EHS PROGRAM CURRICULA

2014 - 2015 Academic Year
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**APPENDIX A**
- EHS Masters’ Thesis Guidelines

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- Additional Forms
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The following shows the SPH requirements with EHS updates.

All students regardless of degree program (i.e. M.S., M.P.H. and Ph.D. students) are required to demonstrate competency in Biostatistics and Epidemiology. Guidelines outlining the options available are listed below.

A. Biostatistics

Options for fulfilling the biostatistics core requirement include satisfactory completion of one of the following three options:

- Option 1: The student will complete Biostatistics 553, offered only in the fall term. (Note that EHS no longer permits Biostat 503 as an option for the SPH/EHS Biostatistics requirement.)
- Option 2: The student will complete both Biostatistics 650 and 651
- Option 3: The student will pass the Biostatistics exemption exam

Most SPH students select Option 1.

For those students in departments that require more than one course in biostatistics, completion of one of the options above will satisfy the prerequisite for entry into the second-level course, Biostatistics 523, which is offered only in the winter term.

_Preparation for Biostatistics 553_

Biostatistics 553 is an introductory course for non-majors that assume no prior course work in biostatistics or statistics. It satisfies the school-wide requirement for biostatistics. 553 assumes moderate preparation in mathematics, e.g., students taking 553 need to have had one term of calculus and be comfortable with function notation and algebra.

B. Epidemiology

Options for fulfilling the epidemiology core requirement include satisfactory completion of one of the following two options:

- Option 1: Successful completion of Epidemiology 503 or Epidemiology 601.
- Option 2: Successful completion of the epidemiology exemption examination.

Choosing Between Epidemiology 503 and Epidemiology 601

Epidemiology 503 is the preferred course for students in most departments. This 3-credit hour course is offered each winter term. The course provides a basic introduction to epidemiology, with review of fundamental principles and concepts, and application to selected examples of chronic, non-infectious diseases and infectious diseases.

Epidemiology 601 is a 4-credit hour course offered in fall term designed for epidemiology majors. It assumes concurrent enrollment in pathology and biostatistics or prior preparation. The course is targeted to an audience with prerequisites consistent with acceptance into the epidemiology masters' program, which assumes appropriate preparation in mathematics and biology.
DEGREE REQUIREMENTS

Environmental Health Sciences MPH
  Human Nutrition MPH

Environmental Health Sciences MS
  Nutritional Sciences MS
  Toxicology MS

Environmental Health Sciences PhD
  Nutritional Sciences PhD
  Toxicology PhD
MASTER OF PUBLIC HEALTH (MPH)  
Environmental Health Sciences

School of Public Health Core Requirements

BIOSTAT 553 (4)  Applied Biostatistics

Select one of the following
- EPID 503 (3)  Strategies and Uses of Epidemiology
- EPID 601 (4)  Principles and Methods in Epidemiology

MPH School of Public Health Requirements

Competency in Biostatistics, Epidemiology, Environmental Health Sciences, Health Behavior and Health Education and Health Management and Policy (See SPH BIC requirements).

Environmental Health Sciences Departmental Core Requirements

EHS 600 (2)  Professional Perspectives in Environmental Health
EHS 601 (3)  Foundations in Environmental Health Sciences I
EHS 602 (2)  Environmental Health Policy
EHS 688 (1)  Topics in Environmental Health Sciences

Select one of the following:
- BIOSTAT 513 (3)  Application of Regression Analysis to Public Health Studies
- BIOSTAT 523 (3)  Biostatistical Analysis for Health-Related Studies

Field Experience (see EHS field experience guidelines)
EHS Tailored MPH Curriculum Core Requirements

Students may follow an EHS Master of Public Health curriculum that is tailored to their particular interests rather than following a specific sub-plan. This provides a high degree of breadth and flexibility in the areas of study covered, and is particularly suited to students who are looking for a broad education in the environmental health and nutrition sciences, or to specialize in more than one area. The Tailored EHS MPH requires students to focus on three specialty areas of their choice, as well as augmenting these with additional electives.

Students following the Tailored EHS MPH will be assigned an advisor, who will work closely with them through the two years of their degree on selecting appropriate courses and evaluating progress. At the beginning of the degree program, the advisor and student will develop and agree on a draft course plan for the following two years (see Course Tracker Form, Appendix C). This will be subject to regular review, and may be revised as circumstances and interests change.

Working with their advisor, each student will agree on three specialty areas within the environmental health and nutrition sciences that they intend to focus on. These may match areas covered by existing EHS sub-plans, or they may address other areas of interest such as Global Environmental Health, Sustainability, Environmental Health Policy or Risk Assessment. The three specialty areas may lie within a similar domain, allowing students to develop deep but tailored expertise within that domain. There is considerable flexibility for students to come up with specialty areas that are tailored to their interests. However each must fall within the environmental health and nutrition sciences.

For each specialty area, the student will work with their advisor to develop and agree on between three and five key competencies for that area – key abilities and areas of understanding. These should ensure that an appropriate depth of education is reached within the specialty area.

Within each specialty area, each student will be required to complete courses worth a minimum of six credit hours that cover the agreed-on competencies. A limited number of courses outside the Environmental Health Sciences Department or the School of Public Health can be included in specialty areas where they directly address the key competencies. Courses cannot be counted against the minimum credit requirements in multiple specialty areas.

For the remaining credit hour requirements required to complete the MPH, courses can be selected from other graduate courses in the department, school or university. It is strongly advised that these are discussed with your advisor.
### EHS Subplan Core Requirements

**Environmental Quality and Health**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Credits</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>EHS 570</td>
<td>3</td>
<td>Water Quality Management</td>
</tr>
<tr>
<td>EHS 572</td>
<td>2</td>
<td>Environmental Impact Assessment</td>
</tr>
<tr>
<td>EHS 574</td>
<td>3</td>
<td>Environmental Chemistry</td>
</tr>
<tr>
<td>EHS 581</td>
<td>1</td>
<td>Principles of Radiological Health</td>
</tr>
<tr>
<td>EHS 582</td>
<td>3</td>
<td>Principles of Community Air Pollution</td>
</tr>
<tr>
<td>EHS 653*</td>
<td>3</td>
<td>Environmental Sampling and Analysis Lab</td>
</tr>
</tbody>
</table>

Select two (2) of the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Credits</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>EHS 508</td>
<td>2</td>
<td>Principles of Risk Assessment</td>
</tr>
<tr>
<td>EHS 576</td>
<td>3</td>
<td>Microbiology in Environmental Health</td>
</tr>
<tr>
<td>EHS 672</td>
<td>3</td>
<td>Life Cycle Assessment</td>
</tr>
<tr>
<td>EHS 674</td>
<td>3</td>
<td>Environmental and Health Risk Modeling</td>
</tr>
</tbody>
</table>

*NOTE: EHS 652 Evaluation of Chemical Hazards is highly recommended prior to taking EHS 653*

**Human Nutrition**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Credits</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOLCHEM 515</td>
<td>3</td>
<td>Introduction to Biochemistry*</td>
</tr>
<tr>
<td>PHYSIO 502</td>
<td>4</td>
<td>Human Physiology*</td>
</tr>
<tr>
<td>EHS 630</td>
<td>3</td>
<td>Principles of Nutritional Science</td>
</tr>
<tr>
<td>EHS 631</td>
<td>3</td>
<td>Metabolism of Vitamins and Minerals</td>
</tr>
<tr>
<td>EHS 639</td>
<td>3</td>
<td>Pathophysiology of Obesity</td>
</tr>
<tr>
<td>EHS 640</td>
<td>3</td>
<td>Nutrition Assessment</td>
</tr>
<tr>
<td>EHS 642</td>
<td>3</td>
<td>Community Nutrition</td>
</tr>
</tbody>
</table>

*NOTE: Biochem 515 and Physio 502 may be exempted by previous coursework*

**Industrial Hygiene**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Credits</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>EHS 501</td>
<td>2</td>
<td>Occupational and Environmental Diseases</td>
</tr>
<tr>
<td>EHS 550</td>
<td>2</td>
<td>Principles of Occupational and Environmental Health</td>
</tr>
<tr>
<td>EHS 556</td>
<td>2</td>
<td>Occupational Ergonomics</td>
</tr>
<tr>
<td>EHS 581</td>
<td>1</td>
<td>Principles of Radiological Health</td>
</tr>
<tr>
<td>EHS 651</td>
<td>2</td>
<td>Management in OSEH</td>
</tr>
<tr>
<td>EHS 652</td>
<td>3</td>
<td>Evaluation of Chemical Hazards</td>
</tr>
<tr>
<td>EHS 653</td>
<td>3</td>
<td>Environmental Sampling and Analysis Laboratory</td>
</tr>
<tr>
<td>EHS 654</td>
<td>3</td>
<td>Control of Exposures to Airborne Contaminants</td>
</tr>
<tr>
<td>EHS 658</td>
<td>1</td>
<td>Physical Hazards</td>
</tr>
<tr>
<td>EHS 668</td>
<td>1</td>
<td>Professional Seminars in Occupational Health</td>
</tr>
<tr>
<td>EHS 757</td>
<td>2</td>
<td>Occupational Health Aspects of Industrial Processes</td>
</tr>
<tr>
<td>IOE 539</td>
<td>3</td>
<td>Occupational Safety Engineering</td>
</tr>
</tbody>
</table>
Occupational and Environmental Epidemiology

BIOSTAT 523 (3) Biostatistical Analysis for Health-Related Studies
EHS 608 (3) Environmental Epidemiology
EHS 668 (1) Professional Seminars in Occupational Health
EHS 670 (3) Applications in Environmental Epidemiology
EPI D 600 (3) Introduction to Epidemiology
EPI D 640 (3) SAS for Epidemiological Research
EPI D 656 (3) Applied Epidemiology Data Analysis

Must select one (1) of the following
EHS 652 (3) Evaluation of Chemical Hazards
EHS 657 (3) Advanced Exposure Assessment

Must select one (1) of the following
EPI D 514 (3) Social Epidemiology
EPI D 550 (3) Reproductive Epidemiology
EPI D 552 (3) Epidemiology of Chronic Diseases
EPI D 604 (3) Cardiovascular Disease Epidemiology
EPI D 605 (3) Infectious Disease Epidemiology
EPI D 616 (2) Neuroepidemiology
EPI D 617 (3) Social Epidemiology II
EPI D 621 (3) Cancer Epidemiology
EPI D 677 (3) Epidemiology of Aging

Toxicology

BIOLCHEM 515 (3) Introductory Biological Chemistry*
EHS 506 (3) Principles of Toxicology
EHS 612 (3) Biochemical and Molecular Toxicology
EHS 616 (2) Toxicologic Pathology

Must select two (2) of the following
EHS 622 (2) Mechanisms of Developmental Toxicology
EHS 623 (2) Mechanisms of Reproductive Toxicology
EHS 624 (2) Mechanisms of Neurotoxicology
EHS 625 (2) Environment and the Immune Response
EHS 660 (2) Environmental Epigenetics and Public Health

EHS 628 (1) Toxicology Research Analysis and Presentation*
EHS 697 (1) Readings*

*NOTE: Biochem 515 may be exempted by previous coursework
EHS 697 is taken concurrently with EHS 628 Toxicologic Research Analysis and Presentation in Toxicology. Students register under the faculty member who is assisting with preparation for the seminar
MASTER OF PUBLIC HEALTH (MPH)  
Human Nutrition (Dietetics)

School of Public Health Core Requirements

BIOSTAT 553 (4)  Applied Biostatistics

Select one of the following

EPID 503 (3)  Strategies and Uses of Epidemiology
EPID 601 (4)  Principles and Methods in Epidemiology

MPH School of Public Health Requirements

Competency in Biostatistics, Epidemiology, Environmental Health Sciences, Health Behavior and Health Education and Health Management and Policy (See SPH BIC requirements).

Dept of Environmental Health Sciences Core Requirements

EHS 600 (2)  Professional Perspectives in Environmental Health
EHS 601 (3)  Foundations in Environmental Health Sciences I
EHS 688 (1)  Topics in Environmental Health Sciences

Select one (1) of the following:

BIOSTAT 513 (3)  Application of Regression Analysis to Public Health Studies
BIOSTAT 523 (3)  Biostatistical Analysis for Health-Related Studies

 NOTE: B IOSTAT 523 is the preferred option.

Field Experience (see EHS field experience guidelines)

Nutrition – Dietetics (DPD)

Nutrition

BIOLCHEM 515 (3)  Introductory Biological Chemistry*
PHYSIOL 502 (4)  Human Physiology*
EHS 540 (2)  Maternal and Child Nutrition
EHS 547 (2)  Food Science
EHS 585 (2)  Food Service Management
EHS 630 (3)  Principles of Nutritional Science
EHS 631 (3)  Metabolism of Vitamins and Minerals

Select one of the following

EHS 646 (2)  Nutrition Counseling
HBHE 671 (3)  Motivational Interviewing in Public Health
EHS 636 (3)  Clinical Nutrition I
EHS 637 (2)  Clinical Nutrition II
EHS 639 (3)  Pathophysiology of Obesity
EHS 640 (3)  Nutrition Assessment
EHS 642 (3)  Community Nutrition

Management

HMP 602 (3)  Medical Care Organization and Delivery Small Groups

Health Behavior

HBHE 503 (3)  Introduction to Health Behavior Theory and Approaches

*NOTE: Biochem 515 and Physio 502 may be exempted by previous coursework
MASTER OF SCIENCE (MS)
Environmental Health Sciences (EHS)

SPH Core Requirements

**BIOSTAT 553** (4) Applied Biostatistics

*Select one (1) of the following*

**EPID 503** (3) Strategies and Uses of Epidemiology
**EPID 601** (4) Principles and Methods in Epidemiology

EHS Department Core Requirements

**EHS 601** (3) Foundations in Environmental Health Sciences
**EHS 688** (1) Topics in Environmental Health Sciences*
**EHS 698** (6) Research
**EHS 699** (1) Masters Thesis
**PUBHLTH 610** (1) Introduction to Public Health

*Select one of the following:*

**BIOSTAT 513** (3) Application of Regression Analysis to Public Health Studies
**BIOSTAT 523** (3) Biostatistical Analysis for Health-Related Studies

*NOTE: Students may elect EHS 698 in any term but are required to complete a minimum total of 6 credits in this course to meet both departmental and program requirements.*

**Master Thesis** -- All MS students are required to perform a research project during the program, to write an acceptable thesis on the project, to present the research results in a seminar and to defend the thesis before a committee of the faculty (see thesis guidelines).

