerations, standardized methods, lab accreditation, QA/QC, Report writing)
  - b. Noise Measurements Laboratory (SLM, Dosimeter, Octave Band Analyzers)
  - c. Assessing Ventilation Systems Laboratory (pitot tubes, mechanical and electronic anemometers, fume hood measurements, duct measurements)
  - d. Sampling Pump Calibration Laboratory (primary and secondary, physical versus instrumentation)
  - e. Sampling of Organic Vapors Laboratory (charcoal tube sampling train)
  - f. Sampling of Particulates Laboratory (TSP, PM10)
  - g. Personal Protective Equipment Laboratory (qualitative and quantitative fit testing, protective suits, hearing protection, gloves)
  - h. Lead in Soil, Dust and Paint Laboratory (soil collections, dust collections, paint chip sampling, XRF testing and chemical spot testing)
  - i. Asbestos Fiber Counting Laboratory (Phase Contrast Microscope, NIOSH 7400)
  - j. Asbestos Determination Laboratory (Polarizing light Microscope, NIOSH 9002)
  - k. Biological Hazards Laboratory (sampling for viable mold spores in air)
  - l. Direct Reading Instruments Laboratory (PID, combustible gas meters, aerosol particle counters, RF and Ionizing Radiation instrumentation)

**1. EOHS 754 – Environmental and Occupational Toxicology**

2. 3 credits / 3 hours

3. Franklin Mirer

4: Textbook

Casarett and Doull's Essentials of Toxicology Curtis D. Klaassen, McGraw-Hill (2010)

Other supplemental materials: Extensive readings from internet sources (NTP, NIOSH, IARC, EPA, ATSDR websites) and additional readings assigned during the term.

Additional readings at least one original research paper, one peer reviewed review paper, and one authoritative recommendations document

5. Specific course information

**Catalogue Description:** Introduction to principles of toxicology with emphasis on environment and occupational aspects. Systematic review of the toxicology of major organ systems; health effects of categories of toxins, such as solvents and metals; and review of toxicological testing and evaluation.

**Additional Course Description and objectives:** System effects and materials toxicology. Intense course covering systematic review of the toxicology of major organ systems, health effects of categories of toxic agents and a review of appropriate legislation. As a result of this course, students should be able to: explain material safety data sheet information as part of a hazard communication program; interpret the toxicology portion of documentation for authoritative recommendations and exposure limits; and explain the basis for occupational and environmental exposure limits for selected agents, and the reasons for divergent limits. Prerequisites or co-requisites College biology, and chemistry are required. College organic chemistry recommended. EOHS 702 or departmental permission required. EOHS 705 or equivalent recommended, or departmental permission. Required for MS and MPH

6. Specific goals for the course

- a. Understand and assess occupational and environmental hazard notification systems including Material Safety Data Sheets, Transportation placards, HMIS placards.
- b. Identify the origin and scientific basis of various environmental and occupational exposure limits.
- c. Describe physiological and/or toxic interactions of physical, chemical, biological, and ergonomic agents, factors, and/or stressors with the human body.

- d. Explain environmental and occupational health laws and regulations and be able to suggest appropriate legislative controls.
- e. Recommend and evaluate personal protective equipment including respiratory selection, fit-testing procedures and use of chemical protective clothing and/or other interventions to reduce or eliminate hazards.
- f. Prepare scientific and technical summaries and reports.
- g. Use the Internet to conduct literature searches, database searches and communicate with colleagues in the EOHS profession.

In addition, students are required meet the objective of written communication by writing a paper comparing and explaining rationales for divergent authoritative exposure limits, post to a current events blog, and comment on other students blog posts.

7. Brief list of topics to be covered:

- Mechanisms of Toxicity, Absorption, Distribution and Excretion of Toxicants
- Biotransformation and Toxicokinetics
- Respiratory System Toxicology
- Immune System Toxicology
- Chemical Carcinogenesis and Genetic Toxicology
- Risk Assessment
- Nervous System Toxicology
- Developmental and Reproductive Toxicology
- Endocrine Toxicology
- Toxicology of the blood and hematopoietic system
- Dermal Toxicology
- Cardiovascular Toxicology

1. **EOHS 755: Industrial Ventilation and Environmental Controls**

2. 3 credits / 3 hours

3. Grace Sembajwe

4. Textbook:

Required:

D. Jeff Burton, Industrial Ventilation, A Self-Directed Learning Workbook, 6th or 7th edition, Supplemental reading assignments will be posted on BlackBoard,

Suggested reading:

Industrial Ventilation: A Manual of Recommended Practice for Design, 27th Edition, ACGIH, 2010.

Companion Study Guide to Industrial Ventilation: A Manual of Recommended Practice for Design,

William A. Burgess, M.J. Ellenbecker, R.D. Treitman, Ventilation for Control of the Work Environment

5. Specific course information:

Fundamentals of industrial ventilation: air flow, local and dilution exhaust ventilation systems, hood and piping design, fan type and selection, air cleaning devices, system-testing; problem-solving; engineering controls. Prerequisites: EOHS 702, Required MS course.

6. Specific goals for the course

- Apply course information, engineering design considerations and system performance factors to propose effective ventilation system designs to control specific airborne occupational exposure hazards;
- Develop an understanding of static, velocity, and total pressures and how they relate to ventilation system efficiency
- Develop ability to recognize and correct ventilation system deficiencies based on accepted engineering, design and performance parameters.
- Apply knowledge gained during this course to design a simple local exhaust ventilation system including a system sketch and air flow specifications.
- Identify ventilation controls for at-risk work operations and tasks typically performed by low wage and unskilled workers.
- Apply preventive strategies utilizing ventilation principles that greatly reduce these workplace exposures and prevent associated occupational disease.
- Identify ventilation system design and performance issues that enhance control of airborne contaminants.

- Be familiar with recognized design and performance considerations for effective and efficient operation of local and general exhaust ventilation systems.
- Understand the proper function and apply methods to evaluate the effectiveness of hoods, ducts, transitions and fans.
- Interpret and apply applicable occupational and environmental regulations with regard to the need for ventilation and engineering controls.
- Develop ability to identify, describe qualitatively, and quantify agents, factors, and stressors generated by and/or associated with defined sources, unit operations, and/or processes.
- Become skilled at evaluating, recommending, and putting into practice administrative and engineering controls and personal protective equipment to reduce or eliminate occupational hazards.
- Acquire the knowledge needed to attain recognized professional certification.

#### 7. Brief list of topics to be covered

- Hazard Recognition: generation of airborne chemicals in the work environment.
- Ventilation System basics.
- Hierarchy of control
- Principles of Airflow.
- LEV: Hood Design and Selection
- Hood Design and Selection.
- Reading engineering tables and graphs. Calculations.
- LEV: Ductwork Design and Selection
- LEV System Design
- Testing of Ventilation Systems.
- Fan Laws and Selection
- Dilution Ventilation
- DV vs. LEV; work processes and control

**1. EOHS 757 Principles of Industrial Hygiene**

2. 3 credits / 3 hours

3. Mark Goldberg, PhD, CIH(ret), Former Associate Professor

4. Textbook (Required):

- Jack Caravanos, Quantitative Industrial Hygiene: A Formula Workbook, ACGIH,
- Barbara Plog, Fundamentals of Industrial Hygiene, National Safety Council
- Supplemental reading assignments will be posted on BlackBoard,

5. Specific Course Information

Recognition, evaluation, and control of industrial hazards due to chemical and physical agents. Topics include occupational health standards, regulatory agency activities, effects of contaminants on human health, sampling and control of hazards, current issues. Pre-requisites: PH 754, EOHS 705, 702, Required MS

6. Specific goals for the course

- Understand and apply the basic principles of industrial hygiene, including those underlying the recognition, evaluation and control of chemical and physical hazards found in occupational environments.
- Describe the principles, calibration and operation of the basic instrumentation employed for sampling the work environment for airborne contaminants, including instruments designed to collect integrated and short-term samples, direct reading instruments, and real-time monitoring devices.
- Select the appropriate parameters, including sampling media, for sample collection, based on standard (NIOSH, OSHA) methods.
- Perform industrial hygiene calculations necessary for quantification of variable effecting the work environment.
- Describe the various approaches to designing sampling strategies, including compliance, epidemiological studies, and sampling campaigns, and be able to design a simple sampling strategy based upon statistical considerations.
- Describe the hierarchy of controls and apply it to specific occupational environments, including recent developments in toxic use reduction.
- Understand the basic principles and measuring techniques involved in assessment of local exhaust and dilution ventilation systems.