EHS Core Requirements

Select at least twelve (12) credits among the following courses (Table 1) in one of the following three areas of specialization:

Environmental Quality and Health (EQH)
Industrial Hygiene (IH)
Occupational and Environmental Epidemiology (OEE)

At least seven of the credits must be 600-level or higher.

EHS Optional Subplans

**Industrial Hygiene**

**STAT 503** (3) Applied Multivariate Analysis
**EHS 601** (3) Foundations in Environmental Health Sciences I
**EHS 550** (2) Principles of Occupational and Environmental Health
**EHS 556** (2) Occupational Ergonomics
**EHS 652** (3) Evaluation of Chemical Hazards
**EHS 653** (3) Environmental Sampling and Analysis Laboratory
**EHS 654** (3) Control of Exposures to Airborne Contaminants
**EHS 658** (1) Physical Hazards
**EHS 668** (1) Professional Seminars in Occupational Health
**EHS 697** (1) Readings

*Select one (1) of the following*

**IOE 539** (3) Occupational Safety Engineering
**EHS 657** (3) Advanced Exposure Assessment
Table 1  Designated courses for each area of specialization (at least 7 credits must be 600-level or higher)

<table>
<thead>
<tr>
<th>Course No.</th>
<th>Course Title</th>
<th>Credit Hrs</th>
<th>EQH</th>
<th>IH</th>
<th>OEE</th>
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</thead>
<tbody>
<tr>
<td>EHS 506</td>
<td>Principles of Toxicology</td>
<td>3</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>EHS 508</td>
<td>Principles of Risk Assessment</td>
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<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>EHS 550</td>
<td>Introduction to Occupational and Environmental Health</td>
<td>2</td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>EHS 570</td>
<td>Water Quality Management</td>
<td>3</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EHS 572</td>
<td>Environmental Impact Assessment</td>
<td>2</td>
<td>X</td>
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<td>X</td>
</tr>
<tr>
<td>EHS 574</td>
<td>Environmental Chemistry</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EHS 576</td>
<td>Microbiology in Environmental Health</td>
<td>3</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>EHS 581</td>
<td>Radiological Health</td>
<td>1</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EHS 582</td>
<td>Principles of Community Air Pollution</td>
<td>3</td>
<td>X</td>
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<tr>
<td>EHS 608</td>
<td>Environmental Epidemiology</td>
<td>3</td>
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<td></td>
<td>X</td>
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<tr>
<td>EHS 614</td>
<td>Water and Global Health</td>
<td>2</td>
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<td>EHS 652</td>
<td>Evaluation of Chemical Hazards</td>
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<td>X</td>
<td>X</td>
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<tr>
<td>EHS 653</td>
<td>Environmental Sampling &amp; Analysis Laboratory</td>
<td>3</td>
<td>X</td>
<td></td>
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<tr>
<td>EHS 654</td>
<td>Control of Exposures to Airborne Contaminants</td>
<td>3</td>
<td></td>
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<tr>
<td>EHS 657</td>
<td>Advanced Exposure Assessment</td>
<td>3</td>
<td>X</td>
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<tr>
<td>EHS 658</td>
<td>Physical Hazards</td>
<td>1</td>
<td>X</td>
<td>X</td>
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<td>EHS 660</td>
<td>Environmental Epigenetics and Public Health</td>
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<td>EHS 672</td>
<td>Life Cycle Assessment: Human health and Environmental Impact</td>
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<td>EHS 674</td>
<td>Environmental and Health Risk Modeling</td>
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<td>EHS 675</td>
<td>Data Analysis for Environmental Epidemiology</td>
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<td>EHS 683</td>
<td>Air Pollution and Global Health</td>
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</table>
MASTER OF SCIENCE (MS)  
Nutritional Sciences (NS)

SPH Core Requirements

BIOSTAT 553 (4)  Applied Biostatistics

Select one (1) of the following
EPID 503 (3)  Strategies and Uses of Epidemiology  
EPID 601 (4)  Principles and Methods in Epidemiology

EHS Department Core Requirements

EHS 688 (1)  Topics in Environmental Health Sciences  
EHS 698 (6)  Research  
EHS 699 (1)  Masters Thesis  
PUBHLTH 610 (1)  Introduction to Public Health  

Select one (1) of the following:
BIOSTAT 513 (3)  Application of Regression Analysis to Public Health Studies  
BIOSTAT 523 (3)  Biostatistical Analysis for Health-Related Studies

NOTE:  Students may elect EHS 698 in any term but are required to complete a minimum total of 6 credits in this course to meet both departmental and program requirements.

Master Thesis -- All MS students are required to perform a research project during the program, to write an acceptable thesis on the project, to present the research results in a seminar and to defend the thesis before a committee of the faculty (see thesis guidelines).

NS Core Requirements

BIOLCHEM 515 (3)  Introduction to Biochemistry*  
PHYSIO 502 (4)  Human Physiology*  
EHS 630 (3)  Principles of Nutritional Science  
EHS 631 (3)  Metabolism of Vitamins and Minerals

Select two (2) of the following
EHS 639 (3)  Pathophysiology of Obesity  
EHS 640 (3)  Nutrition Assessment  
EHS 642 (3)  Community Nutrition  
EHS 662 (3)  Methods in Nutritional Epidemiology

___________________________________________________________

*NOTE:  Biochem 515 and Physio 502 may be exempted by previous coursework
Optional additional course work to complete Dietetics (DPD)

EHS 540 (2) Maternal and Child Nutrition
EHS 547 (2) Food Science
EHS 585 (2) Food Service Management
Select one of the following
  EHS 646 (2) Nutrition Counseling
  HBHE 671 (3) Motivational Interviewing in Public Health
EHS 636 (3) Clinical Nutrition I
EHS 637 (2) Clinical Nutrition II
EHS 639 (3) Pathophysiology of Obesity
EHS 640 (3) Nutrition Assessment
EHS 642 (3) Community Nutrition
HMP 602 (3) Medical Care Organization and Delivery Small Groups
HBHE 503 (3) Introduction to Health Behavior Theory and Approaches
MASTER OF SCIENCE (MS)  
Toxicology (TOX)

SPH Core Requirements

BIOSTAT 553 (4)  Applied Biostatistics

Select one (1) of the following

EPID 503 (3)  Strategies and Uses of Epidemiology
EPID 601 (4)  Principles and Methods in Epidemiology

EHS Core Requirements

EHS 688 (1)  Topics in Environmental Health Sciences
EHS 698 (6)  Research
EHS 699 (1)  Masters Thesis
PUBHLTH 610 (1)  Introduction to Public Health

Select one of the following:

BIOSTAT 513 (3)  Application of Regression Analysis to Public Health Studies
BIOSTAT 523 (3)  Biostatistical Analysis for Health-Related Studies

NOTE:  Students may elect EHS 698 in any term but are required to complete a minimum total of 6 credits in this course to meet both departmental and program requirements.

TOX Core Requirements

BIOLCHEM 515 (3)  Introduction to Biochemistry*
EHS 506 (3)  Principles of Toxicology
EHS 612 (3)  Biochemical and Molecular Toxicology
EHS 616 (2)  Toxicologic Pathology

Select one (1) of the following

EHS 622 (2)  Mechanisms of Developmental Toxicology
EHS 623 (2)  Mechanisms of Reproductive Toxicology
EHS 624 (2)  Mechanisms of Neurotoxicology
EHS 625 (2)  Environmental and the Immune Response
EHS 660 (2)  Environmental Epigenetics and Public Health

EHS 628 (1)  Toxicology Research Analysis and Presentation*
EHS 697 (1)  Readings*
EHS 717 (1)  Toxicological Pathology Laboratory

Select two (2) of the following

CDB 530 (3)  Cell Biology
HUMGEN 541 (3)  Molecular Genetics
BIOLCHEM 550 (3)  Protein Structure and Function

Master Thesis -- All MS students are required to perform a research project during the program, to write an acceptable thesis on the project, to present the research results in a seminar and to defend the thesis before a committee of the faculty (see thesis guidelines).

*NOTE:  Biochem 515 and may be exempted by previous coursework
EHS 697 is taken concurrently with EHS 628 Intermediate Seminar in Toxicology.  Students register under the faculty member who is assisting with preparation for the seminar.
DOCTOR OF PHILOSOPHY (Ph.D.)
(Environmental Health Sciences)

Departmental Course Requirements

BIOSTAT 553 (4) Applied Biostatistics

Select one (1) of the following:

EPID 503 (3) Strategies and Uses of Epidemiology
EPID 601 (4) Principles and Methods in Epidemiology

Select one (1) of the following:

BIOSSTAT 513 (3) Application of Regression Analysis to Health Studies
BIOSSTAT 523 (3) Biostatistical Analysis for Health-Related Studies
BIOSSTAT 560 (3) Statistical Methods in Epidemiology
STAT 401 (3) Applied Statistical Methods II
STAT 503 (3) Applied Multivariate Analysis

Statistics or Biostatistics course (determined with advisor and approval of doctoral committee)

Cognate Course – One 2-3 credit hour course outside the Department of Environmental Health Sciences (to be determined by advisor with approval of EHS Academic Degree Programs Committee)

EHS 688 (1) Topics in Environmental Health Sciences
EHS 801 (2) Research and Communication in Environmental Health Sciences
EHS 869 (1) Doctoral Seminar in Environmental Health Sciences
EHS 899 (6) Advanced Research (2 separate rotations required)

PUBHLTH 610 (1) Introduction to Public Health

________________

1EHS 688 is a departmental seminar that spans the first 2 terms. It is expected that students will attend seminars throughout their doctoral program but do not have to officially register.

2EHS 869 is a doctoral seminar that students register for until they have passed their Preliminary Exam. Prior to the Preliminary Exam, they will present a formal seminar in this class. It is expected that students will attend seminars throughout their doctoral program but do not have to officially register.

3EHS 899 - Students complete two separate rotations with different faculty for a minimum of 1 credit each time

Additional Course Requirements

Select at least nine (9) credits of the following (at least six (6) credits must be 600-level or higher)

EHS 506 (3) Principles of Toxicology
EHS 508 (2) Principles of Risk Assessment
EHS 550 (2) Principles of Occupational and Environmental Health
EHS 570 (3) Water Quality Management
EHS 572 (2) Environmental Impact Assessment
EHS 574 (3) Environmental Chemistry
EHS 576 (3) Microbiology in Environmental Health
EHS 601 (3) Foundations in Environmental Health Sciences
EHS 608 (3) Environmental Epidemiology
EHS 652 (3) Evaluation of Chemical Hazards
EHS 653 (3) Environmental Sampling and Analysis Lab
EHS 654 (3) Control of Exposures to Airborne Contaminants
EHS 657 (3) Advanced Exposure Assessment
EHS 660 (2) Environmental Epigenetics and Public Health
EHS 672 (3) Life Cycle Assessment: Human health and environmental impacts
EHS 675 (2) Data Analysis for Environmental Epidemiology
DOCTOR OF PHILOSOPHY (Ph.D.)
(Nutritional Sciences)

Departmental Course Requirements

BIOSTAT 553 (4) Applied Biostatistics

Select one (1) of the following:

EPID 503 (3) Strategies and Uses of Epidemiology
EPID 601 (4) Principles and Methods in Epidemiology

Select one (1) of the following:

BIOSTAT 513 (3) Application of Regression Analysis to Health Studies
BIOSTAT 523 (3) Biostatistical Analysis for Health-Related Studies

EHS 688 (1) Topics in Environmental Health Sciences
EHS 801 (2) Research and Communication in Environmental Health Sciences
EHS 869 (≤6) Advanced Research (2 separate rotations required)

EHS 610 (1) Introduction to Public Health

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1EHS 688 is a departmental seminar that spans the first 2 terms. It is expected that students will attend seminars throughout their doctoral program but do not have to officially register.

2EHS 869 is a doctoral seminar that students register for until they have passed their Preliminary Exam. Prior to the Preliminary Exam, they will present a formal seminar in this class. It is expected that students will attend seminars throughout their doctoral program but do not have to officially register.

3EHS 899 - Students complete two separate rotations with different faculty for a minimum of 1 credit each time

NS Core Course Requirements

BIOLCHEM 515 (3) Introduction to Biochemistry*

PHYSIO 502 (4) Human Physiology*

EHS 630 (3) Principles of Nutritional Science

EHS 631 (3) Metabolism of Vitamins and Minerals

EHS 639 (3) Pathophysiology of Obesity

EHS 640 (3) Nutrition Assessment

*NOTE: Biochem 515 and PHYSIO 502 may be exempted by previous coursework

NS Plan Course Requirements

**Plan 1: Molecular and Biochemical Nutrition**

Select from the following (minimum of 6 credits)

BIOCHEM 550 (3) Macromolecular Structure and Functions
CDM 530 (3) Cell Biology
HG 541 (3) Molecular Genetics
MICRO 440 (3) Immunology
PHYSIO 510 (3) Principles of Systems and Integrative Physiology
PHYSIO 555 (3) Integrative Biology and Genetics

Select from the following (minimum of 6 credits)

EHS 506 (3) Principles of Toxicology
EHS 576 (3) Microbiology in Environmental Health
EHS 612 (3) Biochemical and Molecular Toxicology
EHS 625 (3) Environment and Immune Responses
EHS 660 (2) Environmental Epigenetics and Public Health
Plan 2: Nutritional Epidemiology

Select from the following (minimum of 12 credits)

- BIOSTAT 512 (3) Analyzing Longitudinal and Clustered Data using Statistical Software
- BIOSTAT 560 (3) Statistics in Epidemiology
- EHS 633 (3) Evaluation of Global Nutrition Programs
- EPID 552 (3) Epidemiology of Chronic Disease
- EPID 601 (3) Principles and Methods of Epidemiology
- EPID 623 (3) Nutritional Epidemiology
- EPID 640 (3) SAS for Epidemiological Research
- EPID 656 (3) Applied Epidemiologic Data Analyses
- EPID/EHS 662 (3) Methods in Nutritional Epidemiology
- EPID/EHS 675 (3) Data Analysis for Environmental Epidemiology
- EPID 552 (3) Epidemiology of Chronic Diseases
- EPID 655 (3) Field Studies in Epidemiology
- EPID 807 (3) Controversial Topics in Nutrition
- EPID 814 (3) Topics in Epidemiologic Analysis
- EPID 820 (3) Multilevel Studies and Multilevel Analysis in Public Health Research
- EPID 888 (3) Nutritional and Infectious Disease

Plan 3: Nutritional Interventions

Select from the following (minimum of 12 credits)

- EHS 633 (3) Evaluation of Global Nutrition Programs
- HBHE 503 (3) Introduction to Health Behavior Theory and Approaches
- HBHE 530 (3) Techniques of Survey Research
- HBHE 600 (3) Psychosocial Factors in Health Related Behavior
- HBHE 620 (3) Behavior Research Models in Public Health
- HBHE 621 (3) Seminar in Behavior Research Model in Public Health
- HBHE 622 (3) Program Evaluation in Health Education
- HBHE 636 (3) Qualitative Methods and Participatory Action Research
- HBHE 638 (3) Qualitative Methods in Public Health
- HBHE 641 (3) Materials and Methods in Health Education Programs
- HBHE 671 (3) Motivational Interviewing in Public Health
- HBHE 733 (3) Community Based Participatory Research
- HMP 610 (3) Cost-Effectiveness Analysis in Health
- HMP 615 (3) Introduction to Public Health Policy
- HMP 640 (3) Program Evaluation in Public Health
- Surv Meth 600 (3) Fundamental of Survey Methods
DOCTOR OF PHILOSOPHY (Ph.D.)
(Toxicology)

Departmental Course Requirements

BIOSTAT 553 (4) Applied Biostatistics

Select one (1) of the following:

EPID 503 (3) Strategies and Uses of Epidemiology
EPID 601 (4) Principles and Methods in Epidemiology

Select one (1) of the following:

BIOSTAT 513 (3) Application of Regression Analysis to Health Studies
BIOSTAT 523 (3) Biostatistical Analysis for Health-Related Studies
BIOSTAT 560 (3) Statistical Methods in Epidemiology
STAT 401 (3) Applied Statistical Methods II
STAT 503 (3) Applied Multivariate Analysis

Statistics or Biostatistics course (determined with advisor and approval of doctoral committee)

PUBHLTH610 (1) Introduction to Public Health
EHS 688 (1) Topics in Environmental Health Sciences
EHS 801 (2) Research and Communication in Environmental Health Sciences
EHS 869 (1) Doctoral Seminar in Environmental Health Sciences
EHS 899 (≤6) Advanced Research (2 separate rotations required)

1EHS 688 is a departmental seminar that spans the first 2 terms. It is expected that students will attend seminars throughout their doctoral program but they do not have to officially register.

2EHS 869 is a doctoral seminar that students register for until they have passed their Preliminary Exam. Prior to the Preliminary Exam, they will present a formal seminar in this class. It is expected that students will attend seminars throughout their doctoral program but they do not have to officially register.

3EHS 899 - Students complete two separate rotations with different faculty for a minimum of 1 credit each time

Additional Course Requirements

BIOLCHEM 515 (3) Introduction to Biochemistry*
EHS 506 (3) Principles of Toxicology
EHS 612 (3) Biochemical and Molecular Toxicology
EHS 616 (2) Toxicologic Pathology
EHS 628 (1) Toxicology Research Analysis and Presentation
EHS 697 (1) Readings*
EHS 717 (1) Toxicological Pathology Laboratory

Select one (1) of the followings:

EHS 622 (2) Mechanisms of Developmental Toxicology
EHS 623 (2) Mechanisms of Reproductive Toxicology
EHS 624 (2) Mechanisms of Neurotoxicology
EHS 625 (2) Environment & the Immune Response
EHS 660 (2) Environmental Epigenetics and Public Health

Select two (2) of the followings:

BIOLCHEM 550(3) Macromolecular Structure and Function
HUMGEN 541 (3) Molecular Genetics
CDB 530 (3) Cell Biology

*NOTE: Biochem 515 may be exempted by previous coursework
EHS 697 is taken concurrently with EHS 628 Intermediate Seminar in Toxicology. Students register under the faculty member who is assisting with preparation for the seminar
I. INTRODUCTION

The Breadth, Integration and Capstone Requirements in Public Health (BIC) are designed to prepare public health professionals to be knowledgeable and able to cope with current and emerging health problems and to work effectively with other public health professionals, citizens in the community, and with political leaders. It is the aim of BIC that course work in one area will support and reinforce course work in other areas and that the faculty and students will continually attempt to build linkages among the several areas. The BIC curriculum and relevant courses are defined in terms of minimum exit level competencies. These requirements represent the knowledge and skills needed by individuals to demonstrate excellence in the practice of public health. Individuals graduating with the MPH degree are expected to be capable of advanced practice in their specialty areas and the broad field of public health. The BIC requirements were adopted by the faculty beginning in the 1997-98 academic year.

Students enrolled for the MPH degree must complete the BIC in addition to the departmental or program requirements.

II. SCOPE OF THE REQUIREMENTS IN PUBLIC HEALTH

There are three separate areas with selected course options that fulfill the Requirements in Public Health:

A. Methodological Core
   Biostatistics
   Epidemiology

B. Breadth and Integration
   Health Behavior and Health Education
   Health Management and Policy
   Environmental Health Sciences

C. Capstone
III. COMPETENCIES EXPECTED OF GRADUATES WITH THE MPH DEGREE

There are five separate areas of expected competencies within the Requirements in Public Health:

**Biostatistics** - the development and application of statistical reasoning and methods in addressing, analyzing and solving problems in public health; health care; and biomedical, clinical and population-based research

**Epidemiology** - the study of patterns of disease and injury in human populations and the application of this study to the control of health problems

**Environmental health sciences** - the study of environmental factors including biological, physical and chemical factors that affect the health of a community

**Health services administration** - a multidisciplinary field of inquiry and practice concerned with the delivery, quality and costs of health care for individuals and populations

**Social and behavioral sciences** - the behavioral, social and cultural factors related to individual and population health and health disparities over the life course

IV. COURSES REQUIREMENTS IN PUBLIC HEALTH

A. Methodological Core

1. **Biostatistics*** (select one of the following)

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOSTAT 503</td>
<td>4</td>
<td>Introduction to Biostatistics</td>
</tr>
<tr>
<td>BIOSTAT 553</td>
<td>4</td>
<td>Applied Biostatistics</td>
</tr>
</tbody>
</table>

*Students in EHS required are to take BIOSTAT 553

2. **Epidemiology** (select one of the following)

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>EPID 503</td>
<td>3</td>
<td>Strategies and Uses of Epidemiology</td>
</tr>
<tr>
<td>EPID 601</td>
<td>4</td>
<td>Principles and Methods of Epidemiology</td>
</tr>
</tbody>
</table>
B. Breadth and Integration

**OPTION #1 (Select one from category 1, 2 and 3)**

1. Health Behavior and Health Education (select one of the following)

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>HBHE 500</td>
<td>4</td>
<td>Behavioral and Social Science Foundations for the Health Professions</td>
</tr>
<tr>
<td>HBHE 503</td>
<td>3</td>
<td>Introduction to Health Behavior Theory and Approaches</td>
</tr>
</tbody>
</table>

2. Health Management and Policy (select one of the following)

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>HMP 602</td>
<td>3</td>
<td>Medical Care Organization and Delivery Small Groups</td>
</tr>
<tr>
<td>HMP 653</td>
<td>3</td>
<td>Law and Public Health</td>
</tr>
<tr>
<td>HMP 685</td>
<td>3</td>
<td>The Politics of Health Policy</td>
</tr>
</tbody>
</table>

3. Environmental Health Sciences

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>EHS 601</td>
<td>3</td>
<td>Foundations in Environmental Health Sciences</td>
</tr>
</tbody>
</table>

**OPTION #2**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PUBHLTH 600</td>
<td>4</td>
<td>Cross Disciplinary Approaches to Public Health</td>
</tr>
</tbody>
</table>

C. Capstone

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>EHS 600</td>
<td>2</td>
<td>Professional Perspectives in Environmental Health</td>
</tr>
</tbody>
</table>

V. PROCEDURES FOR EXEMPTIONS OR SUBSTITUTION OF COURSES IN BIC

To help students avoid any repetition of prior academic work and to make the most of learning opportunities within the BIC offering, the faculty has developed specific exemption and substitution procedures.

Before taking an exemption examination or requesting substitution, students should consult with their departmental faculty advisors.

The specific exemption and substitution procedures for the key BIC areas are as follows:
A. Methodological Core

1. Biostatistics

SPH students from departments other than Biostatistics may be exempted from the biostatistics requirement under the following procedures:

- Students who pass an exemption examination offered and graded by the faculty of Biostatistics will be exempted from the requirement.
- Students who are enrolled in other degree programs on campus that have statistics requirements may be able to substitute such requirements, but only in consultation with and with prior approval from the Department of Biostatistics Curriculum Committee.

For those students in departments that require more than one course in biostatistics, completion of one of the options above will satisfy the prerequisite for entry into the second-level course, Biostatistics 523, which is offered only in the winter term.

2. Epidemiology

Exemption from the Epidemiology component of BIC may only be attained by the successful completion of the Epidemiology Exemption Examination.

B. Breadth and Integration

Exemption from these areas (Health Behavior and Health Education, Health Management and Policy and Environmental Health Sciences) will be based on individual reviews of related courses completed for credit and/or by exemption examination. The EHS Curriculum Committee Chair is authorized to grant exemption requests in the above areas of study with consultation of the student’s advisor. Please obtain an exemption form from the student services staff, review the request with you advisor, and then return it to the student services staff for review by the EHS Curriculum Committee Chair.

C. Capstone

Exemption from the capstone can only be obtained through petition to the EHS Curriculum Chair.
APPENDIX A

EHS Master Thesis Guidelines
# GUIDELINES AND PROCEDURES

## FOR

### MASTER OF SCIENCE THESIS

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**Preamble**

The Master of Science (MS) degree at the University of Michigan is administered by the Rackham School of Graduate Studies. In the Department of Environmental Health Sciences, students registering for the Master of Science degree are required to complete a program of didactic coursework (subject matter and amount depending on the area of specialty), and to undertake original research culminating in a master’s thesis.

**Definition and scope of the research**

Upon enrollment, each student will be assigned an Academic Advisor. The student may choose to work with his/her academic advisor, or find a different Research Mentor who is willing to develop a research project that falls within the area of the student's academic area, e.g., Environmental Health Sciences (Environmental Quality and Health, Industrial Hygiene, or Occupational and Environmental Epidemiology), Toxicology, and Nutrition.

Many MS students work as part of a team, with supervision from faculty, post-doctoral scientists, advanced PhD students, and other scientists. In these cases, the research can draw from the research being conducted by the team. In other cases, MS students may initiate a separate research topic. In both cases, the Research Mentor and Research Committee (see below) will help shape and guide the MSc research and thesis.
The research should be an original investigation with the potential to contribute new knowledge that is publishable in the peer-reviewed literature. The work itself may take any of the following forms:

- A laboratory study, yielding experimental data that will be analyzed and interpreted in terms of new or existing mechanisms and/or natural scientific models.
- A field study, to collect information that will be analyzed and interpreted in terms of new or existing natural scientific models.
- A modeling work or an analysis of existing or secondary data to prove or validate new or existing hypothesis
- A survey to investigate opinions of individuals, or groups of individuals, yielding empirical data that will be analyzed and interpreted in terms of impacts of environmental policies and guidelines.
- A study of the behaviors of individuals, or groups of individuals to collect empirical data that will be analyzed in terms of subjective models of exposure to environmental or nutritional risks.

In any of one of the above examples, analysis may involve any combination of quantitative methods, statistical analysis, and other scientific procedures aimed at elucidating the subject of the enquiry. Interpretation may involve any philosophical or intellectual process aimed at articulating what new knowledge has been gained. This requires a command of the relevant literature, which typically is discussed in the Introduction and Discussion sections of the thesis. Individual specialty areas may specify a particular combination of the research options and data manipulation models.

The scale of the research undertaken – in terms of a combination of amount and depth –should be equivalent to that commensurate with the work required to produce a single peer-reviewed publication. It is therefore likely to be quite narrowly focused. In comparison, the expectation for doctoral dissertation which involves significantly greater amount, depth and (usually) breadth in research is typically equivalent to three or more peer-reviewed publications.

**Conduct of the research and timeline for completion of master thesis**

Table 1 shows the timeline and milestones for completion of the master thesis. During the first Fall term, the student identifies the research mentor and begins to identify the research topic. At the beginning of the Winter term of the first year, the student finalizes the research subject and chooses a Thesis Committee in collaboration with the research mentor. The student then writes the Research Proposal and presents it to the Thesis Committee.

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1 A peer-reviewed publication is desirable, but it is not a requirement of the Master's program. However, the thesis is expected to represent the quality and quantity of work typical of a journal publication. Moreover, submission and acceptance of a journal publication is valuable for the student.
Table 1: Timeline for completion of master’s thesis.

Note mandatory forms F1, F2, F3 and F4 in the timeline.

<table>
<thead>
<tr>
<th>TIMELINE</th>
<th>Fall</th>
<th>Winter</th>
<th>Spr/Sum</th>
<th>Fall</th>
<th>Winter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identify Research Mentor (Form #1)</td>
<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>Identify Research Project/Thesis Committee</td>
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<tr>
<td>Prepare and present proposal (Form #2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>F2</td>
</tr>
<tr>
<td>Completion of research project</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Submit thesis to committee</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Defend Research project to Committee (Form #3)</td>
<td></td>
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<td></td>
<td>F3</td>
</tr>
<tr>
<td>Complete and submit final thesis (Form #4)</td>
<td></td>
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<td></td>
<td>F4</td>
</tr>
</tbody>
</table>

The main body of the research should be carried out during the summer following the end of the first Winter Term, and should continue into the second Fall term of the student's enrollment. The experimental, field, modeling or other data-gathering part of the work should be completed by end of the Fall term and final analysis and interpretation of the results carried out at the beginning of the Winter term, followed by preparation of the thesis itself, to be completed before the end of the (second) Winter Term. In preparation of the thesis, the student will work mainly with his/her research advisor. The completed Thesis will be submitted to the Committee, who will then convene – with the student – for a private oral presentation and question-and-answer session. The research requirement of the Master of Science degree will be considered complete upon approval of the thesis by the Committee.

Research is an open-ended endeavor, that is, there are many options, considerable learning takes place, things do not always work the first time, and the number of potentially time-consuming tasks can seem large. Focus and direction, which you research mentor can provide, are helpful to define a reasonable scope of work, to keep you on schedule, and to finish the thesis within the 2-year schedule shown.