- Describe the basic principles of noise and heat stress, the basis for the standards and regulations developed for them, and the instrumentation employed in assessing them in occupational environments.
- Use industrial hygiene resource materials, including peer-reviewed journals and documents from government and consensus organization to research an occupational health hazard and present the findings in a comprehensive, cohesive paper

7. Brief list of topics to be covered:

- Reading the OSHA Respirator Standard
- Exposure Assessment I: Measurements. Introduction
- Exposure Assessment II: Rationale and Strategies
- Walkthrough Surveys
- Compliance vs. Epidemiology. Sampling Strategies. Statistical Considerations.
- Aerosols: Properties and Behavior; Filtration;
- Air Sampling Instruments
- Size Selective Sampling; Inertial and Gravitational Collectors
- Exposure Assessment, Calculations
- Direct Reading Instruments/Real Time Monitoring: Principles and Applications
- Personal Protective Equipment
- Respiratory Protection
- Control of Chemical Hazards
- Heat Stress: Physiology of Heat Stress; Calculations:
- Control Banding
- Toxic Use Reduction

**1. EOHS 762 Physical Hazards: Assessment and Control**

2. 3 credits / 3 hours

3. Grace Sembajwe or Franklin Mirer

4. Textbook (Required):

- Barbara Plog, Fundamentals of Industrial Hygiene, National Safety Council
- Jack Caravanos, Quantitative Industrial Hygiene: A Formula Workbook, ACGIH, Supplemental reading
- Daniel H. Anna (Editor), air monitoring, and exposure and risk assessment strategies. Volume 2 includes content related to the physical hazards, control methods, and management aspects. The chapters of Volume 1 focuses on the chemical aspects (Foreword), John Howard (Introduction). The Occupational Environment: Its Evaluation, Control, and Management, 3rd edition (Vol. 1 & 2). Publisher: AIHA; 3rd edition (2011). ISBN-10: 1935082159
- OSHA Technical Manual, TED-01-00-015, 1999, Available at: [http://www.osha.gov/dts/osta/otm/otm\\_toc.html](http://www.osha.gov/dts/osta/otm/otm_toc.html)
- Section II, Chapter 3, Technical Equipment-Onsite Measurements (updated 2008): Sections V (Radiation); VII (Noise); VIII (Vibration); X (Heat).
- Section III, Health Hazards: Chapter 4, Heat Stress; Chapter 5, Noise and Hearing Conservation; Chapter 6, LASER Hazards.
- NIOSH / CDC – Noise and Hearing Loss Prevention, Available at: <http://www.cdc.gov/niosh/topics/noise/>

5. Specific Course Information

This is an advanced course that covers assessment and control of physical hazards in the workplace including noise, radiation (ionizing and non-ionizing), vibration, thermal stress, and pressure. Students will be able to recognize potential worker exposure to physical agents, assess exposure to physical agents, determine when physical agents may be hazardous to workers, and recommend strategies for controlling exposures, if necessary. Required for MS degree. Pre-requisites EOHS 702 and EOHS 704 (or equivalent)

6. Specific goals for the course

- Describe physical properties of noise, ionizing radiation and nonionizing radiation
- Describe methods to recognize, evaluate and control physical agents in the workplace.
- Describe occupational-related health effects of noise, ionizing radiation, nonionizing radiation, vibration, thermal stress and pressure.
- Gain familiarity with workplace regulatory requirements, consensus standards, and the basis of occupational exposure standards.

- Understand and apply the basic principles of assessment and control of physical hazards in the workplace.
- Apply industrial hygiene formulae used to quantify exposures to physical agents and effectiveness of control measures.
- Use industrial hygiene resource materials including peer-reviewed journals and documents from regulatory and standard setting organization to research, describe and evaluate occupational programs for managing exposures to workplace physical agents
- Apply course information during preparation for the industrial hygiene certification examination.

## 7. Brief listing of topics

- Physical properties of sound; units of noise measurement; anatomy of hearing; health effects of noise.
- Evaluation of noise exposures; noise measurements; noise surveys; dosimetry; acoustics; addition of noise levels.
- Workplace noise regulations: PEL and AL; hearing conservation programs; general industry and construction; Written assignment proposal due
- Noise exposure reduction: Engineering and administrative controls - basic principles
- Vibration: Health effects, assessment and controls;
- Barometric Hazards: Health effects, assessment and controls. Vibration and Barotrauma.
- Ionizing radiation: Characteristics of electromagnetic and particulate radiation; radioactive decay; sources of radiation; interactions of radiation with matter.
- Biological effects of ionizing radiation; radiation dosimetry: quantities and units; radiation dose calculations; monitoring instruments
- Radiation protection: Time, distance and shielding - basic principles; workplace regulations.
- Non-ionizing radiation: The electromagnetic spectrum; health hazards; ELF; ultrasound; radiofrequency; microwave.
- RF exposure assessment and controls; workplace regulations; Infrared and ultraviolet exposure;
- LASERS: types and uses; control measures; workplace regulations;
- Thermal Stress: Heat; health effects, assessment and controls
- Thermal Stress: Cold; health effects, assessment and controls

**1. PH 737 Public Health Fieldwork**

2. 3 credits / 3 hours

3. Frank Mirer, Professor

4. Required Textbooks

- a. Brownson RC, Baker EA, Leet TL, Gillespie KN, True WR. Evidence-Based Public Health, 2nd edition, Oxford University Press, 2011

5. Specific course information

- a. Students will carry out directed field experiences in public health agencies or programs. Placements are in relation to student's academic background, specialization and career expectations. Emphasis is on applying classroom-acquired concepts and skills. The content and scope of the fieldwork should be similar to work performed by an entry level public health professional. Required MS course, advanced course to be taken after majority of requirements are completed

6. Specific goals for the course

- a. Learn to generate, review, interpret, and apply statistical and epidemiological data from published research
- b. Hone a combination of teamwork, business, and managerial skills to become active in the prudent development, implementation, and management of environmental and occupational hygiene-related programs Acquire the knowledge needed to attain recognized professional certification
- c. Become proficient at preparing technical summaries and reports using the most current technology for managing and presenting data and incorporating appropriate data and observations from the peer-reviewed environmental and occupational hygiene community
- d. Develop an understanding of the roles of city, state, and federal government in promoting health and preventing disease
- e. Develop a critical understanding of the multi-level problems important to delivery of environmental and occupational health services within a diverse urban community with various special needs and vulnerabilities and the history of those issues
- f. Develop skills in diagnosing the strengths and problems of the urban environment and fostering programs to improve the health and welfare of urban communities and to influence institutional and public policy with the aim of improving the health of the urban environment and its constituents
- g. (ii) Conduct an applied science project or research activity resulting in a report that demonstrates both mastery of the subject matter and a high level of professional and public communication skills
- h. CEPH Competencies
  1. Apply the core functions of PH practice (assessment, policy development, and assurance)

2. Understand basic theories, concepts, models and methods from a range of core and related disciplines and apply them to the design of PH research, policy, and practice
  3. Apply ethical principles and standards
  4. Apply principles of effective communication in presenting PH information in various media and formats to professional and lay audiences
  5. Collaboratively engage with diverse communities, sectors and/or constituencies (e.g. researchers, practitioners, community organizations) to achieve PH goals
  6. Use key planning constructs (e.g. values, vision, mission, goals, objectives and outcomes) in planning, implementing and evaluating PH programs
  7. Demonstrate knowledge of the context of public and private health care systems, institutions, actors, and environments in which health care and public health policy is made and health care is delivered
7. Brief list of topics to be covered (not applicable). Fieldwork deliverables:
- A fieldwork contract
  - An IRB determination form
  - A completed Student's Evaluation of Fieldwork Experience Form
  - A completed Field Placement Supervisor's Evaluation Form
  - A brief literature review
  - A 'Reflections' document on Fieldwork for Student Portfolio
  - Completed responses to periodic fieldwork status assessment surveys

**1. PH 738 Capstone Project**

2. 3 credits / 3 hours

3. Frank Mirer, Professor, (EOHS Program)

4. Textbook (suggested)

- a. Cottrell RR, McKenzie JF. *Health Promotion and Education Research Methods, 2<sup>nd</sup> edition*. Sudbury, MA: Jones & Bartlett Publishers, 2010. ISBN:0-7637-750-7X

5. Specific course information

- a. This course consists of a structured seminar aimed at allowing students to reflect upon experiences gained during the MPH or MS program and synthesize that knowledge and experience in the form of a Capstone project. While it is ideal for the Capstone paper to be developed based on the fieldwork experience, students may develop a separate Capstone paper or Master's Essay topic with approval from their Fieldwork faculty member. The paper must be completed during students' penultimate or final semester. Required MS course, advanced course to be taken after majority of requirements are completed

6. Specific goals for the course

- a. Learn to generate, review, interpret, and apply statistical and epidemiological data from published research
- b. Hone a combination of teamwork, business, and managerial skills to become active in the prudent development, implementation, and management of environmental and occupational hygiene-related programs Acquire the knowledge needed to attain recognized professional certification
- c. Become proficient at preparing technical summaries and reports using the most current technology for managing and presenting data and incorporating appropriate data and observations from the peer-reviewed environmental and occupational hygiene community
- d. Develop an understanding of the roles of city, state, and federal government in promoting health and preventing disease
- e. Develop a critical understanding of the multi-level problems important to delivery of environmental and occupational health services within a diverse urban community with various special needs and vulnerabilities and the history of those issues
- f. Develop skills in diagnosing the strengths and problems of the urban environment and fostering programs to improve the health and welfare of urban communities and to influence institutional and public policy with the aim of improving the health of the urban environment and its constituents
- g. (ii) Conduct an applied science project or research activity resulting in a report that demonstrates both mastery of the subject matter and a high level of professional and public communication skills
- h. CEPH Competencies
  8. Apply the core functions of PH practice (assessment, policy development, and assurance)

9. Identify, use and critically evaluate assumptions, methods, interpretations, analyses and conclusions in the PH literature
10. Use basic informatics techniques (e.g., using bibliographic, database management, graphical and statistical software) to retrieve, analyze, summarize and present PH data
11. Apply principles of effective communication in presenting PH information in various media and formats to professional and lay audiences
12. Apply appropriate principles and methods to the collection, management and analysis of PH data and to answer research questions
13. Identify and analyze social, behavioral, biomedical and environmental determinants and modifiers of health and disease across the lifespan in urban settings using an ecological framework
14. Collaboratively engage with diverse communities, sectors and/or constituencies (e.g. researchers, practitioners, community organizations) to achieve PH goals
15. Apply ethical principles and standards when conducting PH activities (e.g. use of information technology; assessment and research; program development, implementation and evaluation; and policy development and analysis)
16. Understand basic theories, concepts, models and methods from a range of core and related disciplines that inform PH research, policy, and practice
17. Apply the core orientation and values of PH in professional practice (e.g., science based, population-focused, community-oriented, prevention-motivated approach, rooted in social justice)

7. Brief list of topics to be covered:

- a. Searching the literature –Template paper
- b. IRB determination
- c. Defining a research question or hypothesis
- d. Logic model
- e. Table shells (planning results)
- f. Data analysis
- g. Sections of the paper: Background, Significance, Literature review, Methods – Procedures-Project, Results, Discussion, Conclusions, Recommendations, Introduction, Abstract
- h. How to structure and prepare your presentation
- i. Student presentations.