Note that the timeline (Table 1) identifies four mandatory forms that must be completed by the student, Research Mentor, and Thesis Committee and submitted to the Academic Degree Committee via Sue Crawford. These forms are designed to monitor progress and aid the timely completion of the research and thesis. They include:

F1: Identification of Research Mentor and Thesis Committee - signed by student and mentor

F2: Successful completion and presentation of Research Proposal - signed by Thesis Committee

F3: Presentation of completed thesis to Thesis Committee - signed by Thesis Committee

F4: Successful completion of final thesis - signed by Research Mentor. This must also include electronic files containing the thesis and abstract, and optionally graphic material.
Evaluation of the student’s progress in their research will be monitored continuously by the Research Advisor, with input from Thesis Committee members as appropriate. Extensions beyond the end of the Winter Term of the student’s second year shall be considered exceptional and will be allowed only upon petition to, and approval by, the Chair of EHS, and consistent with any overarching rules or requirements of the Rackham School of Graduate Studies.

Several guidelines are offered below to define the composition of the Thesis Committee, the format and requirements for the Research Proposal, and the requirements for the thesis.

**Thesis Committee**

Each student and his/her Research Mentor is expected to form a Thesis Committee to assist the student in the selection of research topic, provide supervision and oversight on the research, and assure its successful completion. Each Committee will consist of a minimum of two faculty members, including a Research Mentor from the Department of Environmental Health Sciences, and another faculty member of the EHS or another department at the University of Michigan, based on considerations of matching or complementary interests. Sometimes a third faculty member on the Committee is helpful, for example, to help obtain or interpret a specific database or obtain field access.

The Research Mentor should be appointed as soon as possible after the student has enrolled has had the opportunity to explore options (including areas of potential matching interest, resources, etc.) that may be available. The student will then work with the Research Mentor to identify the other Thesis Committee member or members. The Committee should be appointed by the end of the student's first semester, to obtain their participation in the preparation of the student's research proposal (see below). Form F1 must be completed when the committee is identified (Appendix F1).

**Research Proposal**

The Research Proposal will take the form of a written document (typically a minimum of 10 pages double-spaced, exclusive of citations) that includes:

- **Introduction and statement** of the problem to be studied.
- **Objectives** of the research and articulation of its hypothesis.
- **Background** summary
- Identification of methods to be used, including statistical analysis or modeling procedure
- Identification of expected results.
- Summary of IRB and other special procedures to be followed.
- Identification of resources needed and indication of how these will be realized.
- **Outline** of tasks involved and the methods used for task
- **Time line**, typically as a schedule or a Gantt chart
This will be presented to the Thesis Committee for comments, suggestions for improvements and –ultimately – approval. The Committee will evaluate the Thesis Proposal in terms of:-

- Content, breadth, depth and scope commensurate with graduate work in the environmental health sciences at the master's level.
- Clarity of overall objectives, specific aims, and hypotheses\(^2\)
- Quality of the background learning by the student as reflected in the document.
- Study design - is it up-to-date? valid? following best practices?
- Feasibility of the research itself and its relevance to environmental health.
- Availability of the resources and data in order to allow successful execution of the research in the stated time frame.

Any gaps that remain will be identified by the Committee and conveyed to the student (It is good practice for the student to make a summary e-mail of main decision and requirement taken during a meeting of the Thesis Committee and distribute it to all Committee members). When the Committee is satisfied that the proposed research meets the defined standards according to these criteria, approval will be given for the research to proceed. Form F2 (Appendix F2) indicating successful completion and presentation of the Thesis Proposal should be completed by the student and the Thesis Committee. After formal approval, the research may begin. It is expected that completion of the proposal and its approval will take place before the end of the first Winter Term of the student's enrollment.

**Masters Thesis**

The Thesis is a written document prepared by the student that typically contains the following sections:

- Abstract
- Introduction, including preamble and identification of the problem, background, including a review of relevant literature, and identification of gaps in knowledge, articulation of the primary and secondary objectives of the work, and statement of the hypothesis to be addressed.
- Approach and methods to be adopted.
- Presentation and discussion of the results, including description of analyses of raw data to reveal important effects, trends or tendencies.
- Conclusions and implications of the research.
- Acknowledgements to individuals or supporting parties.
- List of references.

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\(^2\) Objectives are usually broader goals. Specific aims break down the work into a manageable sequence of tasks related to the objective. Hypotheses are scientific questions that the thesis is trying to test. Often, a thesis work plan consists of perhaps 3 or 4 specific aims, several of which would have hypothesis. Aims like "assembling, cleaning and calculating descriptive statistics for a database" would not have hypotheses. But aims like "determining the relationship between PBDE exposure and estrogenic response" would involve hypotheses and statistical tests.
With the approval of the Research Mentor and Thesis Committee, comparable information may be presented in any format considered customary or acceptable in the particular field of scientific enquiry. For example, the student may adopt the format of a journal manuscript.

**Recommendations for writing and formatting the proposal and thesis**

**Writing assistance and style.** Writing assistance is available at the University of Michigan. Scientific and technical writing courses are offered by Rackham, ELI, Engineering, and others. Some advice for better academic writing is given below:

Provide a good introduction: it sets the theme, entices the reader, and tells what lies ahead. An insightful first sentence/thesis statement can provide your essay with a good opening and sharpen the reader's attention. However, carefully craft this initial sentence to directly introduce your main question or topic. Avoid overly general statements/platitudes about cities, urbanism, human nature, etc. that are not specifically linked to your theme. (For example, avoid an opening sentence such as "Humans and cities are interactive, and neither can exist without the other." or "Sustaining a livable planet is the most important goal of humanity, even more important than equity or growth or historic preservation.")

Be sure that the reader quickly understands your main question (the "research question"), how you will address the question, and your answer to the question.

When writing about a book or article, provide more than just a summary of issues. Instead, write a close reading analysis, interpretation, critique, or comparison. You may first need to summarize the text, but then step back and take an intelligent, critical look at the text and set it in the larger context of writings on cities and planning.

But be sure to not go to the other extreme by simply writing a freewheeling list of your opinions. Writing just from experience has its place, but that is not the focus of this course; the function here is to write critically from the readings. (This shift away from either simple summaries or experiential thought-pieces represents the shift from high school to college writing.)

Pay close attention to your writing "voice." Avoid both stiff, academic-sounding language and overly informal "colloquial" language. One effective approach is to use your first-person voice to introduce the topic and questions, then step back and have the various cited authors present their competing arguments, and then conclude by returning to the first person to summarize and critique.

Avoid unnecessary use of passive voice; it often muddles the issue of agency (i.e., who said or did what) and makes sentence structures unnecessarily complicated. An example of passive voice: "Automobile manufacturing jobs in Detroit have been greatly reduced since 1950." Better: "Automation and industrial

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3 From Scott Campbell, Urban Planning, UMICH. http://www-personal.umich.edu/~sdcamp/up540/writingtips.html

Also note that this sub-section provides very useful and valuable suggestions for writing your thesis. Formally, the first part of this section is not part of the thesis guidelines, but it is placed here to encourage your review of the material.
decentralization have greatly reduced automobile manufacturing jobs in Detroit since 1950."

Also: do not go out of the way to avoid using first-person voice just to sound "objective." An example of passive voice: "it is argued that suburban residents participate less in civic organizations." Better: "I argue that suburban residents participate less in civic organizations." (or, if you want to avoid using "I", you might try: "This paper argues that suburban residents participate less in civic organizations.")

Keep your writing focused: don't give a lot of background and history at the beginning without it clearly supporting your main points. Show the reader why the march through a couple of pages of background/history is useful. Otherwise it reads like meandering.

Avoid over-generalizations without supporting documentation (e.g., "cities were horrible places to live until the 20th Century..." or "...suburbs are uniformly sterile, racist, boring places....").

Give your writing a clear, organized structure. Don't just write what is in your head: you can start that way (the exploratory stage of writing), but you then need to restructure and edit for clarity and continuity. Your ideas are only as logical, clear and strong as your writing. (The transition from undergraduate to graduate papers includes the shift from writing a single last-minute version that only the professor sees to writing a series of drafts that are read by many people).

Simplify your writing: you don't need complicated, awkward sentence structures to express complex ideas. Be straightforward, but without losing any subtlety.

Avoid such phrases as "many people say," "some argue that," etc. These evoke a vague, unidentified voice (or voices) of either hearsay or authority without attribution. Either be more specific (by citing specific authors/texts) or drop altogether.

Provide good transitions between ideas. Let the reader know when you are moving from one idea to another (with transitional sentences, and perhaps with section headings). Show the connection between ideas. Develop a systematic, cumulative argument.

If your academic writing seems rusty, take a look at Howard S. Becker, Writing for Social Scientists: How to Start and Finish Your Thesis, Book, or Article. (Chicago: University of Chicago Press, 2007). It is a fun, informal and often helpful guide.

Double-space your text, include page numbers, and use adequate margins.

Show your sources. See instructions below on citations and plagiarism.

Finally, read widely and deeply! Good readers make good writers.

**Thesis format.** The MS thesis is expected be 25 to 50 pages in length and should be double spaced. Additional pages may be necessary for appendices, tables, and figures. The student should select a format, with the approval of the Research Mentor. The format used by a leading journal in the field may be desirable, especially if the thesis is to be submitted as a peer-reviewed
article. The Rackham guidelines for Ph.D. dissertations provide another model for the thesis format.

Title page, abstract and graphical abstract. These are mandatory elements of the thesis. The student is required to submit these electronically to Sue Crawford as pdf file. The EHS department may post these materials on the web.

The written abstract is the usual standard 200 - 500 word description of the thesis that describes, briefly, background, objectives, results, discussion, conclusions and implications of the research.

The graphical abstract contains a sentence or two and an image or other visual element that describes an aspect of the thesis. As defined by the publisher Elsevier (http://support.elsevier.com/app/answers/detail/a_id/345/~/graphical-abstract), the graphical abstract allows readers to quickly gain an understanding of the main take-home message of the paper and is intended to encourage browsing and interdisciplinary scholarship. It should summarize the contents of the paper in a concise, pictorial form. It might utilize a key figure from the thesis. (Look at the Elsevier or other journal sites to see examples.)

Headings. Students should learn to use headings and other formatting tools in their word processor that facilitate generation of a high quality document, table of contents, and other enhancements.

References. Students must provide references for any statements and data used in their proposal or thesis. Appropriate citations are needed to avoid the problem of plagiarism, to give credit to other authors, to allow readers to judge the context, legitimacy and possible bias of the information, and to allow others to find the source of the information.

It is recommended that references and citations be handled using a bibliographic manager such as Endnote, RefMan or Procite. These packages will produce a better product and ultimately save time. Students should learn how to do this.

Presentation of thesis to the Research Committee

The Thesis will be presented to the Research Committee in an appropriate and open format, typically a face-to-face meeting with the Research Committee. The Thesis can be presented as part of a laboratory or research group meeting. In this case, the student will make the presentation and will respond to questions from the audience. The audience will then be asked to leave, and the student and Research Committee will examine the work in all its aspects in a question-and-answer forum. The Thesis will be evaluated in terms of:-

- Content, breadth, depth and scope commensurate with graduate work in the environmental health sciences at the masters' level.
- Clarity of aims and objectives.
- Quality of the background learning by the student as reflected in the document.
- Study design
- Execution of the research and the clarity of its exposition.
- Quality of the data.
- Style and quality of the analysis and interpretation.
- Lucidity of the discussion and conclusions.
- Identification and expression of any importance of the results to environmental health.
- Responses of the student to questions posed by the Thesis Committee.

The Thesis Committee will discuss the thesis and the overall effort on the part of the student, and will make a determination on the outcome of the thesis and presentation. Possible outcomes are the following:

- Satisfactory overall performance, approve with no further revision needed.
- Generally satisfactory performance but some minor revisions needed on the Thesis.
- Generally satisfactory work, but some major revisions needed on the Thesis.
- Unsatisfactory, so the student needs to do more work in order to complete the thesis requirement.

The Thesis Committee will prepare a written summary of its evaluation according to the guidelines above which should be submitted to the Academic Degree Committee (Form F4, Appendix F4).

The student will submit an electronic copy of the approved thesis to the Student Services Coordinator.

**Dual Degrees**

Students pursuing degrees between two departments must complete all requirements indicated in the EHS Guidelines and Procedures for the Master of Science Thesis. Both departments will need to approve the thesis.

To save time and maximize efficiency, the student and Research Mentor(s) should develop a strategy to meet both sets of thesis guidelines and any other requirements. The strategy should address the Research Proposal, the research, the presentation of the research, the final Thesis, and the composition and leadership of the Thesis Committee. For example, typically, both the EHS Faculty Mentor and the non-EHS faculty lead will serve as co-chairs on the Thesis Committee.
Master of Sciences Forms
Department of Environmental Health Sciences
Approval of Research Mentor and Thesis Committee (M.S.)

Name: ___________________ Uniqname: ___________________ ID Number: ___________________

Thesis Title and Summary of Proposed Research

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Approved By:

Dissertation Advisor: ___________________ Date: ___________________
Dissertation Co-Advisor: _________________ Date: _________________
EHS ADP Committee Chair: _______________ Date: _________________
Department of Environmental Health Sciences
Oral Evaluation of M.S. Dissertation Proposal

Name: ______________________ Uniqname: ______________________ ID Number: ______________________

Oral Presentation Date: ______________________
Thesis Title: ______________________

The consensus of the student's Oral Proposal Presentation Committee with regard to the following criteria is:

Scope of proposed work: □ Satisfactory □ Unsatisfactory (explain)

Quality/rigor of work proposed: □ Satisfactory □ Unsatisfactory (explain)

Quality of the presentation: □ Satisfactory □ Unsatisfactory (explain)

Preparation of the student: □ Satisfactory □ Unsatisfactory (explain)

Timeframe and resources: □ Satisfactory □ Unsatisfactory (explain)
Department of Environmental Health Sciences
Oral Evaluation of M.S. Dissertation Proposal (continued)

Name: ________________________________

The consensus of the student’s Preliminary Examination Committee is that the student has:

☐ PASSED  ☐ CONDITIONALLY PASSED  ☐ DID NOT PASS

the oral presentation on the above date. Comments, recommendations, requirements (obligatory for ‘conditional pass’ or ‘did not pass’):


The undersigned faculty participated in the examination.

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</table>
Department of Environmental Health Sciences
Final M.S. Thesis Evaluation and Oral Dissertation Presentation

Name: ___________________________ Uniqname: ___________________________ ID Number: ___________________________

Oral Presentation Date: ___________________________

Thesis Title: ___________________________

The consensus of the student's Thesis Committee with regard to the following criteria is:

Objectives/Aims of Research: ☐ Satisfactory ☐ Unsatisfactory (explain)

Command of Topics: ☐ Satisfactory ☐ Unsatisfactory (explain)

Novelty of Research: ☐ Satisfactory ☐ Unsatisfactory (explain)

Quality/Quantity of Research: ☐ Satisfactory ☐ Unsatisfactory (explain)
Department of Environmental Health Sciences
Final M.S. Thesis Evaluation and Oral Dissertation Presentation (continued)

Name: _________________________________

The consensus of the student’s Thesis Committee is that the student has:

- Oral Presentation: □ PASSED □ CONDITIONALLY PASSED □ DID NOT PASS
- Written Thesis □ PASSED □ PASSED, revisions required □ DID NOT PASS

Comments, recommendations, requirements (obligatory for ‘revisions required’):


The undersigned faculty participated in the examination.

Chair/Co-Chair ___________________________ Dept/Unit ___________________________ Signature ___________________________ Date __________

Chair/Co-Chair ___________________________ Dept/Unit ___________________________ Signature ___________________________ Date __________

Member ___________________________ Dept/Unit ___________________________ Signature ___________________________ Date __________

Member ___________________________ Dept/Unit ___________________________ Signature ___________________________ Date __________
Department of Environmental Health Sciences
Certification of M.S. Thesis Final Approval

Name: ___________________________ Uniqname: ___________ ID Number: ___________

Oral Presentation Date: ___________

Thesis Title: ___________________________

Representing the committee of the above mentioned student, I certify that:

☐ all corrections and revisions have been made OR
☐ no corrections or revisions were required

Chair or Designate Signature: ___________________________

Name Printed: ___________________________

Date: ___________________________
APPENDIX B

EHS Doctoral Guidelines
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1. Introduction

The Department of Environmental Health Sciences (EHS) offers the Doctor of Philosophy (Ph.D.) degree in Environmental Health Sciences, Nutritional Sciences and in Toxicology. These degrees are officially conferred by the Horace H. Rackham School of Graduate Studies, and the broad requirements for completing a Ph.D. program at the University of Michigan are described in the Student Handbook issued by Rackham. Additional requirements and specific procedures for fulfilling all degree requirements are typically provided by each school and department within the university. All students should be thoroughly familiar with those sections of the current Rackham Student Handbook, School of Public Health catalogue, and EHS documents pertaining to doctoral programs.

This document (PhD Guidelines) summarizes the procedures for meeting the doctoral degree requirements in the EHS Department. It is intended to elaborate on Rackham requirements, with guidance specific to the EHS PhD degree program. It is the responsibility of each student to consult all relevant documents and to ensure that all of their doctoral requirements are met.

Doctoral students ordinarily follow the sequence shown in Table 1. Although there are firm deadlines for some of the required tasks, particularly within the first two years, others are more open-ended (see below). The time necessary to complete the dissertation research depends upon many factors due to the inherent uncertainty of the research process, the varied backgrounds of students entering the degree program, and many other extenuating factors. Nonetheless, students are encouraged to progress as diligently as possible toward completion of their degree. Progress is monitored by the primary faculty mentor, the EHS Academic Degree Programs Committee, the EHS Department and by the EHS faculty as a whole. Evidence of a persistent lack of progress will trigger an inquiry into the situation.

The EHS Academic Degree Programs Committee is charged with the responsibilities of administering the program, interpreting and revising policy, conducting the Pre-Candidacy Review (described below), monitoring doctoral student progress, and serving as liaison body between students and faculty. The EHS Academic Degree Programs Committee is composed of four or more EHS instructional faculty members whose backgrounds represent the diverse areas of departmental expertise.

2. Major Area of Study and Study Plan

1. The major areas of study within the EHS Department are, Environmental Health Sciences (Environmental Quality and Health, Industrial Hygiene, Environmental & Occupational Epidemiology), Nutritional Sciences and Toxicology. Interdisciplinary research is encouraged both within the department and between EHS and other departments on campus.

---

1 A Dr.P.H. (Doctor of Public Health) is no longer offered

Department of Environmental Health Sciences

- 1 -
Table 1: Milestone chart for the doctoral program.

<table>
<thead>
<tr>
<th>Milestone</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
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<tbody>
<tr>
<td>Orientation and enrollment</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Appointment of academic advisor</td>
<td>x</td>
<td></td>
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<td></td>
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<tr>
<td>Draft of study plan</td>
<td>x</td>
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<tr>
<td>Completion of coursework, rotations, etc.</td>
<td>x x x x x x</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Completion of PEERRS training</td>
<td>x</td>
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<td></td>
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<tr>
<td>Preparation for Pre-Candidacy Review</td>
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<tr>
<td>Selection of primary research mentor</td>
<td>x</td>
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<tr>
<td>Pre-Candidacy Review (DQE, etc.)</td>
<td>x</td>
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<tr>
<td>Selection of dissertation topic</td>
<td>x x</td>
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<tr>
<td>Preparation of dissertation proposal</td>
<td>x x x</td>
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<tr>
<td>Establishment of dissertation committee</td>
<td>x x</td>
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<tr>
<td>Preliminary Examination</td>
<td>x x</td>
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<tr>
<td>Completion of research</td>
<td>x x x x x x</td>
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<tr>
<td>Data Meeting</td>
<td>x x</td>
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<tr>
<td>Initial drafts of dissertation</td>
<td>x x x</td>
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<tr>
<td>Dissertation defense</td>
<td></td>
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<td>x</td>
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<tr>
<td>File final dissertation with Rackham</td>
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2. Although there is considerable flexibility in the selection of required courses (see below), certain courses may be specifically recommended for students in a given major area of study. Students may wish to take a sequence of courses in an area to establish a ‘minor concentration’. Course selections will also be dictated by the student’s research interests. The EHS Curricular Guide, which is revised and re-issued annually at the start of the academic year, should be consulted for EHS course offerings, and decisions should be made in consultation with the academic advisor.

3. Students should review the required curriculum and other milestones with their academic advisor and submit the sequence of courses they plan to take to the Student Services Office by the third week of the first semester in residence. The EHS Academic Degree Programs Committee is responsible for reviewing/approving the proposed course of study.

3. Academic Advising

An academic advisor is assigned to each student when he/she begins the Ph.D. program. The advisor is a faculty member in the student's major area of study who is responsible for guiding the student during the first year of the program. The academic advisor may or may not ultimately serve as the primary research mentor (dissertation committee chair), in which case they would continue to guide the student through the program. The student should consult with the advisor to establish a study plan that defines coursework to be taken, research rotation advisors, and possible areas of research appropriate for dissertation topics. Students are strongly encouraged to get to know, and to seek advice from, other faculty and their fellow students as well.
4. Course Requirements and Performance Criteria

1. Doctoral students must be registered for at least nine credit hours of classes to be considered full-time. Eight credits is considered full-time when a student reaches candidacy.

2. Doctoral students must maintain a GPA of 3.3. Students with GPAs that drop below 3.3 are placed on probation and cannot sit for the DQE. Failure to raise the GPA above 3.3 by the end of the following semester is grounds for dismissal from the program. Appeals can be addressed to the Chair of the EHS Academic Degree Programs Committee.

3. Students must complete two research rotations in two different groups, one in each of their first two terms. The number of credit hours can range from 1-3, and should reflect the amount of work to be accomplished. A report is required at the end of each rotation.

4. Students are encouraged to start defining possible research topics for the dissertation as soon as possible, since they will need to identify a primary research mentor by the end of the first academic year and ideas for topics will most likely evolve over the course of the first year.

5. The sequencing of courses is decided in consultation with the academic advisor. However, in order to sit for the DQE (part of the Pre-Candidacy Review, described in next section), the student must take a minimum of 22 credit hours, including the following:
   a. One biostatistics/statistics courses
   b. One epidemiology course
   c. Two research rotations
   d. Three required EHS courses from degree option

5. Pre-Candidate Review (PCR)

At the end of the first academic year, students undergo their Pre-Candidacy Review (PCR). The PCR is administered by the EHS Academic Degree Programs Committee. If a student has completed an MS or MPH degree in EHS and has been admitted to PhD program, the PCR can take place at the end of their Master’s program (i.e., prior to the official start of their doctoral program). The review consists of the following:

1. Confirmation of completion of sufficient coursework and two research rotations (MPH/MS students are not be subject to this requirement).

2. Completion of training on responsible conduct of research (PEERRS). Students are required to complete the following modules: (1) Foundations of Good Practice, (2) Research Administration, (3) Conflict of Interest and (4) Authorship, Publication and Peer Review. The following modules may be required depending our your research focus (1) Human Subjects – Biomedical & Health Sciences; (2) Human Subjects – Social &Behavioral Sciences and (3) Animal Subjects

3. Doctoral Qualifying Examination (DQE)

4. Assessment of overall performance in classes, research experiences, and any other relevant academic or professional activities.

5. Confirmation of primary research mentor selection and agreement to serve on their part.
5.1. Submission of required materials

In April, the student must submit the following materials:

a. A summary indicating that sufficient coursework has been completed in preparation for the DQE and that the GPA is 3.0 or higher.

b. Curriculum vitae that includes a listing of educational institutions attended, relevant undergraduate and graduate courses taken, degrees completed, relevant work experience, and other appropriate information.

c. Certification of successful PEERRS training in the appropriate modules.

d. Any additional relevant materials they wish to submit.

e. A letter from a faculty member agreeing to serve as the primary research mentor for the student.

5.2. Doctoral Qualifying Examination (DQE) (see Attachment 2)

1. Passing the DQE is an important milestone. A student is eligible to sit for the DQE if they have maintained a GPA of 3.3 or better in required courses. The GPA is calculated on the basis of didactic courses and up to 6 credit-hours of independent study courses (e.g., research, readings).

2. Preparation, scheduling, administration, and decisions about ultimate outcome of the DQE are the responsibility of the EHS Academic Degree Programs Committee.

3. The DQE is a written examination taken at the end of the second academic term (second or third week of May) in the doctoral program. Students who have completed a Master’s degree in the department are expected to take the examination upon completion of that degree. If there are extraordinary circumstances and compelling reasons why a doctoral student would not be prepared to take the DQE at this point in their career, a written request to postpone taking the DQE must be submitted to the EHS Student Services Office two months prior to the examination. It will be reviewed by the EHS Academic Degree Programs Committee and a judgment rendered.

4. Details about the DQE are provided in Attachment 2 of this document.

5.3. Selection of Primary Research Mentor (Dissertation Chair)

1. Prior to the PCR it is the responsibility of the student to discuss potential areas of dissertation research with members of the faculty who might serve as his/her primary research mentor and dissertation committee chair, to explore and, ideally, define a topic suitable for the dissertation research, and to obtain agreement from a faculty member to serve in the role of primary mentor.

2. The primary mentor must be a full-time or jointly appointed member of the department faculty and of the Graduate School Faculty, qualified to guide the student in research, and capable of taking on the responsibility of mentorship without incurring an excessive burden. Adjunct faculty do not qualify to serve as a sole dissertation chair. For those exceptional cases where a student finds a faculty member outside of the department who agrees to play a
primary role in mentorship, that faculty member may be allowed to serve as co-chair of the dissertation committee as long as a member of the departmental instructional faculty member who also serves as co-chair. These cases must meet with the approval of the EHS Academic Degree Programs Committee, and should be brought to the attention of the committee at the PCR.

3. The primary mentor (or co-mentor) assumes the functions of the academic advisor and responsibility for guiding the student through the program.

4. The primary research mentor often assumes responsibility for supporting the student financially, typically by hiring the student as a GSRA. Financial support of this nature is not an entitlement to the student, however, and sustained satisfactory performance is generally expected in order to maintain such support. Even under such circumstances, it is not generally possible to guarantee financial support for the duration of the dissertation due to the vagaries of research funding. That said, every effort is made to do so. Students will also be expected to work with the Student Administrative Coordinator and faculty advisor to take advantage of other potential sources of financial support.

6. Preliminary Examination

1. The doctoral Preliminary Examination has two components: (1) a formal written research proposal, and (2) an oral examination by the preliminary examination committee of the quality and scope of proposed research and the student’s preparation to conduct the research.

2. The Preliminary Examination should be taken no sooner than three months and no later than 12 months after completing the Pre-Candidate Review, ideally at the end of the second academic year in the program. Students must have maintained a GPA of 6.0 or better and be in good standing to sit for the examination. As per Rackham policy, students must successfully complete the preliminary examination within 3 years of starting the doctoral program.

3. The student must establish a Preliminary Examination Committee in collaboration with the primary research mentor. Requests to faculty members who are deemed appropriate for the Preliminary Examination Committee are made by the student. Participation is voluntary. Once agreements to serve are received by the student from all committee members, the committee composition is submitted to the Student Services Office and forwarded to the EHS Academic Degree Programs Committee for approval (approval is presumed and notification will only be sent by the Doctoral Committee if there is a problem). This committee also serves as the Doctoral Dissertation Committee. Therefore, the committee membership must meet the Rackham requirements for a Doctoral Dissertation Committee (see below for EHS rules on dissertation committee composition).

4. To be able to take the Preliminary Examination, the form entitled "Request for Student to Take Preliminary Examination" (Attachment 3) must be obtained from the EHS Student Services Office, completed, and returned for approval. This form must be completed and approved no later than 4 weeks before the scheduled preliminary examination. The student must have successfully passed the Doctoral Qualifying Examination without conditions at least three months prior to the planned Preliminary Examination date, completed any conditions as part of the Pre-Candidate Review, and completed all coursework.
5. The research proposal that is required for the Preliminary Examination must be distributed to the Preliminary Examination Committee three weeks prior to the examination date. Exceeding this deadline constitutes automatic grounds for rescheduling the examination. Permission to hold to the original examination date must be obtained from all committee members if the deadline is exceeded.

6. The research proposal should be formatted like a standard NIH grant proposal, with an abstract, sections on specific goals, background and significance, preliminary data (if any), research methods that include milestones, and literature citations used in preparation of the proposal. A timeline for completion of major tasks and milestones must be included as well. The length of the proposal text (excluding abstract, literature citations, and time line) must be no more than 20 pages (double-spaced, 12-pt font, 1” margins all around).

7. It is expected that the primary advisor will work with the student during the development of the proposal, and that it will be of high quality technically and literarily. This normally means a fair amount of editing prior to the final version being circulated to the committee.

8. In addition to circulating copies to committee members, the student must submit a copy to the Student Services Office for archiving by the EHS Academic Degree Programs Committee.

9. All Preliminary Examinations are announced to the EHS faculty at least one week prior to the examination. Students must provide an abstract of the research proposal to the Student Services Office for distribution to departmental faculty two weeks before the examination.