1. **PH 750 Biostatistics**
2. 3 credits / 3 hours
3. *Staff (Biostatistics / Epidemiology Program (Lab Instructor - Anthony DeVito, MS)*
4. Required Textbooks
  - a. The Art and Science of Learning from Data, Alan Agresti & Christine Franklin, Pearson Prentice Hall, 2009; ISBN 978-0-13-513199-2
  - b. SPSS for Mac or PC (Student license)
5. Specific course information
  - a. This course is designed to enable students to analyze, present, and interpret population health data. Students will learn to apply common statistical concepts and methods, e.g., distribution, probability, hypothesis testing, statistical significance, sampling, and an introduction to univariate, bivariate and multivariate analyses. The course is taught through lectures and computer exercises using Excel and SPSS.
6. Specific goals for the course (a, b, c, ABET)
  - a. Learn to generate, review, interpret, and apply statistical and epidemiological data from published research
  - b. Become proficient at preparing technical summaries and reports using the most current technology for managing and presenting data and incorporating appropriate data and observations from the peer-reviewed environmental and occupational hygiene community
  - c. Acquire the knowledge needed to attain recognized professional certification
  - d. CEPH Core Competencies (supplemental)
    - Apply the core functions of PH practice (assessment, policy development, and assurance)
    - Understand basic theories, concepts, models and methods from a range of core and related disciplines and apply them to the design of PH research, policy, and practice
    - Apply ethical and social justice principles and standards
    - Interpret and apply the PH literature
    - Use basic statistical and informatics techniques
    - Communicate PH information verbally and in writing
    - Collect, analyze and interpret PH data
7. Brief list of topics to be covered
  - Intro (Why Biostatistics? Law of Sci Discovery, case studies)
  - Data Exploration (graphs, measurements, standardizations)
  - Quantifying randomness, probability
  - Probability distribution
  - Sampling
  - Estimation
  - Significance testing

- Comparing two groups
- One way ANOVA
- Analyzing the association between two categorical variables (Chi-sq, Pearsons)
- Correlation and Linear Regression
- Advance topics (Multiple Linear Regression, Logistic Regression)

1. **PH 752 Epidemiology**
2. 3 credits / 3 hours
3. Staff (Biostatistics / Epidemiology Program)
4. Required Textbooks
  - a. Gordis L. Epidemiology. 4<sup>th</sup> ed. Philadelphia, PA: Saunders Elsevier, 2009
  - b. Johnson S. The Ghost Map: The Story of London's most terrifying epidemic—and how it changed science, cities and the modern world. New York, NY: Riverhead Books (Penguin Group), 2006
5. Specific course information
  - a. An introduction to epidemiologic principles, methods and measures commonly used in public health.
6. Specific goals for the course
  - a. Learn to generate, review, interpret, and apply statistical and epidemiological data from published research
  - b. Become proficient at preparing technical summaries and reports using the most current technology for managing and presenting data and incorporating appropriate data and observations from the peer-reviewed environmental and occupational hygiene community
  - c. Acquire the knowledge needed to attain recognized professional certification
  - d. Competencies
    - Apply the core functions of PH practice (assessment, policy development, and assurance)
    - Understand basic theories, concepts, models and methods from a range of core and related disciplines and apply them to the design of PH research, policy, and practice
    - Apply ethical and social justice principles and standards
    - Interpret and apply the PH literature
    - Use basic statistical and informatics techniques
    - Communicate PH information verbally and in writing
    - Collect, analyze and interpret PH data
7. Brief list of topics to be covered
  - Introduction to Epidemiology
  - Measures of Disease Occurrence / Cross-sectional Studies
  - Cohort Studies
  - Case-Control Studies
  - Clinical Trials
  - Surveillance
  - Ecological Studies
  - Hypothesis Testing

- Selection bias and confounding
- Mediation and Effect Modification
- Information Bias / Validity and Reliability
- Infectious Disease Epidemiology / Screening
- Causation
- Ethics

1. **PH 754 Environmental Health and Safety**
2. 3 credits / 3 hours
3. Jack Caravanos / Elizabeth Geltman
  
4. Required Textbooks
  - a. Essentials of Environmental Health, Robert Friis, 2<sup>nd</sup> Ed. Jones & Bartlett
  - b. Extensive use of Websites (EPA, OSHA, CPSC, FDA, NIOSH)
  
5. Specific course information
  - a. Survey of chemical, physical and biological factors influencing quality of ambient, workplace and home environments. Topics include: air and water pollution; radiation and noise hazards; hazardous substances; solid wastes; food protection; natural and human-made disasters; and specific hazards such as lead, asbestos, mold and pesticides. Required MS, no pre-req.
  
6. Specific goals for the course
  - a. Develop ability to identify, describe qualitatively, and quantify agents, factors, and stressors generated by and/or associated with defined sources, unit operations, and/or processes
  - b. Learn about physiological and/or toxic interactions of physical, chemical, biological, and ergonomic agents, factors, and/or stressors with the human body
  - c. Develop an understanding of the qualitative and quantitative aspects of exposure assessment, dose-response, and risk characterization based on applicable pathways and modes of entry
  - d. Learn to generate, review, interpret, and apply statistical and epidemiological data from published research
  - e. Learn the origin, scientific basis, interpretation, and application of various environmental and occupational exposure limits and be able to communicate that information to others
  - f. Hone a combination of teamwork, business, and managerial skills to become active in the prudent development, implementation, and management of environmental and occupational hygiene-related programs
  - g. Become proficient at preparing technical summaries and reports using the most current technology for managing and presenting data and incorporating appropriate data and observations from the peer-reviewed environmental and occupational hygiene community
  - h. Develop an understanding of the roles of city, state, and federal government in promoting health and preventing disease
  - i. Learn the fundamental aspects of safety and environmental health
  - j. Develop an understanding of appropriate ethical practices in environmental and occupational hygiene
  - k. Develop a critical understanding of the multi-level problems important to delivery of environmental and occupational health services within a diverse urban community with various special needs and vulnerabilities and the history of those issues

- l. Develop skills in diagnosing the strengths and problems of the urban environment and fostering programs to improve the health and welfare of urban communities and to influence institutional and public policy with the aim of improving the health of the urban environment and its constituents
  - m. Acquire the knowledge needed to attain recognized professional certification
7. Brief list of topics to be covered
- Introduction to EHS / Environmental Controls
  - Environmental Law / NEPA
  - Hazard Identification and Evaluation
  - Toxicology and Environmental Disease
  - Air Pollution and Health
  - Water Supply and Health
  - Solid and Hazardous Wastes
  - Climate Change / Going Green / LEED certification
  - Food Contamination and Safety
  - Consumer Product Safety / Accidents Causation Theory
  - Global Environmental Health
  - Occupational Health and Safety

**1. PH 755 Urban Health and Society**

2. 3 credits / 3 hours

3. *Full Time Staff (Community Health Program)*

4. Required Textbooks

- a. Freudenberg, N, Galea, S and Vlahov, D, (Eds.) *Cities and the Health of the Public*, Nashville, TN: Vanderbilt University Press, 2006, ISBN: 0-8265-1512-6.

5. Specific course information

- a. Examines impact of social and political forces on the health of urban populations and describes roles for public health professionals in promoting health of urban communities.

6. Specific goals for the course

- a. Learn to generate, review, interpret, and apply statistical and epidemiological data from published research
- b. Hone a combination of teamwork, business, and managerial skills to become active in the prudent development, implementation, and management of environmental and occupational hygiene-related programs Acquire the knowledge needed to attain recognized professional certification
- c. Become proficient at preparing technical summaries and reports using the most current technology for managing and presenting data and incorporating appropriate data and observations from the peer-reviewed environmental and occupational hygiene community
- d. Develop an understanding of the roles of city, state, and federal government in promoting health and preventing disease
- e. Develop a critical understanding of the multi-level problems important to delivery of environmental and occupational health services within a diverse urban community with various special needs and vulnerabilities and the history of those issues
- f. Develop skills in diagnosing the strengths and problems of the urban environment and fostering programs to improve the health and welfare of urban communities and to influence institutional and public policy with the aim of improving the health of the urban environment and its constituents
- g. Competencies
  - Apply the core functions of PH practice (assessment, policy development, and assurance)
  - Understand basic theories, concepts, models and methods from a range of core and related disciplines and apply them to the design of PH research, policy, and practice
  - Interpret and apply the PH literature.
  - Communicate PH information verbally and in writing
  - Explain key social, behavioral, biomedical and environmental determinants of and inequities in health and disease across the lifespan in urban settings

7. Brief list of topics to be covered
- Introductions and Overview: An urban public health framework
  - The social determinants of health and health disparities
  - Research on urban health: Theoretical & methodological foundations
  - Historical perspectives on urban public health
  - The urban physical and occupational environment
  - The urban social environment
  - Social inequalities and health
  - The impact of urbanization, migration and suburbanization on health
  - Urban public health nutrition
  - Global perspectives on urban health
  - Current issues in public health: The Public Health Response to Hurricane Sandy
  - From cultural differences to cultural meaningful frameworks
  - Urban public health interventions and community health programs
  - Simulated Public Testimonies
  - Simulated Public Testimonies, Wrap-Up

**1. PH 756 Health Care Administration**

2. 3 credits / 3 hours

3. *Full Time Staff (Community Health Program)*

4. Required Textbooks

- a. TS Bodenheimer and K Grumbach. *Understanding Health Policy: a Clinical Approach, 5<sup>th</sup> edition.* Lange Medical Books, New York, 2012

5. Specific course information

- a. This course examines the financing, organization, delivery and quality of health care in the United States with an understanding of the previous insurance based system and its improvements through the recently enacted Patient Protection and Affordability Care Act (Affordability Care Act) with implications for public and community health. Required MS, no pre-requisites