10. The examination is conducted by the Preliminary Examination Committee, with a member other than the primary research mentor presiding. The primary mentor is present only to provide a brief review of the student’s record to date, to confirm that the student is qualified to proceed, to clarify matters of a factual nature, and to resolve issues that would otherwise stall the proceedings. They are not to serve as an advocate for the student and should refrain from intervening unless it is deemed necessary by the other committee members.

11. The Preliminary Examination Committee, as a whole, is responsible for the evaluation of the student's qualifications and promise for a successful dissertation. All members of the committee must be present (or actively participating via video- or tele-conference) in order for the examination to be valid. The examination evaluates the student's knowledge in her/his chosen area of research, the feasibility and adequacy of the dissertation proposal, and the student’s preparation and capability to complete the proposed research.

12. The Preliminary Examination should be structured to be completed within a time limit of two hours. It is up to the presiding faculty member to ensure that the examination is held to the time limit. Following a brief closed-door conference among the committee members at the outset, typically up to 45 minutes are allotted to the formal presentation by the student (if uninterrupted) and up to 50 minutes are allotted to questions by the committee members. An additional 15 minutes is then allotted for the committee to deliberate and come to a decision about the outcome. The student is informed immediately of the results and any prescribed remedial actions. Follow-up by the primary research mentor with the student at the conclusion of the examination is customary.

13. The Preliminary Examination is closed to non-faculty participants. Only the student, the members of the committee, and any other interested faculty are allowed to participate. No
other students may be present during the examination and there will be no recording of the proceedings.

14. A student passes the Preliminary Examination only upon approval of all of the members of the Preliminary Examination Committee. A form is signed by all committee members attesting to the outcome of the examination. Any conditions placed on the student by any member of the committee in order to receive a favorable decision (i.e., “pass”) are also written on this form and they must be completed within six months of the examination date (or sooner if so required by the committee).

15. Students who fail the examination may petition to retake the examination once, no sooner than six months after the initial examination. This would normally entail submission of a revised proposal and scheduling of another presentation. Students who fail the examination twice will be dismissed from the PhD program.

16. Results of the examination, along with the documentation (i.e., the signed form) are provided by the primary research mentor to the Student Services Office, which will notify the Department Chair and the EHS Academic Degree Programs Committee.

17. If there are significant changes in direction, depth, or scope of research subsequent to the Preliminary Examination, the nature of such changes should be approved by the Preliminary Examination Committee and reported by the student to the Student Services Office for archiving by the EHS Academic Degree Programs Committee.

18. Once the Preliminary Examination is passed, the student advances to candidacy. A certificate of admission to candidacy is issued by the Graduate School when all requirements are met.

19. The composition (membership) of the Dissertation Committee should be finalized as soon as possible after the Preliminary Examination. Unless a request to change the dissertation committee is submitted, the department will submit to the Rackham Graduate School, the members of the preliminary examination committee as the dissertation committee
7. Preliminary Examination Committee and Doctoral Dissertation Committee

1. The Doctoral Preliminary Examination Committee and Doctoral Dissertation Committee must meet the following criteria:

   a. A minimum of four members.
   
   b. A minimum of two members must have faculty appointments in EHS (may include one faculty member with a primary appointment in a department other than EHS but who has an officially recognized/approved joint appointment in EHS) and be members of the Rackham Graduate Faculty.
   
   c. The chair or co-chair must have a primary faculty appointment (≥50% paid appointment) in EHS. Adjunct faculty cannot serve as co-chairs without explicit approval from the EHS Academic Degree Programs Committee. Petitions for such approval must be accompanied by a statement of justification signed by the EHS Co-chair and submission of a completed Rackham Special Nomination Form."
   
   d. The committee must include at least one cognate member from the Rackham Graduate Faculty with a primary appointment in another department (EHS Faculty, including adjunct and joint appointments, are ineligible) and with an active interest in the research.
   
   e. Thus, at least three members of the Committee, including the cognate, must be Rackham Graduate Faculty (see Rackham Student Handbook). Other committee members can be members of the Graduate Faculty or "special appointees." The additional committee member(s) may be scholars from other departments or from other institutions where scholarly work is performed.
   
   f. Any other criteria imposed by the Rackham Graduate School or School of Public Health.

2. The Dissertation Committee is responsible for the evaluation of the student's progress toward completing the dissertation research. The committee composition is usually the same as the Preliminary Examination Committee.

3. Members of the Dissertation Committee should play a central role in the student’s PhD program and should be consulted regularly for academic and technical advice. Meetings of the committee members (with or without the student, at their discretion) may be called as needed. A report is put in the student's file after each meeting.

4. Once a Dissertation Committee has been established, any changes to the committee membership need to be approved by the EHS Academic Degree Programs Committee. A memo should be generated by the student, endorsed by the dissertation chair, and submitted to the Student Services Office. The memo should indicate what changes are being requested, justification for the changes, and the revised committee membership. The request is reviewed by the EHS Academic Degree Programs Committee for approval and then forwarded to the appropriate offices for processing.
8. The Research Program

1. After advancing to candidacy, students are expected to register for EHS 995 for any term they draw upon University resources, which includes faculty and staff time.

2. By definition, the work performed for the PhD should be original and scientifically significant. It should contribute to the field of study in a way that advances the state-of-the-art. Generally, it should be hypothesis-driven, meaning that it sets forth along a series of well-defined paths defined by well-formulated postulates, and attempts to prove or disprove the hypotheses by means of data collection, analysis and interpretation. It should be guided by rigorous principles of scientific inquiry and ethics.

3. Original research requires capabilities that differ from those required for didactic courses. Accordingly, an emphasis is placed on developing such capabilities in the student. Skills to be imparted and developed include reviewing the literature and placing the student’s work in the context of what others have done before and the state-of-the-art, writing and speaking effectively and articulately, developing and perfecting technical and methodological skills, generating high-quality data with proper quality control measures, managing samples and data, analyzing the data, interpreting and presenting the results, drawing conclusions, and recognizing the shortcomings of the work and the nature of any future studies needed to build upon that which has just been completed.

4. Advice and assistance should be sought whenever necessary from members of the Dissertation Committee, from other members of the EHS faculty, or from any other qualified scholars with insights or experience that could be brought to bear. The student, however, is responsible for the originality of study, the progress of the research, the quality of the results, the soundness of the interpretations, and the style and clarity of its presentation as a written document.

5. Students must submit a written progress report to the Student Services Office for review by the EHS Academic Degree Programs Committee every year (in March). A form is available for this purpose from the Student Services Office (Attachment 3). It is filled out by both the student and primary research mentor, discussed between them, and signed prior to submission. Should the student not be making satisfactory progress toward the degree, certain actions are triggered (see form).

6. Students are expected to give at least one departmental seminar describing their research and pertinent findings prior to the dissertation defense.

7. Students are expected to co-author at least one peer-reviewed publication based upon their research prior to graduation. They should be listed as first author to acknowledge that they were the primary researcher for the work.

8. Students are also expected to assimilate and adopt proper study habits, ethical integrity, and professional attitudes commensurate with the scholarly nature of their pursuit.
9. Data Review Meeting (Data Meeting)

1. At least four months (no exceptions!) prior to scheduling the defense of the dissertation, a data review meeting must be held with members of the dissertation committee. This is an extremely important meeting. The defense cannot be scheduled prior to a successful data review. In fact, the outcome of a successful data meeting is permission by the dissertation committee to proceed with writing and, ultimately, defending the dissertation.

2. Preferably all, but a minimum of three committee members (including cognate), should attend this meeting. If there are committee members off-campus who cannot attend, alternative means of communicating with those members should be arranged in order to obtain their input.

3. The purpose of the data meeting is for the committee to critically assess the following:
   - quality and quantity of research performed by the student
   - extent to which the research has met the goals set forth in the research proposal submitted as part of the student's Preliminary Examination (note: legitimate changes in research goals are allowable)
   - progress the student has made toward an advanced understanding of the methodology, importance and implications of the research, and critical interpretation of the results
   - ability to organize, present, and discuss material in a professional manner and demonstration of mastery of the topics to be included in the dissertation

4. The student should give a formal presentation to the committee that summarizes the work performed and includes methodological details, key results and their implications, remaining work to be completed and included in the dissertation, conclusions, and recommendations for future research.

5. A member of the dissertation committee other than the chair should preside, and the chair should intercede only for reasons of clarification.

6. The committee deliberates immediately following the presentation and completes the Pre-Defense Data Form (Attachment 3). The committee chair informs the student whether he/she can proceed to schedule the dissertation defense. If a student is deemed not ready to defend the thesis because the material presented is inadequate or there is a need for additional analysis, the committee will provide the student with detailed suggestions on what needs to be done.

7. Official notification is provided to the EHS Academic Degree Programs Committee by the dissertation committee chair via the Pre-Defense Data Meeting Form when the student has received dissertation committee approval to write and defend the dissertation.
10. The Dissertation

1. The dissertation represents the culmination of several years’ worth of work by the student. It is an important document.

2. Since it serves as a permanent record of the contributions made by the student, the dissertation should be written carefully and coherently with proper regard for technical and literary style and quality. Students are advised to consult previous dissertations, which are available from the primary research mentor or through the university library system, to obtain a sense of acceptable style and content.

3. Typical dissertations are 180-250 pages long. Often the substantive chapters (which typically follow one or two introductory chapters), each of which describes a component of the broader body of work performed over the course of the student’s career, have been or could be published in the peer-reviewed literature in slightly revised form. In fact, one approach taken by many primary research mentors is to encourage students to think of chapters and publications in a similar vein, and to organize the chapters in the dissertation accordingly. Although it is technically a violation of copyright regulations to re-publish peer-reviewed articles verbatim as dissertation chapters (or vice versa), the content will invariably be very similar – unlike archival publications, dissertation chapters are not restricted in length and could contain data and analyses too lengthy to include in a published paper.

4. Another purpose of the dissertation is to serve as a resource for other students working in the same area who might build upon the research performed to date. It is useful to keep this in mind as the student writes the dissertation, particularly the conclusions and topics requiring additional study.

5. Rackham places very specific formatting requirements on the dissertation. The student should visit the appropriate Rackham webpage or office to obtain guidance documents on this subject.

6. It is customary to provide copies (bound) to the members of the committee after the final version is submitted to Rackham. More recently, a complete and searchable PDF file is also provided.


1. The student must be officially registered (and their tuition paid) in order to defend the dissertation. The (oral) defense is normally scheduled during the fall or winter semester, unless special arrangements are made for a Spring/Summer defense and agreement is obtained by all dissertation committee members.

2. Permission for the student to set the date for the final oral examination is given by the primary mentor on the basis of the comments obtained from the dissertation committee at the Data Meeting and progress made by the student since that meeting. It reflects the judgment of the mentor that the dissertation research is complete or virtually so.

3. Once permission is granted to set the date of the defense, the student must notify the Student Services Office so that forms can be ordered and a check can be made that all other degree requirements have been met.
4. The defense is held only after all members of the dissertation committee have had adequate time to review a near-final version of the written dissertation. Rackham requires a minimum of two weeks be afforded the committee to review the dissertation prior to the defense. Since this deadline has been routinely exceeded in recent years, in fairness to the committee members, EHS requires that the committee be given three weeks to review the dissertation prior to the defense. Exceeding this deadline automatically voids the originally scheduled defense date and demands that the student reschedule or get permission from all committee members to hold to the original date.

5. The primary mentor (dissertation committee chair) is responsible to the other members of the committee for ensuring that the draft that they receive has been reviewed, edited, and revised sufficiently to be considered in ‘near-final’ form prior to distribution for their evaluation.

6. The defense of the dissertation is considered the final oral examination of the candidate’s mastery of the subject matter covered in the dissertation. It is open to the public, and notices of the event are posted ahead of time with an open invitation to interested parties. The candidate gives a formal presentation, typically 40-45 minutes in length, that describes the major findings of the research and the implications in relation to the current state of knowledge in that field. Following the presentation, the candidate answers questions from the audience and then from the Dissertation Committee. The latter part of the defense is a closed session.

7. All members of the Dissertation Committee must be present for the defense.

8. The Dissertation Committee may at the time of the defense require alterations or corrections to the dissertation. The ‘Report of the Final Oral Examination’ is submitted at the conclusion of the defense. Any changes requested in the dissertation must be made prior to final filing, and it typically falls to the primary research mentor to ensure that such changes are made.

9. The final form of the dissertation must be taken registered with the Rackham Graduate School (see Rackham Graduate School Handbook). The final dissertation also must be submitted the the EHS Student Services Office for archiving with the department. Once Rackham accepts the dissertation, the student has officially completed the program and earned their PhD degree. The celebrations can then commence!
ATTACHMENTS

Attachment 1 - Required Courses
Attachment 2 – Doctoral Qualifying Examination (DQE)
Attachment 3 – Preliminary Examination Forms
Attachment 4 – Data Meeting Forms
Attachment 5 – Annual Progress Report
ATTACHMENT 1 – Required Coursework

DOCTOR OF PHILOSOPHY (Ph.D.)
(Environmental Health Sciences)

Departmental Course Requirements

BIOSTAT 553 (4) Applied Biostatistics
Select one (1) of the following:
  EPID 503 (3) Strategies and Uses of Epidemiology
  EPID 601 (4) Principles and Methods in Epidemiology
Select one (1) of the following:
  BIOSTAT 513 (3) Application of Regression Analysis to Health Studies
  BIOSTAT 523 (3) Biostatistical Analysis for Health-Related Studies
  BIOSTAT 560 (3) Statistical Methods in Epidemiology
  STAT 401 (3) Applied Statistical Methods II
  STAT 503 (3) Applied Multivariate Analysis
Statistics or Biostatistics course (determined with advisor and approval of doctoral committee)

Cognate Course – One 2-3 credit hour course outside the Department of Environmental Health Sciences (to be determined by advisor with approval of EHS Academic Degree Programs Committee)

PUBHLTH 610 (1) Introduction to Public Health
EHS 688 (1) Topics in Environmental Health Sciences¹
EHS 801 (2) Research and Communication in Environmental Health Sciences
EHS 869 (1) Doctoral Seminar in Environmental Health Sciences²
EHS 899 (≤6) Advanced Research (2 separate rotations required)³

¹EHS 688 is a departmental seminar that spans the first 2 terms. It is expected that students will attend seminars throughout their doctoral program but do not have to officially register.

²EHS 869 is a doctoral seminar that students register for until they have passed their Preliminary Exam. Prior to the Preliminary Exam, they will present a formal seminar in this class. It is expected that students will attend seminars throughout their doctoral program but do not have to officially register.

³EHS 899 - Students complete two separate rotations with different faculty for a minimum of 1 credit each time

Additional Course Requirements

Select at least nine (9) credits of the following (at least six (6) credits must be 600-level or higher)
  EHS 506 (3) Principles of Toxicology
  EHS 508 (2) Principles of Risk Assessment
  EHS 550 (2) Principles of Occupational and Environmental Health
  EHS 570 (3) Water Quality Management
  EHS 572 (2) Environmental Impact Assessment
  EHS 574 (3) Environmental Chemistry
  EHS 576 (3) Microbiology in Environmental Health
  EHS 601 (3) Foundations in Environmental Health Sciences
  EHS 608 (3) Environmental Epidemiology
  EHS 652 (3) Evaluation of Chemical Hazards
  EHS 653 (3) Environmental Sampling and Analysis Lab
  EHS 654 (3) Control of Exposures to Airborne Contaminants
  EHS 657 (3) Advanced Exposure Assessment
  EHS 660 (2) Environmental Epigenetics and Public Health
  EHS 672 (3) Life Cycle Assessment: Human health and environmental impacts
  EHS 675 (2) Data Analysis for Environmental Epidemiology
DOCTOR OF PHILOSOPHY (Ph.D.)
(Nutritional Sciences)

Departmental Course Requirements

BIOSTAT 553 (4) Applied Biostatistics

Select one (1) of the following:
- EPID 503 (3) Strategies and Uses of Epidemiology
- EPID 601 (4) Principles and Methods in Epidemiology

Select one (1) of the following:
- BIOSTAT 513 (3) Application of Regression Analysis to Health Studies
- BIOSTAT 523 (3) Biostatistical Analysis for Health-Related Studies

EHS 688 (1) Topics in Environmental Health Sciences
EHS 801 (2) Research and Communication in Environmental Health Sciences
EHS 869 (1) Doctoral Seminar in Environmental Health Sciences
EHS 899 (6) Advanced Research (2 separate rotations required)

PUBHLTH 610 (1) Introduction to Public Health

1EHS 688 is a departmental seminar that spans the first 2 terms. It is expected that students will attend seminars throughout their doctoral program but do not have to officially register.
2EHS 869 is a doctoral seminar that students register for until they have passed their Preliminary Exam. Prior to the Preliminary Exam, they will present a formal seminar in this class. It is expected that students will attend seminars throughout their doctoral program but do not have to officially register.
3EHS 899 - Students complete two separate rotations with different faculty for a minimum of 1 credit each time

NS Core Course Requirements

BIOLCHEM 515 (3) Introduction to Biochemistry*
PHYSIO 502 (4) Human Physiology*
EHS 630 (3) Principles of Nutritional Science
EHS 631 (3) Metabolism of Vitamins and Minerals
EHS 639 (3) Pathophysiology of Obesity
EHS 640 (3) Nutrition Assessment

*NOTE: Biochem 515 and PHYSIO 502 and may be exempted by previous coursework

NS Plan Course Requirements

Plan 1: Molecular and Biochemical Nutrition

Select from the following (minimum of 6 credits)
- BIOCHEM 550 (3) Macromolecular Structure and Functions
- CDM 530 (3) Cell Biology
- HG 541 (3) Molecular Genetics
- MICRO 440 (3) Immunology
- PHYSIOL 510 (3) Principles of Systems and Integrative Physiology
- PHYSIOL 555 (3) Integrative Biology and Genetics

Select from the following (minimum of 6 credits)
- EHS 506 (3) Principles of Toxicology
- EHS 576 (3) Microbiology in Environmental Health
- EHS 612 (3) Biochemical and Molecular Toxicology
- EHS 625 (3) Environment and Immune Responses
- EHS 660 (2) Environmental Epigenetics and Public Health
Plan 2: Nutritional Epidemiology

Select from the following (minimum of 12 credits)

- BIOSTAT 512 (3) Analyzing Longitudinal and Clustered Data using Statistical Software
- BIOSTAT 560 (3) Statistics in Epidemiology
- EHS 633 (3) Evaluation of Global Nutrition Program
- EPI 601 (3) Principles and Methods of Epidemiology
- EPI 623 (3) Nutritional Epidemiology
- EPI 640 (3) SAS for Epidemiological Research
- EPI 656 (3) Applied Epidemiologic Data Analyses
- EPI/EHS 662 (3) Methods in Nutritional Epidemiology
- EPI 652 (3) Epidemiology of Chronic Disease
- EPI/EHS 575 (3) Population Environmental Dynamics
- EPI 552 (3) Epidemiology of Chronic Diseases
- EPI 655 (3) Field Studies in Epidemiology
- EPI 807 (3) Controversial Topics in Nutrition
- EPI 814 (3) Topics in Epidemiologic Analysis
- EPI 820 (3) Multilevel Studies and Multilevel Analysis in Public Health Research
- EPI 888 (3) Nutritional and Infectious Disease

Plan 3: Nutritional Interventions

Select from the following (minimum of 12 credits)

- EHS 633 (3) Evaluation of Global Nutrition Program
- HBHE 503 (3) Introduction to Health Behavior Theory and Approaches
- HBHE 530 (3) Techniques of Survey Research
- HBHE 600 (3) Psychosocial Factors in Health Related Behavior
- HBHE 620 (3) Behavior Research Models in Public Health
- HBHE 621 (3) Seminar in Behavior Research Model in Public Health
- HBHE 622 (3) Program Evaluation in Health Education
- HBHE 636 (3) Qualitative Methods and Participatory Action Research
- HBHE 638 (3) Qualitative Methods in Public Health
- HBHE 641 (3) Materials and Methods in Health Education Programs
- HBHE 671 (3) Motivational Interviewing in Public Health
- HBHE 733 (3) Community Based Participatory Research
- HMP 610 (3) Cost-Effectiveness Analysis in Health
- HMP 615 (3) Introduction to Public Health Policy
- HMP 640 (3) Program Evaluation in Public Health
- Surv Meth 600 (3) Fundamental of Survey Methods
DOCTOR OF PHILOSOPHY (Ph.D.)
(Toxicology)

Departmental Course Requirements

<table>
<thead>
<tr>
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<td>Applied Biostatistics</td>
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<tr>
<td>EPID 503</td>
<td>3</td>
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</tr>
<tr>
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<td>Principles and Methods in Epidemiology</td>
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<td>EHS 628</td>
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<td>Toxicology Research Analysis and Presentation</td>
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<td>EHS 697</td>
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<td>Readings 2</td>
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<tr>
<td>PUBHLTH 610</td>
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<td>Introduction to Public Health</td>
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2EHS 869 is a doctoral seminar that students register for until they have passed their Preliminary Exam. Prior to the Preliminary Exam, they will present a formal seminar in this class. It is expected that students will attend seminars throughout their doctoral program but do not have to officially register.

3EHS 899 - Students complete two separate rotations with different faculty for a minimum of 1 credit each time

Additional Course Requirements

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<td>Toxicology Research Analysis and Presentation</td>
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<td>Readings 2</td>
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<td>EHS 717</td>
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<td>Toxicological Pathology Laboratory</td>
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Select one (1) of the followings

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<td>Mechanisms of Reproductive Toxicology</td>
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<td>EHS 624</td>
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<td>Mechanisms of Neurotoxicology</td>
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<td>EHS 625</td>
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<td>Environment &amp; the Immune Response</td>
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<td>EHS 660</td>
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<td>Environmental Epigenetics and Public Health</td>
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Select two (2) of the followings

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<td>CDB 530</td>
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<td>Cell Biology</td>
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*NOTE: Biochem 515 may be exempted by previous coursework
EHS 697 is taken concurrently with EHS 628 Intermediate Seminar in Toxicology. Students register under the faculty member who is assisting with preparation for the seminar

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ATTACHMENT 2

EHS Doctoral Qualifying Examination

1. The DQE is a written examination comprising two components intended to assess a student’s aptitude for doctoral-level work.

   a. The first component is given *in class* and typically spans two four-hour time periods (e.g., morning and afternoon of the same day or mornings on two different days). It is closed-book (no notes, published materials, electronic access or aids, other than a calculator will be allowed) and there is a time limit for completion.

   The in-class component of the DQE is intended to explore the student's grasp of core principles and their application to a specific field of study.

   The examination consists of one or more general questions addressing the understanding of general environmental health issues, methodologies and models, including areas of biostatistics and epidemiology where appropriate. It usually comprises less than half of the total content of the examination.

   The major portion of the in-class examination contains questions from subject matter covered in the more advanced courses taken by the student in their chosen major area of study.

   b. At the conclusion of the last in-class component the student begins the *take-home* component, which is completed within 3-4 days. Specific instructions are provided. For this component, students are expected to work independently but can utilize notes, textbooks, literature, and other appropriate resources.

   The take-home portion provides an opportunity for students to more carefully consider and present their answers. Questions for this section will focus on the student's ability to synthesize information, compare and contrast different views on a subject, devise rational and well-supported conclusions, provide constructive critique of published work, and devise appropriate hypotheses and experiments to support them. The use of verbatim descriptions from previously published materials (including course notes, internet resources, journal articles, books, etc.) is not allowed. Students should identify previously published materials, ideas, and/or experimental designs used to prepare their answers and provide citations to the sources of such material in their responses. Responses from the take-home portion of the examination are to be typed, double-spaced, single-sided and neatly presented. Specific instructions for format, length, content and timetable for completion will be included with the examination.

   *Evidence of collaboration, consultation with other individuals, verbatim use of reference materials, or plagiarism will result in a failure of the exam and a recommendation for dismissal from the doctoral program.*

Department of Environmental Health Sciences 2014-2015

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2. Question Format

All students will receive the same questions in the DQE. At least three (typically more) different faculty members contribute questions to any given exam.

The DQE is not intended to be a re-evaluation of the coursework but will be derived from them and should reflect the outcomes expected from those courses. Students should be able to demonstrate an understanding of the basic principles underlying environmental health sciences and his/her major area of study, as well as the ability to apply such principles to problem-solving.

The questions are intended to evaluate the ability to synthesis information, develop hypotheses, devise experiments to test hypotheses, interpret data, and to express these outcomes in writing. Acceptable responses to questions should demonstrate an understanding of concepts, methodologies and practices germane to the subject areas.

Specific questions for the qualifying examination are solicited from the appropriate departmental faculty. Students can expect questions related to core courses in biostatistics, epidemiology and general environmental health as well as questions based on subject matter from higher-level courses that they have taken.

The in-house and take-home portions of the examination will not differ significantly in their overall attempt to evaluate the student's ability to think critically, synthesize information, and apply principles. Some questions may not have a single "correct" answer but instead will challenge students to propose possible solutions and support them with appropriate facts and rational arguments.

The questions are scored by the faculty members who devised them and the scores are tallied and reviewed by the EHS Academic Degree Programs Committee.

3. All examinees are identified using a double-blind system. Each answer is evaluated by the faculty member who wrote the question and assigned a numerical score from 0-100 (100 being a perfect score). A score of 70% is considered the minimum required to get full credit for any specific question. It is expected that a student will achieve an average score of at least 80% on all questions to pass the DQE unconditionally. Faculty members will submit graded exams questions to the EHS Academic Degree Programs Committee within two weeks of the exam. Where a student has done particularly poorly on a question, the faculty member is expected to provide explanatory text. Numerical scores are collated and assessed individually and collectively by the Doctoral Committee and the student is assigned one of the following DQE outcomes:

a. **Pass** – Meets expectations for the exam
b. **Conditional Pass** – Deficiencies or errors noted, but overall response may be acceptable pending supplemental evaluation.
c. **Fail** – Does not meet expectations for doctoral level work due to critical deficiencies or errors
The Committee may take supplementary information into account such as independent studies, research reports, papers, references, or any other supportive documentation determining the potential for doctoral study. The final decision requires consensus among all members of the EHS Academic Degree Programs Committee. DQE scores and the Committee's decision should be communicated to the student within four weeks of completing the exam.
# Department of Environmental Health Sciences

## Request to Take Preliminary Examination (Ph.D.)

**Date of Examination:**

**Time:**

**Place:**

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<thead>
<tr>
<th>Name</th>
<th>Uniname</th>
<th>ID Number</th>
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</table>

**Home address:**

**Proposal Title:**

---

Attach a copy of proposed research and send an electronic version to Susan Crawford (sac@umich.edu).

### Committee Members

<table>
<thead>
<tr>
<th>Name</th>
<th>Rank</th>
<th>Dept/Unit</th>
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</thead>
<tbody>
<tr>
<td>Chair/Co-Chair:</td>
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<td>Chair/Co-Chair:</td>
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<td>Cognate:</td>
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<tr>
<td>Member*:</td>
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</tbody>
</table>

*If a member is not a regular member of the graduate faculty, please attach the special nomination form found on the Rackham degree website. Include all attachments.

---

**Approved By:**

**Dissertation Advisor:** ____________________________  **Date:** __________

**Dissertation Co-Advisor:** ____________________________  **Date:** __________

**EHS Doctoral Committee Chair:** ____________________________  **Date:** __________
EHS - Preliminary Examination

Purpose of the Examination

The purpose of the Preliminary Examination in the EHS Department is to

1) assess whether the student has sufficient knowledge, skills, and preparation to effectively pursue his/her chosen area(s) of doctoral research, and
2) determine if the proposed research is of sufficient scope and rigor to make a significant, original contribution to the state-of-the-art in the field.

The doctoral Preliminary Examination requires

1) a formal written research proposal, and
2) an oral presentation/defense.

The primary criteria used to determine if the student has passed the Examination are, thus, the quality of the written proposal and the presentation, evidence of sufficient preparation of the student, and the quality/scope of work proposed. Secondary criteria include the reasonableness of the timeline, and the availability of adequate resources.

Conduct of the Examination

In general, the Preliminary Examination should be completed within a 2-hr period of time. Following brief introductions, the student is normally excused and the committee members select an Examination Chairperson, review the purpose of the Examination, the student’s progress in the doctoral program to date, the quality of the written proposal, and the ground rules for questioning during the Examination, which may vary depending on the preferences of the committee members. Next, the student gives the presentation and fields questions from the committee members, and then the student is, again, excused while the committee members make their assessment and discuss the elements of the Examination in an effort to reach consensus. The decision should be unanimous and the student given a verbal synopsis of the evaluation by the committee Chairperson prior to adjournment.

It is expected that the student’s primary advisor will be present but will refrain from participating in the Examination except in matters of clarification, or where it is otherwise appropriate. Accordingly, the second (or third) member of the committee representing the EHS Department is expected to preside over the proceedings (i.e., serve as the default Examination Chairperson) to ensure that the student’s performance is properly and fairly assessed, and to solicit critical input from the other committee members. During post-questioning committee deliberations, the primary advisor may provide input but should temper his or her opinions in such a way as to avoid unduly influencing the process or the outcome.
**Outcome of the Examination**

There are three possible outcomes of the Preliminary Examination: unconditional pass, conditional pass, and fail.