6. Specific goals for the course

- a. Learn to generate, review, interpret, and apply statistical and epidemiological data from published research
- b. Hone a combination of teamwork, business, and managerial skills to become active in the prudent development, implementation, and management of environmental and occupational hygiene-related programs Acquire the knowledge needed to attain recognized professional certification
- c. Become proficient at preparing technical summaries and reports using the most current technology for managing and presenting data and incorporating appropriate data and observations from the peer-reviewed environmental and occupational hygiene community
- d. Develop an understanding of the roles of city, state, and federal government in promoting health and preventing disease
- e. Develop a critical understanding of the multi-level problems important to delivery of environmental and occupational health services within a diverse urban community with various special needs and vulnerabilities and the history of those issues
- f. Develop skills in diagnosing the strengths and problems of the urban environment and fostering programs to improve the health and welfare of urban communities and to influence institutional and public policy with the aim of improving the health of the urban environment and its constituents
- g. Competencies
  - Apply the core functions of PH practice (assessment, policy development, and assurance)
  - Understand basic theories, concepts, models and methods from a range of core and related disciplines and apply them to the design of PH research, policy, and practice
  - Interpret and apply the PH literature.
  - Communicate PH information verbally and in writing

- Explain key social, behavioral, biomedical and environmental determinants of and inequities in health and disease across the lifespan in urban settings

7. Brief list of topics to be covered

- Introduction to Policy & Management issues in the US Health System :
- Health vs. Health Care
- Financing, Health Insurance and Managed Care
- The Uninsured, Other Nations
- Federal and State Payers
- Organization, of Care ; Public and Private Payers
- Aging and Long Term Care
- The Hospital Industry –Non profit hospitals
- Pharmaceutical Industry
- Health Care Reform
- Healthcare Workforce
- Quality of Care, Consumer rights in health care;
- Law in Health Care
- Accountability Transparency,
- Presentations

## APPENDIX B – FACULTY VITAE

1. Caravanos, Jack
2. Geltman, Elizabeth
3. Mirer, Franklin
4. Sembajwe, Grace
5. *Vacancy*

|                             |  |
|-----------------------------|--|
| <b>Jack Caravanos, DrPH</b> | POSITION TITLE   |
|                             | Associate Professor, CUNY School of Public Health,<br>Environmental & Occupational Health Science<br>Program Director – IH |

| EDUCATION/TRAINING (Begin with baccalaureate or other initial professional education, such as nursing, and include |                           |         |                    |
|--|---------------------------|---------|--------------------|
| INSTITUTION AND LOCATION   | DEGREE<br>(if applicable) | YEAR(s) | FIELD OF STUDY     |
| Hunter College of City University of NY, NYC   | BS                        | 1977    | Environ. Health    |
| Polytechnic University, Brooklyn, NYC  | MS                        | 1979    | Environ. Heath Eng |
| Columbia Univ. School of Public Health, NYC  | DrPH                      | 1984    | Environ. Science   |

### **3. Academic Experiences**

1980-82 Staff Associate, Columbia University School of Public Health, NYC  
1981-84 Instructor, Hunter College EOHS Program (grad/undergrad courses), NYC  
1984-05 Assistant Professor, EOHS Program, Hunter College, NYC  
1997 - Program Director, EOHS Program (MS/MPH), Hunter College, NYC  
2005 - Associate Professor, EOHS Program (MS/MPH), Hunter College, NYC

### **4. Non-Academic Experience**

1982 – Environmental and Occupational Health Consulting / Legal work  
1986 - Research Associate / Trainer, CET UMDNJ School of Public Health, NJ  
2005 - Technical Advisory Board, Blacksmith Institute, NYC  
2012 - Global Alliance on Health and Pollution (international organization), UK  
2013 - World Health Organization, Committee on eWaste and Children’s Health, Geneva,

### **5. Certifications and Professional Registrations**

Certified Industrial Hygienist (CIH) renewal pending.  
40 Hr HzdWOPER  
Asbestos Building Inspector (US EPA accredited)

### **6. Current Memberships in Professional Organizations**

American Industrial Hygiene Association, Washington, DC  
Indoor Air Quality Association  
American Academy of Industrial Hygienist.

### **7. Honors and Awards**

2006 -Presidential Award for Excellence in Teaching, Hunter College, NYC

### **8. Service Activities (within and outside the institution)**

- Reviewer for several EHS journals including, Environmental Health Perspectives, Env. Research, Env Monitoring and Assessment and others.t
- Member of Global Alliance on Health and Pollution; an international collaborative alliance with WHO, UNEP, UNIDO, World Bank, Asian Developmental Bank and European Commission/Union, for the identification and management of toxic hotspots in low and middle income countries.
- Technical Consultant to the Blacksmith Institute, a global non-governmental organization working in 47 low and middle income countries for the management of toxic waste sites.

### **9. Selected Peer-reviewed Publications (since 2006)**

Chatham-Stephens K, Caravanos J, Ericson B, Sunga-Amparo J, Susilorini B, Sharma P, Landrigan PJ, Fuller R. *Burden of Disease from Toxic Waste Sites in India, Indonesia, and the Philippines in 2010* Environ Health Perspectives; .doi:10.1289/ehp.1206127, May 2013

Caravanos J, Clarke EE, Osei CS, Amoyaw-Osei Y; *Exploratory Health Assessment of Chemical Exposures at an e-Waste Recycling and Scrapyard Facility in Accra, Ghana*, Journal of Health and Pollution, Feb 2013

Jones DE, Pérez MC, Ericson B, Sánchez DE, Gualtero S, Smith-Jones A, Caravanos J; *Childhood Blood Lead Reductions Following Removal of Leaded Ceramic Glazes in Artisanal Pottery Production: A Success Story*, Journal of Health and Pollution, Feb 2013

Caravanos J, Ericson B, Ponce-Canchihuamán J, Hanrahan D, Block M, Susilorini B; *Rapid Assessment of Environmental Health Risks Posed by Mining Operations in Low and Middle Income Countries: Select Case Studies*, Environmental Research and Pollution Science, Dec 2012

Caravanos J, Chatham-Stephens K, Ericson BC, Landrigan PJ, Fuller R; *The Burden of Disease from Pediatric Lead Exposure at Hazardous Waste Sites in 7 Asian Countries*, Environmental Research, ePub Sept 2012

Ericson BC, Caravanos J, Chatham-Stephens K, Landrigan PJ; *Approaches to Systematic Assessment of Environmental Exposures Posed at Hazardous Waste Sites in the Developing World: The Toxic Sites Identification Project*, Journal of Environmental Monitoring and Assessment; May 2012

Rosen M, Caravanos J, Udasin I, Milek D, *An Innovative Approach to Interdisciplinary Occupational Safety and Health Education*, American Journal of Industrial Medicine, 54(7): 515-20, July 2011

Caravanos J, Clarke E, Lambertson C, *Assessing the Exposure Risks and Potential Health Effects from Chemical Contamination at an Electronic and Electrical Recycling and Waste Site in Accra, Ghana*; Journal of Health and Pollution, Vol 1, No 1, February 2011

#### **10. Most Recent Professional Development Activities / Awards**

Most recently and together with other EOHS faculty, we were able to provide extensive health and safety support to the residents affected by Hurricane Sandy. The EOHS program united to collect and distribute over 75,000 respirators, hundreds of TYVEK suits, goggles, gloves and other safety equipment to both residents, workers and volunteers. While the mold growth situation expanded, I quickly produced several YouTube videos on assessment, dehumidifiers, exposure and health effect issues. I provide 8 free mold awareness and remediation seminars in the affected area and was subsequently awarded a Training Grant with Dr. Mitchel Rosen of Rutgers University School of Public Health to provide 70 mold awareness and safe work practices 3 hour seminars. This \$95,500 grant was implemented quickly so affected communities could take advantage of the skills EOHS faculty were providing. Finally, it became apparent that Moisture Meters were necessary to determine whether it was safe to start rebuilding. I was awarded a \$7,397 grant to purchase moisture meters and conduct training for volunteers.

Also, since 2006 I have been extensively involved with quantifying the global burden of environmentally induced disease from toxic waste sites in low and middle income countries. Together with several partners, I was able to visit 15 countries and conduct training and logistic support for country specific hazardous waste site activities. The work has already generated several important articles and more are coming. During my sabbatical in 2014, I will continue and expand this research and service effort.

| Elizabeth Glass Geltman, J.D.   |                           | POSITION TITLE   |                                    |
|---|---------------------------|--|------------------------------------|
|   |                           | Visiting Associate Professor<br>(Associate Prof, tenure-track, beginning 9/2013) |                                    |
| EDUCATION/TRAINING ( <i>Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.</i> ) |                           |  |                                    |
| INSTITUTION AND LOCATION  | DEGREE<br>(if applicable) | YEAR(s)  | FIELD OF STUDY                     |
| Cornell University, Ithaca, New York<br>Georgetown University Law Center, Washington, DC<br>University of Baltimore School of Law, MD               | A.B.<br>J.D<br>LL.M       | 1983<br>1986<br>1988   | Psychology & History<br>Law<br>Law |

### 3. Academic Experiences:

Visiting Associate Professor, CUNY School of Public Health at Hunter College, Environmental & Occupational Health Sciences, 2012- Present, full time

Instructor, United States Department of Agriculture Graduate School, (Environmental Journalism; Environmental Journalism Online), 1998-2002, Part time

Visiting Research Fellow, Johns Hopkins University, The Paul H. Nitze School of Advanced International Studies, 1998-2000, full time

Professorial Lecturer, the George Washington University Law School, Washington, District of Columbia, Associate Professor of Environmental Law (1995-1998), Visiting Associate Professor (1993-1995), (1991-1993), 1991-1998, full time

### 4. Non-academic Experience

EnVed (formerly the International Environmental Education Foundation), Executive Director, 2004-2012, Full time (Policy advisor concerning local, state, federal and international environmental policy questions, including WASA lead abatement efforts, creating of District of Columbia environmental protection agency; environmental recommendations for Obama transition team; drafted federal securities and other market-based environmental disclosure requirements)

Squire Sanders, Counsel, Environmental Practice Group, 1994-2004, full time (Drafted state, federal and international brownfields legislation and implementing regulation; drafted environmental audit privilege legislation; environmental recommendations for Bush transition team; conducted environmental risk assessments; supervised environmental audits; designed environmental management systems; brownfield cleanups)

Hunton & Williams, Associate, Energy and Environmental Team, 1991- 1993 (Drafted state and federal implementation regulation for the Clean Air Act Amendments of 1990; negotiated environmental permits; conducted environmental risk assessments, supervised environmental audits; designed environmental management systems; brownfield cleanups)

Fulbright & Jaworksi, Participating Associate (1991), Associate (1987-1990), and Summer Associate (1984), International, Environmental & Corporate/Securities (Conducted environmental risk assessments, supervised environmental audits; designed environmental management systems, brownfield cleanups) 1987- 1991, full time

The Honorable Paul Alpert, Maryland Court of Special Appeal, Judicial Law Clerk, 1986 Term, full time

**5. Certifications or Professional Registrations**

**Bar Admissions:** Maryland (1986), District of Columbia (1987), United States Court of Appeals for the District of Columbia (1988), United States Court of Appeals for the Federal Circuit (1988), United States Court of International Trade (1988), United States Supreme Court (1988)

**6. Current membership in professional organizations:**

American Public Health Association, American Industrial Hygiene Association, American Bar Association, Maryland Bar Association, District of Columbia Bar Association

**7. Honors and awards**

**8. Service activities (within and outside of the institution):**

Reviewer, Journal of Public Health and Epidemiology  
Special Education Liaison, District of Columbia Public Schools  
Parent Ambassador & Auction Committee, Maret School

**9. Briefly list the most important publications and presentations from the past five years – title, co-authors if any, where published and/or presented, date of publication or presentation:**

Panel Organizer & Moderator: Climate Change and Public Health: Creating a Climate Ready NYC, The Graduate Center, City University of New York, January 23, 2013  
Presentation: Trend Report: The Impact of Increased Shale Gas Extraction on World Wide Public Health, CUNY School of Public Health at Hunter College, March 4, 2013  
Panel Organizer & Moderator: What's the Deal with Fracking?: Public Health Implications of Shale Gas Extraction, Roosevelt House, May 7, 2013

**10. Briefly list the most recent professional development activities**

I am currently working on a book about the public health implications of shale gas extraction.

|                               |                                 |
|-------------------------------|---------------------------------|
| <b>Franklin E. Mirer, PhD</b> | POSITION AND TITLE<br>Professor |
|                               |                                 |

EDUCATION/TRAINING (Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)

| INSTITUTION AND LOCATION                    | DEGREE<br>(if applicable) | YEAR(s) | FIELD OF STUDY    |
|---|---------------------------|---------|-------------------|
| Columbia College, New York, NY              | AB                        | 1966    | Chemistry         |
| Harvard University, Cambridge, MA           | AM                        | 1967    | Organic Chemistry |
| Harvard University, Cambridge, MA           | PhD                       | 1972    | Organic Chemistry |
| Harvard School of Public Health, Boston, MA | Post Doc                  | 1975    | Toxicology        |

### 3. Academic Experience

Professor, Environmental and Occupational Health Sciences, CUNY School of Public Health at Hunter College, New York, NY, 2006-Present; Professor, DPH Faculty, CUNY Graduate Center, 2009-present  
Adjunct Professor, Department of Environmental and Occupational Health, University of Michigan School of Public Health, Ann Arbor, MI, June 2003-present; Adjunct Associate Professor July 1977-June 2003.  
Adjunct Associate Professor, Department of Community Health, Mt. Sinai School of Medicine, New York, NY, May 2003-present.  
Visiting Lecturer, Department of Environmental and Occupational Health, Harvard School of Public Health, Cambridge, MA, 1999-present.

### 4. Non Academic Experience

Director, Health and Safety Department, United Automobile, Aerospace and Agricultural Implement Workers of America (UAW), Detroit, MI, January 1982-2006.

### 5. Certifications

CIH, Chemical Aspects, 1975-Present

### 6. Membership in Professional Organizations

American Industrial Hygiene Association, Member, Risk Assessment Committee, Social Concerns Committee  
American Conference of Governmental Industrial Hygienists

### 7 Honors and Awards

Edward Cummings Memorial Award, American Industrial Hygiene Association, 2012  
Franklin and Eleanor Roosevelt House Faculty Associate, Hunter College, 2007  
Alice Hamilton Award for Lifetime Achievement, Safety and Health Section, APHA, 2005  
Fellow, American Industrial Hygiene Association, 2002  
Safety and Health Hall of Fame International, National Safety Council, inducted 1999  
Fellow, Collegium Ramazzini, 1985

### 8. Service Activities

Member, Hazard Abatement Board, New York State Department of Labor, March 2007 - present  
Member, Review of NIOSH Research Programs, Framework Committee, Institute of Medicine, June 2005 – Present,  
Evaluation Committee for Health Hazard Evaluation Programs, December 2007-November 2008  
Member, Roundtable on Environmental Health Sciences Research and Training, Institute of Medicine, National Research Council, Washington, DC, June 1998 – May 2002.

### 9. Publications

Mirer FE (2013). "Risk Assessment - Suffer Little Children." Synergist 24(2): 23-24. (22 additional commentaries since 2008)

- Morabia, A., Zhang F, Kappil, M. A., Flory, J., Mirer, F. E., Santella, R. M., Wolff, M., Markowitz, S. B., (2012) "Biologic and epigenetic impact of commuting to work by car or using public transportation: A case-control study." *Prev Med*, 54 229–233
- Mirer, FE (2012) "Metalworking Fluids", *Patty Industrial Hygiene and Toxicology*, Chapter 109, Wiley, New York
- IARC (2012) "Some Chemicals in Industrial and Consumer Products, Food Contaminants and Flavourings, and Water Chlorination By-Products", *IARC Monographs on the Evaluation of Carcinogenic Risks to Humans*, Volume 101
- Richmond-Bryant J, Bukiewicz L, Kalin R, Galarraga C, Mirer F (2011) "A multi-site analysis of the association between black carbon concentrations and vehicular idling, traffic, background pollution, and meteorology during school dismissals", *Science of the Total Environment* 409 2085–2093
- Mirer, FE, (2011) "The Mode of Absorption, Distribution, and Elimination of Toxic Materials," *Patty's Industrial Hygiene and Toxicology*, 6th Edition, Volume 1, Wiley, New York p.41-88,
- Mirer F (2010) My Dogs are Barking – Foot and Ankle Pain Among Factory Workers," *American Journal of Industrial Medicine*, 53(12): 1240-1241 <http://onlinelibrary.wiley.com/doi/10.1002/ajim.20872/pdf>
- Mirer FE (2010) "New Evidence on the Health Hazards and Control of Metalworking Fluids since Completion of the OSHA Advisory Committee Report," *American Journal of Industrial Medicine*, 53(8): 792 – 801.
- Morabia A, Mirer F, Amstislavski T, Eisl H, Werbe Fuentes J, Gorczynski J, Goranson C, Wolff M, Markowitz S (2010) "Potential Health Impact of Switching from Car to Public Transportation When Commuting to Work". *American Journal of Public Health*, 53(8): 792 – 801.
- Buchanan S, Vossenas P, Krause N, , Moriarty J, Frumin E, Shimek JAM, Mirer F, Orris P, Punnett L, (2010) "Occupational injury disparities in the US hotel industry" *Amer J Ind Med* Feb;53(2):116-25.
- Morabia A, Amstislavski P, Mirer F, Amstislavski T, Eisl H, Wolff M, Markowitz S "Simultaneous assessment of air pollution and physical activity during transportation by car, subway or foot." *Am J Prev Med* 37:72-77 (2009).
- "Safety and Health Protections." Mirer F E and Stellman J M "Occupational In: Kris Heggenhougen and Stella Quah, editors *International Encyclopedia of Public Health*, Vol 4. San Diego: Academic Press; 2008. pp. 658-668.

## 10. Professional Development

Attendance at American Industrial Hygiene Conference, 2006-2013, podium and roundtable presentations each year

|                                    |               |  |                       |
|------------------------------------|---------------|--|-----------------------|
| <b>Grace Sembajwe, ScD, MSc</b>    |               | <b>POSITION TITLE</b><br>Associate Professor |                       |
| <b>EDUCATION/TRAINING</b>          |               |  |                       |
| <b>INSTITUTION AND LOCATION</b>    | <b>DEGREE</b> | <b>YEAR(s)</b>                               | <b>FIELD OF STUDY</b> |
| Goshen College                     | B.A.          | 1993   | Natural Science       |
| University of Central Missouri     | M.Sc.         | 2000   | Industrial Hygiene    |
| University of Massachusetts Lowell | Sc.D.         | 2007   | Epidemiology (Occup.) |
| Harvard School of Public Health    | Non-degree    | 2010   | Cancer Prevention     |

### **3. Academic Experience**

- 02/2012 – present: Associate Professor, City University New York School of Public Health at Hunter, New York City, New York
- 09/2010 – 06/2012: Research Associate Harvard School of Public Health, Department of Environmental Health, Exposure Epidemiology and Risk
- 09/2007 – 08/2010: Postdoctoral Research Fellow Harvard School of Public Health, Department of Society Human Development and Health Dana Farber Cancer Institute, Center for Community-Based Research

### **4. Non-Academic Experience**

- 04/2008 – present: Affiliate/Research Epidemiologist, Partners Healthcare System, MGH/BWH
- 01/2001-06/2002: Industrial Hygiene Intern Environmental Health and Safety Department (Allston), Harvard University
- 07/2001-12/2001: Assistant Industrial Hygienist, Environmental Health and Safety Department, University of Massachusetts in Boston
- 12/1999-07/2001: Industrial Hygiene Consultant, Burns & McDonnell Engineering, Inc., Kansas City, Missouri

### **5. Certifications**

- 1999 – present 40-hour Hazardous Waste Operations (HAZWOPER)
- 1999 – present 8-hour HAZWOPER Supervisor
- 1999 – present 10-hour Occupational Safety and Health Administration (OSHA) Construction Safety  
*Eligible to take the Certified Industrial Hygienist (CIH) examination in spring 2013*

### **6. Other Experience and Professional Memberships**

- 1999 – present American Society of Safety Engineers (ASSE)
- 2003 – present American Conference of Governmental Industrial Hygienists (ACGIH)
- 2005 – present American Public Health Association (APHA)
- 2007 – 2011 National Postdoctoral Association (NPA)

### **7. Honors and Awards**

- 04/2000 Outstanding Industrial Hygiene Student Award from University of Central Missouri
- 09/2001 National Institute of Occupational Safety and Health (NIOSH) Scholarship Award from the Univ of Mass Lowell
- 09/2007 National Cancer Institute (NCI) Postdoctoral Research funding in Cancer Prevention and Control
- 05/2008 Harriet Hardy Award for outstanding performance in work environment, U of Massachusetts Lowell

### **8. Service Activities (within and outside of the institution)**

- MGH IRB review board C (Jan 2009-Aug 12)
- Search Committee (EOHS senior faculty/track director) 2012-3
- Grant Reviewer: NCI, NIOSH
- Journal Reviewer: Social Science and Medicine, BMJ Open, BMMJR, OEM

- Book Reviewer: Thompson Reuters
- Program Reviewer; METISS (Paris, France)

## **9. Selected publications / Activities**

- Sembajwe G**, Tveito T, Hopcia K, Kenwood C, O'Day ET, Stoddard AS, Dennerlein J, Hashimoto D, Sorensen G Psychosocial stress and reports of multi-site musculoskeletal pain in a cross-sectional survey of patient care workers, *Workplace Health Saf.* 2013 Mar; 61(3):117-25
- Sembajwe G**, Wahrendorf M, Siegrist J, Sitta R, Zins M, Goldberg M, Berkman L. Effects of job strain on fatigue: cross-sectional and prospective views of the Job Content Questionnaire and Effort Reward Imbalance in the GAZEL cohort. *Occup Environ Med.* 2012 Jun; 69(6):377-84. Epub 2011 Aug 17
- Sembajwe G**, Cifuentes M, Tak SW, Gore R, Kriebel D, Punnett L. Employment and global estimates of work-related respiratory disease from the WHO World Health Survey. [Manuscript under review at *J Occup Environ Health – conditionally accepted*]
- Sembajwe G**, Quinn M, Kriebel D, Stoddard A, Krieger N, Barbeau E. The influence of sociodemographic characteristics on agreement between self-reports and expert exposure assessments. *Am J Ind Med.* 2010 Oct; 53(10):1019-31
- Sembajwe G**, Cifuentes M, Tak SW, Gore R, Kriebel D, Punnett L. National income and global estimates of work-related respiratory disease from the WHO World Health Survey. *Eur Respir J.* 2010 Feb; 35(2):279-86. Epub 2009 Sep 9.
- Schooling CM, Sembajwe G, Agalliu I. Re: Christina G. Jespersen, Mette Nørgaard, Michael Borre. Androgen-deprivation Therapy in Treatment of Prostate Cancer and Risk of Myocardial Infarction and Stroke: A Nationwide Danish Population-based Cohort Study. *Eur Urol.* In press.  
<http://dx.doi.org/10.1016/j.eururo.2013.02.002>. *Eur Urol.* 2013 Apr 19.
- Wahrendorf M, **Sembajwe G**, Siegrist J, Sitta R, Zins M, Goldberg M, Berkman L. Long-term effects of psychosocial work stress in mid-life on health functioning after labour market exit - results from the GAZEL study. *J Gerontol B Psychol Sci Soc Sci.* 2012 Apr 29
- Boden L, **Sembajwe G**, Torill T, Hashimoto D, Hopcia K, Kenwood C, Stoddard A, Sorensen G Occupational Injuries among Patient Care Workers in a Hospital Setting. *Am J Ind Med.* 2012 Feb;55(2):117-26. doi:

## **10. Professional Development Activities:**

FELLOWSHIPS: 2007-2010 Postdoctoral Research Fellow, Harvard School of Public Health, Department of Society Human Development and Health, Dana Farber Cancer Institute, Center for Community-Based Research

### CONFERENCES AND PROCEEDINGS

- The Seventh Annual Conference on Prevention of Musculoskeletal, Disorders: PREMUS 2010 and WDPI 2010. August 29- September 3, 2010 Angers, France. [Oral]
- Employment and global estimates of respiratory symptoms from the WHO World Health; Survey Session: Epidemiology in the Global Context. 43rd Annual Meeting of the World. Jun 23-26. 2010, Seattle. WA [Oral]
- A modular measure of psychosocial stress from the GAZEL cohort using the Job Content Questionnaire (JCQ) and Effort Reward Imbalance (ERI) scales. Four Centre Initiative Workshop, May 5-7, 2010, Stockholm, Sweden

### PROFESSIONAL AFFILIATIONS:

Partners Healthcare (Massachusetts General Hospital); Dana Farber Cancer Institute INSERM

## APPENDIX C – EQUIPMENT

| Name of equipment                             | Manufacturer              | Model No       | No. of Units |
|---|---------------------------|----------------|--------------|
| Aethalometer                                  | MacGee Scientific         | AE-42          | 1            |
| Air Cub                                       | MSA                       |                | 1            |
| Air Mask                                      | MSA                       |                | 2            |
| Air Mask, Ultralite II, Pressure Demand       | MSA                       |                | 2            |
| Air Sampler Pump                              | AirChek                   | 224-43XR       | 1            |
| Air Sampling Pump, Permissible                | MSA                       | Type C115      | 1            |
| Air Sampling Pumps (with charger)             | MSA ELF                   |                | 10           |
| Air Velocity Meter                            | Kurz Instruments          | 443            | 1            |
| Air Velocity Meter, VELOCICALC PLUS           | TSI Inc.                  | 8360           | 4            |
| Anderson Air Sampler, 8 stage                 | 2000 In                   | 21-000/1262    | 1            |
| Atmospheric Monitor PhD2                      | Biosystems Inc.           | 1615           | 1            |
| Atomic Absorption Spectrometer                | Varian                    | Spectra AA 50B | 1            |
| Balance - analytical                          | Mettler                   | P 1200         | 1            |
| Balance – micro Ohas                          |                           |                | 2            |
| Buck Calibrator                               | A.P. Buck Inc.            | M-5            | 4            |
| CO Analyzer                                   | Energetics Science        |                | 1            |
| CO <sub>2</sub> Detector                      | Telaire Systems           | 1310           | 1            |
| Combustible Gas Indicator                     | MSA                       | 40             | 2            |
| Combustible Gas Indicator-Explosimeter        | MSA                       | 2A             | 1            |
| Condensation Particle CounterGT-521           | Met One                   | H4891          | 2            |
| Constant Flow Sampler Calibrator              | DuPont                    |                | 1            |
| Data Rams                                     | MIE Inc.                  | pDR            | 2            |
| Dosimeter                                     | Dosimeter Corp of America | 3700           | 1            |
| Dosimeter                                     | GenRad                    |                | 3            |
| Drager Pumps                                  | National Draeger Inc.     | TUV 12 RgG 017 | 10           |
| Electronic Bubble flow meter                  | Spectrex                  | BFM 4000       | 1            |
| Field Kit                                     | Photovac Inc.             | TA 104         | 1            |
| Fit Test Adaptor Kit (3M APR)                 | TSI Inc.                  | 8025-16        | 1            |
| Fit Test Adaptor Kit (MSA APR)                | TSI Inc.                  | 8025-14        | 1            |
| Fit Test Apparatus, Qualitative               | 3M Health Care            | FT-10          | 2            |
| Gas (CO and CO <sub>2</sub> ) Calibration Kit | Graywolf                  | CA-GS12        | 2            |
| Gas Chromatograph (student)                   |                           |                | 3            |
| Gas Chromatograph, Photoionization, Portable  | Photovac                  |                | 1            |
| Gemini Twin Port Sampler                      | MSA                       |                | 11           |
| Genesis Gas Monitors                          | Gastech                   | OO39039        | 5            |
| Gilian Hi Flow Sampler                        | Gilian Instrument Corp.   | HFS 513A       | 3            |
| Gilian Hi Flow Sampler                        | Gilian Instrument Corp.   | HFS 113A       | 1            |
| Gillibrator                                   | Gilian                    |                | 2            |
| Hot Block                                     | Environmental Express     | SC154          | 1            |
| Incubator                                     | GCA Precision Scientific  |                | 1            |
| Indoor Air Quality Probe (with PDAs)          | Graywolf                  | IQ-410         | 2            |
| LuxMeter                                      | General Electric          | Type 213A      | 7            |
| LuxMeter                                      | Lutron                    | LX-101         | 1            |
| Magnehelic Gage                               | Dwyer Instruments Inc.    |                | 1            |
| Manometer with 3 Pitot tubes                  |                           |                | 3            |
| Manometer, Mark II                            | Dwyer Instruments Inc.    | 27             | 3            |

| <b>Name of equipment</b>                       | <b>Manufacturer</b>        | <b>Model No</b> | <b>No. of Units</b> |
|--|----------------------------|-----------------|---------------------|
| Manometer, Mark II                             | Dwyer Instruments Inc.     | 40-1            | 3                   |
| Mask Sampling Adaptor                          | TSI Inc.                   | 8025-20         | 1                   |
| Mask Sampling Adaptor (North7700)              | TSI Inc.                   | 8025-17         | 1                   |
| Mask Sampling Adaptor (with neg pressure resp) | TSI Inc.                   | 8025-10         | 1                   |
| Mask Sampling Adaptor II (3M Adaptor)          | TSI Inc.                   | 8025-16         | 1                   |
| Microbial Air sampler, Anderson                | Enviro Monitoring Systems  | 6025SE-V        | 5                   |
| Microbial Air sampler, Anderson                | Benton Harbor              | 1531-107B-G557X | 5                   |
| Microprinter, Compuflow                        | Alnor                      | 8520            | 1                   |
| Microscope                                     | Olympus                    | BH-2            | 3                   |
| Microscope                                     | Olympus                    | CH-2            | 4                   |
| Microwave Survey Meter                         | Holiday Industries Inc.    | 1501            | 1                   |
| Midget Impinger Apparatus                      | MSA                        | 14502           | 1                   |
| Muffle Furnace                                 | Blue M electric Co.        | M25A - 1A       | 1                   |
| Organic Chemistry Kit                          | Corning                    |                 | 1                   |
| Organic Vapor Analyzer (Century Ova 128 GC)    | Foxboro                    | 50513, 50514    | 2                   |
| Oxygen Analyzer                                | Edmont                     |                 | 1                   |
| Oxygen Indicator                               | MSA                        | 245             | 2                   |
| Oxygen Meter                                   | Bacharach                  | Sniffer 503 A   | 1                   |
| Photo-ionizer                                  | Hnu Systems Inc.           | PI 101          | 3                   |
| Pistonphone                                    | Bruel and Kjaer            | Type 4220       | 1                   |
| Portable Alarm_Combustible gas and oxygen      | MSA                        | 261             | 3                   |
| Primary gas Flow calibrator                    | Gilian Instrument Corp.    |                 | 1                   |
| Pump Calibrator, HFS                           | Gilian                     | LCP 300 HL 1909 | 1                   |
| Pump Calibrator, HFS                           | Gilian                     | 1HCP300 HL 1895 | 1                   |
| Radiation Hazard Meter, RAHAM                  | General Microwave Corp     | Model 4         | 1                   |
| Respirator Fit Tester, PortaCount              | TSI Inc.                   | 8010            | 2                   |
| Respirators                                    | MSA Comfo                  |                 | Numerous            |
| Respirators                                    | North                      |                 | Numerous            |
| Respirators                                    | Blue I                     |                 | Numerous            |
| Respirators                                    | Wilson                     |                 | Numerous            |
| Respirators                                    | 3M (Half face)             |                 | Numerous            |
| Rotating Vane Anemometer                       | Florite                    | 3035A           | 1                   |
| Side Pak Aerosol Monitor                       | TSI                        | AM 510          | 4                   |
| Side Pak Aerosol Monitor                       | TSI                        |                 | 6                   |
| Sound Level Calibrator                         | General Radio Company      | 1562-A          | 3                   |
| Sound Level Calibrator                         | Columbia Research Lab Inc. | SPC-10          | 6                   |
| Sound Level Calibrator                         | GenRad                     | 1986            | 1                   |
| Sound Level Meter                              | Columbia research Lab Inc. | SPL 103         | 2                   |
| Sound Level Meter                              | Bruel and Kjaer            | Type 2232       | 3                   |
| Sound Level Meter                              | Bruel and Kjaer            | Type 2219       | 1                   |
| Sound Level Meter                              | General radio Company      | 1565-B          | 3                   |
| Sound Level Meter                              | GenRad                     | 6NR 14          | 5                   |
| Tensiometer                                    | UP-Right Inc.              | 2150            | 1                   |
| Thermal printer with bubble generator          | Gilian                     | P/NC-800274     | 1                   |
| Thermo Anemometer                              | Alnor                      | 8565            | 1                   |
| Vacuum Pumps                                   | Millipore                  | XX5500000       | 4                   |
| Vacuum Pumps                                   | Dawson                     | A004163         | 1                   |
| Vacuum Pumps                                   | GAST                       | 1531-107-G288   | 2                   |
| Vaneometer                                     | Lab safety                 |                 | 1                   |

| <b>Name of equipment</b>            | <b>Manufacturer</b>        | <b>Model No</b>   | <b>No. of Units</b> |
|-------------------------------------|----------------------------|-------------------|---------------------|
| Velometer                           | Alnor                      | F02, E03, T09,B02 | 4                   |
| Velometer                           | Alnor                      | Type 8100         | 4                   |
| VOC PID Monitor (PPBRAE Plus)       | RAE Systems                | PGM-7240          | 1                   |
| Weather Station, HOBO               | MetOne                     |                   | 4                   |
| Wet/Dry Humidity Meter, Pschro-Dyne | Environmental Technologies |                   | 1                   |



## **APPENDIX D. INSTITUTIONAL SUMMARY**

INSTITUTION: CUNY School of Public Health  
UNIT: Hunter College School of Urban Public Health  
PROGRAM: Environmental and Occupational Health Sciences MS Program

### **1. The Institution**

#### ***a. Name and address of the institution:***

Hunter College of the City University of New York  
2180 3<sup>rd</sup> Avenue  
New York, New York, 10035

#### ***b. Name and title of the chief executive officer of the institution and, if different, of the campus president, chancellor, etc.:***

Dr. Neal L. Cohen, Acting Dean  
CUNY School of Public Health

Ms. Jennifer J. Raab, Esq., President  
Hunter College

Dr. Matthew Goldstein, Chancellor  
City University of New York

#### ***c. Name and official position of the person submitting the completed questionnaire:***

Dr. Neal L. Cohen  
Acting Dean  
CUNY School of Public Health

### **2. Type of Control**

CUNY School of Public Health and Hunter College are public nonprofit, state supported institution.

### **3. Educational Unit**

The Educational Unit being evaluated is the EOHS-MS program located in the Hunter College School of Urban Public Health which is part of the CUNY School of Public Health. The CUNY

School of Public Health is a consortium structure set on four campuses, although the EOHS Program and EOHS-MS are found only on the Hunter Campus. The EOHS Program is one of five programs at the Hunter campus. The EOHS faculty is headed by a Program Director. The Program Director reports to the Dean of the **CUNY School of Public Health**. The Dean of the CUNY School of Public Health reports to the Chancellor of the City University of New York

An organizational diagram is found in Figure D-1.

#### **4. Academic Support Units**

All required and virtually all elective courses in the EOHS-MS program are taught by the faculty in the four programs within the Hunter College School of Urban Public Health.

Environmental and Occupational Health Program – Jack Caravanos, Program Director  
Epidemiology and Biostatistics Program – Lorna Thorpe, Program Director  
Community Health Program – Martha Crum, Program Director  
Health Policy Management Program – Barbara Berney, Program Director

#### **5. Non-academic Support Units**

##### Library

Margaret Bausman, Assistant Professor Interim Head, Schools of Social Work and Public Health  
Mason Brown, John Pell – Public Health Support

##### Computing Facilities

Mitch Ahlbaum, CIO/AVP for Instructional Computing & Information Technology

##### Learning Center (student support and tutoring)

Dr. Steven Serafin, Director, Reading/Writing Center

##### Research Administration

Robert Buckley, Director, Office of Research Administration

#### **6. Credit Unit**

**All courses carry 3 credits except EOHS 741, laboratory, which is 4 credit . Courses meet once a week for 15 weeks; class meetings are two hours.**

## Signature Attesting to Compliance

By signing below, I attest to the following:

That EOHS-MS (Name of the program(s)) has conducted an honest assessment of compliance and has provided a complete and accurate disclosure of timely information regarding compliance with ABET's *Criteria for Accrediting Applied Science Programs* to include the General Criteria and any applicable Program Criteria, and the *ABET Accreditation Policy and Procedure Manual*.

Neal L. Cohen, MD  
Dean's Name (As indicated on the RFE)

Neal L. Cohen, MD

June 28, 2013

## APPENDIX E

### 2010 Update Report to ABET

# HUNTER COLLEGE

of the City University of New York  
School of Health Sciences • Brookdale Health Science Center  
425 East 25th Street, New York, NY 10010

Environmental and Occupational Health Sciences

February 15<sup>th</sup> 2010

(212) 481-7569

### **Response - January ABET:**

#### **Hunter College's EOHS Master's Degree / Industrial Hygiene Program:**

#### **Supplemental Report to the Accreditation Board for Engineering & Technology (ASAC)**

#### **BACKGROUND:**

The Applied Science Accreditation Commission of the Accreditation Board for Engineering and Technology (ASAC/ABET) issued a Final Statement on the Master of Science in Environmental and Occupational Health Sciences (MSEOHS) degree at Hunter College. A site evaluation team from ABET performed a site visit of the MSEOHS degree program during October 14 – 16, 2007. The site evaluation team found one weakness that had to be addressed, namely “Criterion 3: Program Outcome and Assessment”. The criticism specifically stated: “*The MSEOHS program has developed instruments for alumni, student and employer surveys. However, these surveys have only been implemented once in 2007. A six-year cycle for Alumni and Employer Surveys has not allowed for any improvements to be incorporated prior to the accreditation visit.*”. ABET requested proof of additional assessment efforts at the end of 2 years.

The purpose of this document is to report on efforts to address this remaining weakness. The employer survey was prepared and pretested in late October and launched on December 1<sup>st</sup> 2009.

Sufficient responses were collected to allow faculty to closed the survey in early January 2010. The timetable for this activity is listed below:

| <b>Date</b> | <b>Activity</b>                                      | <b>Status</b> |
|-------------|--|---------------|
| Oct 2009    | Preparation and standardization of Employer survey   | Completed     |
| Nov 2009    | Review and pretest employer survey                   | Completed     |
| Nov 2009    | Assemble expanded employer survey mailing list       | Completed     |
| Dec 2009    | Employer Survey Launched                             | Completed     |
| Jan 2010    | Employer Survey closed, data downloaded              | Completed     |
| Jan 2010    | Analysis of employer survey data                     | Completed     |
| Jan 2010    | Review and act on data                               | Completed     |
| Jan 2010    | Present data analysis to EOHS Advisory Board Meeting | Completed     |
| Jan 2010    | Summit Curriculum Proposal to Hunter College Senate  | Completed     |
| Feb 2010    | Final report to ABET                                 | Submitted     |

#### EMPLOYEE SURVEY RESULTS:

- Profile of Respondents**  
 In total, 44 environmental / industrial hygiene employers responded to the survey with 36% of respondents representing Consulting Eng/Env firms, 18% city, state or federal regulatory agencies and 14 were private employers (i.e. corporations). More than 50% had some type of certification (i.e. CIH, CSP CHMM etc), 17% were CIH's. Finally 69% had employed at least 1 Hunter EOHS graduate and 17% had employed 4-6 EOHS graduates.
- Hunter Performance**  
 Overall, the respondents rank the Hunter EOHS program very positively with 93% responding "very well" or "well" to the question: *Overall, how well do you think the Hunter Master's program prepared our graduates for their work in your agency?*

#### **ABET / EOHS GENERAL OUTCOMES:**

| <b>To what extent do the graduates of the HC-EOHS-MS program have..</b>                     | <b>Very Well</b> | <b>Well</b>      | <b>Fairly Well</b> | <b>Not at all</b> |
|---|------------------|------------------|--------------------|-------------------|
| (a) the ability to apply knowledge of mathematics, science, and applied sciences            | <b><u>13</u></b> | 10               | 4                  | 0                 |
| (b) the ability to design and conduct experiments, as well as to analyze and interpret data | 10               | <b><u>11</u></b> | 6                  | 0                 |

|  |                  |                  |   |   |
|--|------------------|------------------|---|---|
| (c) the ability to formulate or design a system, process or program to meet desired needs                            | 9                | <b><u>13</u></b> | 5 | 0 |
| (d) the ability to function on multi-disciplinary teams  | <b><u>15</u></b> | 9                | 2 | 0 |
| (e) the ability to identify and solve applied science problems   | <b><u>13</u></b> | 11               | 3 | 0 |
| (f) an understanding of professional & ethical responsibility  | <b><u>16</u></b> | 10               | 1 | 0 |
| (g) the ability to communicate effectively   | 10               | <b><u>11</u></b> | 6 | 0 |
| (h) the broad education necessary to understand the impact of solutions in a global and societal context             | 7                | <b><u>15</u></b> | 4 | 0 |
| (i) a recognition of the need for, and an ability to engage in life-long learning                                    | <b><u>13</u></b> | 12               | 2 | 0 |
| (j) a knowledge of contemporary EOHS issues  | <b><u>13</u></b> | 12               | 2 | 0 |
| (k) the ability to use the techniques, skills, and modern scientific & technical tools necessary for prof'l practice | 11               | <b><u>12</u></b> | 4 | 0 |
| (l) an understanding of the particular public health problems of urban communities                                   | 8                | <b><u>15</u></b> | 3 | 0 |
| (m) the ability to apply their public health knowledge to help promote help and cure disease among urban populations | 6                | <b><u>14</u></b> | 5 | 1 |

| <b><u>ABET /EOHS SPECIFIC OUTCOMES</u></b>   |                  |                  |                    |                   |
|--|------------------|------------------|--------------------|-------------------|
| <b>To what extent do the graduates of the Hunter College EOHS-MS program have the ability to....</b>                               | <b>Very Well</b> | <b>Well</b>      | <b>Fairly Well</b> | <b>Not at all</b> |
| (a) identify agents, factors, and stressors generated by and/or associated with defined sources, unit operations, and/or processes | <b><u>15</u></b> | 7                | 4                  | 0                 |
| (b) describe qualitative and quantitative aspects of generation of agents, factors, and stressors                                  | 9                | <b><u>12</u></b> | 4                  | 1                 |
| (c) understand physiological and/or toxicological  | <b><u>11</u></b> | 10               | 4                  | 1                 |

|  |           |           |          |   |
|--|-----------|-----------|----------|---|
| interactions of physical, chemical, biological, and ergonomic agents, factors, and/or stressors with the human body  |           |           |          |   |
| (d) assess qualitative and quantitative aspects of exposure assessment, dose-response, and risk characterization based on applicable pathways and modes of entry | 9         | <u>10</u> | 7        | 0 |
| (e) calculate, interpret, and apply statistical and epidemiological data   | 5         | <u>12</u> | 9        | 0 |
| (f) recommend and evaluate engineering, administrative, and personal protective equipment controls and/or other interventions to reduce or eliminate hazards     | <u>14</u> | 9         | 3        | 0 |
| (g) demonstrate an understanding of applicable business and managerial practices   | 6         | <u>9</u>  | <u>9</u> | 2 |
| (h) interpret and apply applicable occupatl & envir regulations  | <u>12</u> | <u>12</u> | 2        | 0 |
| (i) understand fundamental aspects of safety & env. health   | <u>16</u> | 10        | 0        | 0 |
| (j) attain recognized professional certification   | 7         | <u>13</u> | 5        | 1 |
| (k) understanding of the particular public health problems of urban communities  | 9         | <u>11</u> | 5        | 0 |
| (l) to apply their public health knowledge to help promote health and prevent disease among urban populations  | 8         | <u>12</u> | 5        | 0 |

With regard to EOHS / ABET defined outcomes, the program appears to be addressing these satisfactorily (see tables below). The only outcome that respondents' felt still needs continuing work is "demonstrate an understanding of applicable business and managerial practices". This outcome goal continues to challenge the EOHS program and renewed efforts are being made to address it. Specifically, a new course, which can be substituted for a required public health course, will be designed. This course, tentatively entitled "Managing EOHS Programs and Projects" will be implemented academic year 2011/2012 and evaluated shortly afterward.

- Evaluation of Changes in Graduation Requirements using Employer Survey

The creation of the CUNY School of Public Health at Hunter College has created a challenge for the EOHS – MS program; namely we have been mandated to reduce the number of credits by 3 (49 to 46) to be consistent with other degree programs in the “department” and to add a distinct 3 credit “Fieldwork” course. This essentially reduces the number of elective courses that a Hunter EOHS-MS student can take from 2 to 1.

The timing of this survey was opportune in that we were able to assess how to adapt to this change. Essentially, previous investigation through student meetings, faculty meetings and external collegial discussions indicated that changing the course “Industrial Site Visits” from required to elective would be least disruptive. To further evaluate this suggested change, we pose the question in the Employer Survey.

The results were consistent with other assessment methods and indicated that of all the required courses mandated by the EOHS-MS program, the change from required to elective of “Industrial Site Visits” would not have adverse effects (see responses below).

| <b>The courses listed below are presently required of all EOHS-MS graduates. If you had to make one of these courses elective, which would you choose?</b> | <b>Response Percent</b> |
|--|-------------------------|
| Industrial Hygiene   | 3.8%                    |
| Industrial Ventilation   | 15.4%                   |
| Laboratory   | 15.4%                   |
| Physical Hazards (noise, radiation)  | 11.5%                   |
| Toxicology   | 15.4%                   |
| Site Visits  | 38.5%                   |

On reducing the number of credits, over 90% of respondents stated it would have little to no significant impact on the quality of EOHS graduates. (see responses below).

| <b>We are contemplating reducing the number of credits for graduation from 49 to 46. How would you rate this proposal?</b> | <b>Response Percent</b> |
|--|-------------------------|
| Unlikely to have a significant impact on the quality of EOHS graduates   | 67.9%                   |
| Likely to have a slight impact   | 25.0%                   |
| Likely to have a significant (negative) impact   | 7.1%                    |

On the importance of taking elective courses, almost 90% of respondents thought that was important or very important. This further enforces our recommendation to change the status of “Industrial Site Visits” from required to elective.

| <b>How important do you think it is for students to be allowed to take electives in EOHS?</b> | <b>Response Percent</b> |
|---|-------------------------|
| Very Important  | 60.7%                   |
| Important   | 28.6%                   |
| Desirable but not essential   | 10.7%                   |
| No opinion  | 0.0%                    |

- Closing the Loop

The data from the Employer survey together with discussions with the EOHS advisory board and EOHS faculty input have generated an “EOHS-MS Degree Curriculum Proposal” to implement the recommended changes (see curriculum proposal attached).

The table below lists some of the specific issues and how they were assessed and implemented.

| <b>ISSUE</b>  | <b>DESCRIPTION</b>   | <b>ASSESSMENT MEASURE</b>  | <b>SOLUTION SUBMITTED</b>   |
|---|--|--|---|
| Reduce number of credits from 49 to 46  | MS program needs to be in parity with the MPH program  | - Faculty discussion<br>- Adv. Board consultation<br>- Employer Survey | EOHS curriculum proposal prepared and circulated to college (approved, Feb 15th)  |
| Reducing number of credits will reduce the number of free electives from 2 courses to 1 course. | EOHS faculty needed to determine which course can be changed to elective status                  | - Faculty discussion<br>- Adv. Board consultation<br>- Employer Survey | EOHS curriculum proposal prepared, submitted and approved to change required course EOHS 759 "Site Visits" to elective status   |
| EOHS Project Management and Program Management content absent from curriculum                   | Employer survey and advisory board identified need to add more management content to curriculum. | - Faculty discussion<br>- Adv. Board consultation<br>- Employer Survey | School curriculum committee approved the substitution of an EOHS management course for one of the Public Health required courses. Management course is being designed and will likely be offered to MS student in 2011/12. Course will be entitled: "Managing EOHS Programs and Projects" |

### SUMMARY

The EOHS MS Program has completed an "Employer Survey" and interpreted the issues. The faculty, with input from members of the EOHS Advisory, have developed and successfully implemented a plan to address these issues. This satisfies the issue identified ABET.