In order to pass unconditionally, the written proposal, the oral presentation, the evidence for proper preparation of the student to perform the research, and the timeline and resources must all be deemed sufficient to merit approval by all of the committee members. Some leeway should be allowed on the latter two criteria. The committee should feel free to suggest (and document) actions to be taken by the student to promote success, regardless of the decision to pass the student unconditionally.

A conditional pass is to be awarded, where merited, in cases where one of the primary criteria is not met, but the student otherwise demonstrates evidence of likely success. In this case, sufficient comments should be written on the evaluation form, prior to adjournment, to explain/rationalize the decision in terms understandable to the primary advisor, the student, and the ADP Committee. The remediation action required of the student should be defined along with a target date for completion that is commensurate with the nature/scope of the remediation. Subsequent approval by the (entire) committee may require another meeting or may be obtained by teleconference or by electronic mail. Upon approval, the student will be considered to have passed the Examination.

Failure to meet two or more of the primary criteria is generally considered grounds for a decision to fail the student. If the student fails the Preliminary Examination, the committee may recommend to the ADP Committee that he/she terminate the degree program or they may invite the student to re-take the Examination not less than 3 months after addressing the deficiencies leading to this decision. As with the conditional pass decision, sufficient comments should be written on the evaluation form, prior to adjournment, to explain/rationalize the decision in terms understandable to the primary advisor, the student, and the ADP Committee. A follow-up meeting of the committee with the student is required wherein the student will be re-examined and another decision rendered. An unconditional or conditional pass must be documented as described above, along with any additional requirements or recommendations. A decision to fail the student a second time will, barring extenuating circumstances, result in the student being dismissed from the program.
# Department of Environmental Health Sciences

## Preliminary Examination Recommendation (Ph.D.)

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<td>Preliminary Exam Date:</td>
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<td>Proposal Title:</td>
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The consensus of the student's Preliminary Examination Committee with regard to the following criteria is:

- **Scope of work proposed:**
  - [ ] Satisfactory
  - [ ] Unsatisfactory (explain)

- **Quality/nigir of work proposed:**
  - [ ] Satisfactory
  - [ ] Unsatisfactory (explain)

- **Quality of the presentation:**
  - [ ] Satisfactory
  - [ ] Unsatisfactory (explain)

- **Preparation of the student:**
  - [ ] Satisfactory
  - [ ] Unsatisfactory (explain)

- **Timeframe and resources:**
  - [ ] Satisfactory
  - [ ] Unsatisfactory (explain)
The consensus of the student's Preliminary Examination Committee is that the student has:

☐ PASSED  ☐ CONDITIONALLY PASSED  ☐ DID NOT PASS

the oral preliminary exam on the above date. Comments, recommendations, requirements (obligatory for 'conditionally pass' or 'did not pass'):

The undersigned faculty participated in the examination.

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ATTACHMENT 4
Pre-Defense Data Meeting

Department of Environmental Health Sciences

Student Name: __________________________  Student ID#: __________________________  Date: __________________________

Evaluation of the research results presented by the candidate:
- Objectives/Aims of Research: □ Satisfactory □ Unsatisfactory
- Command of topics: □ Satisfactory □ Unsatisfactory
- Novelty of research: □ Satisfactory □ Unsatisfactory
- Quality/Quantity of research: □ Satisfactory □ Unsatisfactory

Suggestions/Comments:
______________________________________________________________
______________________________________________________________
______________________________________________________________
______________________________________________________________

The Dissertation Committee recommends the student write his/her dissertation: □ YES □ NO

If no, provide a list of major concerns, specific recommendations for further research work, or other requirements set by the Dissertation Committee. Attach additional sheets if necessary.
______________________________________________________________
______________________________________________________________
______________________________________________________________
______________________________________________________________

Signatures of all Committee members indicate approval of the requirements listed above.

Name (printed)          Signature
Chair/Co-Chair: __________________________
Chair/Co-Chair: __________________________
Cognate: __________________________
Member: __________________________
Member: __________________________
Member: __________________________
ATTACHMENT 5

Doctoral Progress Report
Annual Feedback of EHS Doctoral Students

Students complete an annual progress report in the doctoral program beginning in their first year. The purpose of this report is to facilitate interactions between students and their thesis mentors by providing specific feedback on student progress toward the Ph.D. The following procedures will be followed:

**DOCTORAL PRE-CANDIDATES:**
It is understood that you may not yet have identified a Faculty Mentor for your doctoral dissertation research, and in this case, you should confer with your assigned Faculty Mentor (who may or may not become your Faculty Research Mentor). It is understood that sections of this feedback form (both self-reports by the student and assessments by faculty mentor) may not apply to you or may be filled with minimal information.

**DOCTORAL CANDIDATES:**
It is expected for you to complete all sections, discuss with your Faculty Mentor, and submit duly to Sue Crawford.

**TIMING:**

By March 15 of this year, faculty mentors and their students will complete the attached form evaluating the progress of each student. A critical component of the evaluation is the student’s summary of research progress and goals that is submitted with the form.

The progress report will be reviewed by a departmental committee. The committee will provide specific feedback regarding the student’s progress, including possible remediation, before April 30 of the year.
To be completed by student

I. Candidate Information

A. Year Started PhD Program:

B. Date (or projected date) of Satisfactory Completion of DQE:

C. Term (or projected term) of Preliminary Exam:

D. Term (or projected term) of Data Meeting:

E. Projected Semester and Year of Dissertation Defense:

II. Funding:

1. Type of funding (i.e. GSRA, GSI, Fellowship) and source of funding

   Current year funding

   Fall:

   Winter:

   Spr/Sum:

   Proposed NEXT year funding

   Fall:

   Winter:

   Spr/Sum:

III. Research Progress (provide as an attachment)

1. Summarize briefly, in bullet style, your major research accomplishments. Include a list of all publications and presentations, marking new listings with an asterisk (*).

2. Briefly state the previous year’s plan. Describe how the past year’s research accomplishments fit within the goals of the previous year’s plan and how they relate to your dissertation objectives (two page double spaced limit).

3. Summarize in bullet style your primary research goals for the upcoming year. Under each goal describe its importance to your dissertation and future publications and include a strategy on how to plan to accomplish that goal (two page double spaced limit).

4. ONLY for pre-candidates in our PhD program (those who have not successfully completed the DQE): please provide a list of the coursework you have taken thus far, and a plan for your remaining coursework (which courses and when you plan to take them). For all courses, indicate whether they are required or elective. Note, PhD candidates do NOT need to complete this section.
**Self Evaluation of Student (to be completed by student)**

Describe your research progress and performance during the past year. Please provide specific comments and suggestions on the following to the extent possible:

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<tr>
<th>Category</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>NB</th>
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<tr>
<td>a) research skills (literature background, experimental design, focus,</td>
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<td>technique, ingenuity, productivity)</td>
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<td>4</td>
<td>NB</td>
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<td>b) communication (written, oral)</td>
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<td>c) presentation (informal, formal)</td>
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<tr>
<td>d) teaching/mentorship of fellow students</td>
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<td>e) coursework (sufficient foundation for research?)</td>
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<td>e) Community/committee service (leadership, volunteer, etc.)</td>
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</table>
Self Evaluation of Student *(to be completed by student)*

Do you have deficiencies or other obstacles that could hinder progress toward obtaining your degree? If so, describe them as well as the suggested remedial action.

Additional Comments and Suggestions

Do you think you are making good progress towards the completion of your doctoral degree?

YES     MARGINAL     NO

*If you indicate you are making marginal or no progress, please indicate your concerns here*

Signature of Student

Date

Mentor Name:______________________

Student Name:______________________
Evaluation by Faculty Mentor

Describe the candidate's research progress and performance during the past year. Please provide specific advice and suggestions on the following to the extent possible:

1 – Outstanding; 2 Satisfactory; 3 - Needs Improvement; 4 - Unsatisfactory; NB - No Basis for Judgment

a) research skills (literature background, experimental design, focus, technique, ingenuity, productivity)

b) communication (written, oral)

c) presentation (informal, formal)

d) teaching/mentorship of fellow students

e) coursework (sufficient foundation for research?)

e) Community/committee service (leadership, volunteer, etc.)

Mentor Name: _______________________

Student Name: _______________________

Department of Environmental Health Sciences 2014-2015
Evaluation by Faculty Mentor

Does the candidate have deficiencies or other obstacles that could hinder progress toward obtaining her/his degree? If so, describe them as well as the suggested remedial action.

Additional Comments and Suggestions

Progress toward Degree

a) Is the student making good progress towards completing their doctoral degree?

   YES       MARGINAL       NO

   If the student is making marginal or no progress, please indicate your concerns here

b) I met with the student on _______________________ to discuss progress.

   Date

To be signed jointly by both student and faculty mentor after reviewing the student report, student self-evaluation and faculty mentor evaluation.

Signature of Student  Date  Signature of Faculty Mentor  Date

Department of Environmental Health Sciences  2014-2015
APPENDIX C

Additional Forms

BIC Plan
BIC Request for Exemption or Special Substitution Form
Departmental Request for Exemption or Special Substitution Form
Course Tracker for Tailored MPH Program
DEPARTMENT OF ENVIRONMENTAL HEALTH SCIENCES  
SCHOOL OF PUBLIC HEALTH  
BREADTH, INTEGRATION AND CAPSTONE (BIC)

<table>
<thead>
<tr>
<th>Student’s Name</th>
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<tr>
<th>I.D.#</th>
<th>Enrolled (First Term)</th>
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<th>Advisor</th>
<th>Sub-Plan</th>
<th>EQH</th>
<th>HN</th>
<th>IH</th>
<th>OEE</th>
<th>TX</th>
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□ EQR □ HN □ IH □ OEE □ TX
□ HN (Dietetics)

---

**METHODOLOGICAL CORE**

Select one from each of the following areas:

### Biostatistics
- BIOSTAT 553 Applied Biostatistics
- OTHER (attach exemption form)

### Epidemiology
- EPID 503 Strategies & Uses of Epidemiology
- EPID 601 Principles and Methods of Epidemiology
- OTHER (attach exemption form)

---

**BREADTH AND INTEGRATION and CAPSTONE (BIC)**

Select one from each of the following areas:

#### Environmental Health Sciences
- EHS 550 Principles of Occupational & Environmental Hygiene
- EHS 601 Foundations in Env Hlth Sciences
- PUBHLTH 600 Cross-Disp Approaches
- OTHER (attach exemption form)

#### Health Behavior and Health Education
- HBHE 500 Behavioral and Social Science Foundations for the Health Professional
- HBHE 503 Introduction to Health Behavior Theory and Approaches
- PUBHLTH 600 Cross-Disp Approaches
- OTHER (attach exemption form)

#### Health Management and Policy
- HMP 602 Medical Care Organization and Delivery
- HMP 653 Law and Public Health
- HMP 685 The Politics of Health Policy
- PUBHLTH 600 Cross-Disp Approaches
- OTHER (attach exemption form)

#### Capstone
- EHS 600 Professional Perspectives in Env Health
- OTHER (attach exemption form)

---

APPROVED: ____________________________  ________
EHS Department                Date

Department of Environmental Health Sciences  2014-2015
### Department of Environmental Health Sciences
#### School of Public Health

**Breadth, Integration and Capstone (BIC)**

**REQUEST FOR SUBSTITUTION**

- **Student Name:**
- **Uniqname:**
- **Date:**
- **Student ID#:**
- **Enrolled (First Term):**
- **TERM**
- **YEAR**
- **Sub-Plan:**
  - [ ] EQH
  - [ ] HN
  - [ ] IH
  - [ ] IH/HSAT
  - [ ] OEE
  - [ ] TX
  - [ ] RS
  - [ ] HN (Dietetics)
- **Advisor:**
- **Area in which exemption or special substitution is requested:**
  - [ ] Health Behavior & Health Education
  - [ ] Health Management and Policy
  - [ ] Environmental Health Sciences
  - [ ] Capstone
- **Student Signature:**
- **Date:**
- **Advisor Signature:**
- **Date:**

---

**Complete all relevant parts (attach additional materials as required):**

#### A. Relevant course(s) completed or course(s) to be substituted

<table>
<thead>
<tr>
<th>Institution</th>
<th>Department</th>
<th>Course Number</th>
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<th>Credit Hours</th>
<th>Semester or Quarter</th>
<th>Grade</th>
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#### B. Other

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- [ ] Approved
- [ ] Disapproved

**EHS Academic/Professional Degree Committee Chair**

**Comments:**

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Revised: 6/2011

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# SPH Required Courses

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<th>CREDITS</th>
<th>NOTES</th>
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<tr>
<td></td>
<td>Biostat required course – one of BIOSTAT 553</td>
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<tr>
<td>BIOSTAT 553</td>
<td><em>Applied Biostatistics</em></td>
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<td></td>
<td>Epidemiology required course – one of EPID 503 or EPID 601</td>
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<td>EPID 503</td>
<td><em>Strategies and uses of epidemiology</em></td>
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<td>Breadth &amp; Integration Required courses – PUBHLTH 600 or approved courses in HBHE and HMP</td>
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# EHS Required Course

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<td>EHS 601</td>
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<td>EHS 602</td>
<td><em>Environmental Health Policy</em></td>
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<td>EHS 688</td>
<td><em>Topics in EHS</em></td>
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<tr>
<td>BIOSTAT 513</td>
<td><em>App of regression anal to PH studies</em></td>
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<tr>
<td>BIOSTAT 523</td>
<td><em>Biostatistical Analysis for Health-Related Studies</em></td>
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# Field Experience

| Organization: |
| Brief description of placement: |

| Credits to be claimed for hours worked: |
Cluster One

Cluster Title: 
Description: 

Outcomes (competencies). On completing these courses I expect to be able to:

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Cluster One courses:

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Cluster Two

Cluster Title: 
Description: 

Outcomes (competencies). On completing these courses I expect to be able to:

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Cluster Two courses:

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2 Include a very brief summary of the course and The specific outcomes it addresses (e.g. ‘This course addresses outcomes #2, #3 and #4)
Cluster Three

| Cluster Title: | |
| Description: | |

**Outcomes (competencies).** On completing these courses I expect to be able to:

| #1 | |
| #2 | |
| #3 | |
| #4 | |

**Cluster Three courses:**

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**Electives**

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**Total credits:** _____

Supervisor approval: Date:

PDP approval: Date: