

EHS
PROGRAM
CURRICULA

2006 - 2007 Academic Year

*Department of Environmental Health Sciences
The University of Michigan
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Ann Arbor, Michigan 48109-2029*

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SCHOOL OF PUBLIC HEALTH (SPH) REQUIREMENTS

All students regardless of degree program (i.e. M.S., M.P.H., M.H.S.A, Dr.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

1. The normal route to fill the Biostatistics requirement will be one of the following three options.
 - Option 1 The student will complete either Biostatistics 503 or 553, depending upon his/her preparation offered only in the Fall Term.
 - Option 2 The student will complete Statistics 400, an upper level undergraduate course offered by the College of Literature, Sciences and Arts
 - Option 3 The student will complete both Biostatistics 650 and 651
2. Students may be exempted from the Biostatistics requirement under the following procedures:
 1. Students who have satisfactorily completed one of the options above or Statistics 350 (B or better grade) at the University of Michigan within the last five years are exempt from this requirement.
 2. Students who pass an exemption examination offered and graded by the faculty of Biostatistics will be exempted from the requirement.
 3. Students who are enrolled in other degree programs on campus, which have statistics requirements may be able to substitute such requirements but only in consultation and with prior approval from the current Biostatistics 503 faculty member.

B. Epidemiology

1. The Epidemiology requirement will be fulfilled only by the completion of the one of the following two options.
 - Option 1 Epidemiology 503, Epidemiology 600 or Epidemiology 601
 - Option 2 Successful completion of the epidemiology exemption examination

MASTER OF PUBLIC HEALTH (MPH) Environmental Health Sciences

School of Public Health Core Requirements

Select one of the following

BIOSTAT 503	(4)	Introduction to Biostatistics
BIOSTAT 553	(4)	Applied Biostatistics
STAT 400	(4)	Applied Statistical Methods

NOTE: U of Michigan STAT 350 will meet this requirement if it has been taken within the last 5 years and a B or better was achieved.

Select one of the following

EPID 503	(3)	Strategies and Uses of Epidemiology
EPID 600	(3)	Introduction to 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 501	(2)	Occupational and Environmental Disease
EHS 506	(2)	Principles of Toxicology
EHS 507	(2)	Principles of Exposure Assessment
EHS 508	(2)	Principles of Risk Assessment
EHS 600	(1)	Professional Perspectives in Environmental Health
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)

Students who have selected one of the designated sub-plans (Hazardous Substances, Human Nutrition, Industrial Hygiene, Occupational and Environmental Epidemiology, and/or Toxicology) need to complete the required SPH Core cores, EHS departmental core courses and the required subplan courses. Remaining courses to meet your credit hour requirement (i.e. 60 hrs) can be selected from other graduate courses in the department, school or university.

Students who do not select a designated sub-plan are required to complete a minimum of 20 credits within the department from Table 1. Of the 20 credit hours required, a maximum of 8 credit hours can be 500 level courses.

TABLE 1 List of approved departmental courses for students who do not have a designated subplan:

Course No	Course Title	Credit Hrs
EHS 540	Maternal and Child Nutrition	2
EHS 550	Introduction to Occ & Environ Health	3
EHS 570	Water Quality Management	3
EHS 572	Environmental Impact Assessment	2
EHS 574	Environmental Chemistry	3
EHS 582	Principles of Community Air Pollution	3
EHS 612	Biochemical & Molecular Toxicology	3
EHS 616	Toxicology Pathology	2
EHS 622	Mechanisms of Developmental Toxicology	2
EHS 623	Mechanisms of Reproductive Toxicology	2
EHS 624	Mechanisms of Neurotoxicology	2
EHS 625	Environment & the Immune Response	2
EHS 630	Principles of Nutritional Sciences	4
EHS 643	Food & Nutrition Policy & Programs	3
EHS 645	Nutritional Education: Theory & Practice	3
EHS 652	Evaluation of Chemical Hazards	3
EHS 653	Chem Exp Measuremnts & Cntrl Lab	3
EHS 654	Ventilation for Contaminant Cntrl	3
EHS 656	Res Methods in Occup & Environ Health	3
EHS 657	Advanced Exposure Assessment	3
EHS 680	Env Management Hazardous Substances	3

EHS Subplan Core Requirements

Hazardous Substances

EHS 550	(3)	Principles of Industrial Hygiene
EHS 581	(1)	Principles of Radiological Health
EHS 556	(3)	Occupational Ergonomics
EHS 574	(3)	Environmental Chemistry
EHS 570	(3)	Water Quality Management
EHS 572	(2)	Environmental Impact Assessment
EHS 652	(3)	Evaluation of Chemical Hazards
EHS 653	(3)	Environmental Sampling and Analysis Laboratory
EHS 654	(3)	Ventilation for Contaminant Control
EHS 658	(1)	Physical Hazards
EHS 668	(1)	Professional Seminars in Occupational Health
EHS 757	(2)	Occupational Health Aspects of Industrial Processes
IOE 539	(3)	Occupational Safety Engineering

Must select two (2) of the following

EHS 680	(3)	Environmental Management Hazardous Substances
ENSCEN 686	(2)	Environmental Sustainability
NRE 537	(3)	Industrial Ecology
NRE 595	(3)	Risk Benefit Analysis

Human Nutrition

Pre-Enrollment Requirements

BIOCHEM 415	(3)	Introduction to Biochemistry (or equivalent)
PHYSIO 502	(4)	Human Physiology (or equivalent)
EHS 630	(4)	Principles of Nutritional Science
EHS 636	(2)	Clinical Nutrition
EHS 637	(2)	Advanced Clinical Nutrition
EHS 640	(3)	Nutrition Assessment
EHS 642	(3)	Community Nutrition
EHS 643	(3)	Food & Nutrition Policy & Programs
EHS 647	(1)	Seminar in Nutrition

Industrial Hygiene

EHS 550	(3)	Principles of Industrial Hygiene
EHS 556	(2)	Occupational Ergonomics
EHS 581	(1)	Principles of Radiological Health
EHS 652	(3)	Evaluation of Chemical Hazards
EHS 653	(3)	Environmental Sampling and Analysis Laboratory
EHS 654	(3)	Ventilation for Contaminant Control
EHS 658	(1)	Physical Hazards
EHS 668	(1)	Professional Seminars in Occupational Health
EHS 757	(2)	Occupational Health Aspects of Industrial Processes
IOE 539	(3)	Occupational Safety Engineering

Occupational and Environmental Epidemiology

BIOSTAT 510	(3)	Statistical Computer Program Packages
BIOSTAT 523	(3)	Biostatistical Analysis for Health-Related Studies
BIOSTAT 560	(4)	Statistical Methods in Epidemiology
EHS 656	(3)	Research Methods in Occupational and Environmental Health
EHS 659	(1)	Occupational Injury Prevention Seminar
EHS 656	(3)	Research Methods in Occupational and Environmental Health
EHS 659	(1)	Occupational Injury Prevention Seminar
EHS 670	(3)	Applications in Environmental Epidemiology
EPID 600	(3)	Introduction to Epidemiology
EPID 601	(4)	Principles and Methods in Epidemiology
EPID 655	(5)	Field Studies in Epidemiology

Toxicology

BIOCHEM 515	(3)	Introductory Biological Chemistry
<i>Must select two (2) of the following</i>		
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 612	(3)	Biochemical and Molecular Toxicology
EHS 616	(2)	Toxicologic Pathology
EHS 628	(1)	Toxicology Research Analysis and Presentation ¹
EHS 697	(1)	Readings ¹

NOTE: ¹EHS 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

Select one of the following

BIOSTAT 503	(4)	Introduction to Biostatistics
BIOSTAT 553	(4)	Applied Biostatistics
STAT 400	(4)	Applied Statistical Methods

NOTE: U of Michigan STAT 350 will meet this requirement if it has been taken within the last 5 years and a B or better was achieved.

Select one of the following

EPID 503	(3)	Strategies and Uses of Epidemiology
EPID 600	(3)	Introduction to 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 507	(2)	Exposure Assessment
EHS 600	(1)	Professional Perspectives in Environmental Health
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)

Nutrition – Dietetics (DPD)

Nutrition

EHS 540	(2)	Maternal/Child Nutrition
EHS 547	(3)	Food Sciences
EHS 585	(3)	Food Safety
EHS 630	(4)	Principles of Nutritional Science
EHS 631	(4)	Advanced Nutrition Sciences
EHS 636	(2)	Clinical Nutrition
EHS 637	(2)	Advanced Clinical Nutrition
EHS 639	(3)	Obesity/Eating Disorders
EHS 640	(3)	Nutrition Assessment
EHS 642	(3)	Community Nutrition
EHS 643	(3)	Food & Nutrition Policy & Programs
EHS 645	(3)	Nutrition Education
EHS 647	(1)	Seminar in Nutrition

Management

Must select one (1) of the following:

HMP 602	(4)	Survey US Health Care Systems
HMP 617	(3)	Public Health Administration
HMP 643	(3)	Behavior in Health Organizations

Health Behavior

HBHE 600	(3)	Psychosocial Factors in Health Behavior
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MASTER OF SCIENCE (MS) Environmental Health Sciences (EHS)

SPH Core Requirements

Select one of the following

BIOSTAT 503	(4)	Introduction to Biostatistics
BIOSTAT 553	(4)	Applied Biostatistics
STAT 400	(4)	Applied Statistical Methods

NOTE: U of Michigan STAT 350 will meet this requirement if it has been taken within the last 5 years and a B or better was achieved.

Select one of the following

EPID 503	(3)	Strategies and Uses of Epidemiology
EPID 600	(3)	Introduction to 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

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

*Students enroll each Fall term.

EHS Core Requirements

EHS 501	(2)	Occupational and Environmental Disease
EHS 506	(2)	Principles of Toxicology
EHS 507	(2)	Principles of Exposure Assessment
EHS 508	(2)	Principles of Risk Assessment
EHS 570	(3)	Water Quality Management
EHS 572	(2)	Environmental Impact Assessment
EHS 574	(3)	Environmental Chemistry
EHS 582	(3)	Principles of Community Air Pollution

Electives - Each student must take 6 credit hours of graduate courses. Electives should be approved by the student's advisor.

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).

MASTER OF SCIENCE (MS) Nutritional Sciences (NS)

Pre-Enrollment Requirements

BIOCHEM 415	(3)	Introduction to Biochemistry (or equivalent)
PHYSIO 502	(4)	Human Physiology (or equivalent)

SPH Core Requirements

Select one of the following

BIOSTAT 503	(4)	Introduction to Biostatistics
BIOSTAT 553	(4)	Applied Biostatistics
STAT 400	(4)	Applied Statistical Methods

NOTE: U of Michigan STAT 350 will meet this requirement if it has been taken within the last 5 years and a B or better was achieved.

Select one of the following

EPID 503	(3)	Strategies and Uses of Epidemiology
EPID 600	(3)	Introduction to 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

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

NS Core Requirements

EHS 630	(4)	Principles of Nutritional Science
EHS 631	(4)	Advanced Nutritional Science
EHS 647	(1)	Seminar in Nutrition

Recommended Electives

EHS 540	(3)	Maternal and Child Nutrition
EHS 547	(3)	Food Science
EHS 636	(2)	Clinical Nutrition
EHS 637	(2)	Advanced Clinical Nutrition
EHS 639	(3)	Obesity and Eating Disorders
EHS 640	(2)	Nutrition Assessment
EPID 623	(3)	Nutritional Epidemiology

Electives – Each student must choose at least **two electives** (minimum 2 credits per elective). These may be from other nutrition courses offered in the program, or from courses in areas such as exercise physiology, pharmacology or toxicology. Electives should be approved by the student's advisor.

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).

MASTER OF SCIENCE

Industrial Health (Industrial Hygiene)

SPH Core Requirements

Select one of the following

BIOSTAT 503	(4)	Introduction to Biostatistics
BIOSTAT 553	(4)	Applied Biostatistics
STAT 400	(4)	Applied Statistical Methods

NOTE: U of Michigan STAT 350 will meet this requirement if it has been taken within the last 5 years and a B or better was achieved.

Select one of the following

EPID 503	(3)	Strategies and Uses of Epidemiology
EPID 600	(3)	Introduction to 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

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

IH Core Requirements

EHS 501	(2)	Occupational and Environmental Disease
EHS 506	(2)	Principles of Toxicology
EHS 550	(3)	Principles of Industrial Hygiene
EHS 556	(2)	Occupational Ergonomics
EHS 652	(3)	Evaluation of Chemical Hazards
EHS 653	(3)	Environmental Sampling and Analysis Laboratory
EHS 654	(3)	Ventilation for Contaminant Control
EHS 657	(3)	Advanced Exposure Assessment
EHS 658	(1)	Physical Hazards
EHS 668	(1)	Professional Seminars in Occupational Health

Electives – Each student must choose at least **two electives** (minimum 2 credits per elective). One of these courses must be a course outside the EHS department. Electives should be approved by the student's advisor.

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).

MASTER OF SCIENCE (MS) Toxicology (TOX)

SPH Core Requirements

Select one of the following

BIOSTAT 503	(4)	Introduction to Biostatistics
BIOSTAT 553	(4)	Applied Biostatistics
STAT 400	(4)	Applied Statistical Methods

NOTE: U of Michigan STAT 350 will meet this requirement if it has been taken within the last 5 years and a B or better was achieved.

Select one of the following

EPID 503	(3)	Strategies and Uses of Epidemiology
EPID 600	(3)	Introduction to Epidemiology
EPID 601	(4)	Principles and Methods in Epidemiology

EHS Core Requirements

EHS 506	(2)	Principles of Toxicology
EHS 688	(1)	Topics in Environmental Health Sciences
EHS 698	(3)	Research
EHS 699	(1)	Masters Thesis

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

TOX Core Requirements²

EHS 612	(3)	Biochemical and Molecular Toxicology
EHS 616	(2)	Toxicologic Pathology

Must 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 628	(1)	Toxicology Research Analysis and Presentation ¹
EHS 697	(1)	Readings ¹
EHS 698	(3)	Research ²
EHS 717	(1)	Toxicological Pathology Laboratory

Must select two (2) of the following

CDB 530	Cell Biology
HG 541	Molecular Genetics
BCHM 550	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).

¹EHS 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

²Students 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.

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

SPH Course Requirements

Select one of the following

BIOSTAT 503	(4)	Introduction to Biostatistics
BIOSTAT 553	(4)	Applied Biostatistics
STAT 400	(4)	Applied Statistical Methods

NOTE: U of Michigan STAT 350 will meet this requirement if it has been taken within the last 5 years and a B or better was achieved.

Select one of the following

EPID 503	(3)	Strategies and Uses of Epidemiology
EPID 600	(3)	Introduction to Epidemiology
EPID 601	(4)	Principles and Methods in Epidemiology

EHS Departmental Course Requirements

EHS 688	(1)	Topics in Environmental Health Sciences
EHS 899	(6)	Advanced Research
EHS 869	(1)	Doctoral Seminar in Environmental Health Sciences ¹

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

¹EHS 869 is a doctoral seminar that students register for until they have passed their DQE. Upon completion of their DQE, they will present a seminar once a year until completion of their doctoral program. It is expected that they will attend the seminars throughout their doctoral program but do not need to register after successfully passing the DQE.

Major Area Course Requirements

Environmental Health Sciences

EHS 507	(2)	Principles of Exposure Assessment
EHS 508	(2)	Principles of Risk Assessment
EHS 572	(2)	Environmental Impact Assessment
EHS 574	(3)	Environmental Chemistry

Minor Area Course Requirements

No formal course requirements for a minor area are required. However the student should have the equivalent of 5 credit hours of coursework. The student and academic advisor will submit to the Student Services office a plan stating the minor and how the student will meet course requirements whether by previous or current coursework. The Doctoral Committee will review and approve the plan. This should be done within the first term of enrollment.

DOCTOR OF PHILOSOPHY (Ph.D.)

Industrial Health

SPH Course Requirements

Select one of the following

BIOSTAT 503	(4)	Introduction to Biostatistics
BIOSTAT 553	(4)	Applied Biostatistics
STAT 400	(4)	Applied Statistical Methods

NOTE: If STAT 350 has been taken as an undergraduate within the last 5 years and a B or better was achieved, then this course will meet the biostatistics requirement.

Select one of the following

EPID 503	(3)	Strategies and Uses of Epidemiology
EPID 600	(3)	Introduction to Epidemiology
EPID 601	(4)	Principles and Methods in Epidemiology

EHS Department Course Requirements

EHS 688	(1)	Topics in Environmental Health Sciences
EHS 899	(6)	Advanced Research
EHS 869	(1)	Doctoral Seminar in Environmental Health Sciences ¹

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

¹EHS 869 is a doctoral seminar that students register for until they have passed their DQE. Upon completion of their DQE, they will present a seminar once a year until completion of their doctoral program. It is expected that they will attend the seminars throughout their doctoral program but do not need to register after successfully passing the DQE.

Major Area Course Requirements

Industrial Health

EHS 501	(2)	Occupational and Environmental Disease
EHS 507	(2)	Principles of Exposure Assessment

Must select one (1) of the following

EHS 550	(3)	Principles of Industrial Hygiene
EHS 652	(3)	Evaluation of Chemical Hazards
EHS 654	(3)	Ventilation of Contaminant Controls
EHS 556	(3)	Occupational Ergonomics

Minor Area Course Requirements

No formal course requirements for a minor area are required. However the student should have the equivalent of 5 credit hours of coursework. The student and academic advisor will submit to the Student Services office a plan stating the minor and how the student will meet course requirements whether by previous or current coursework. The Doctoral Committee will review and approve the plan. This should be done within the first term of enrollment.

DOCTOR OF PHILOSOPHY (Ph.D.) Toxicology

SPH Course Requirements

Select one of the following

BIOSTAT 503	(4)	Introduction to Biostatistics
BIOSTAT 553	(4)	Applied Biostatistics
STAT 400	(4)	Applied Statistical Methods

NOTE: U of Michigan STAT 350 will meet this requirement if it has been taken within the last 5 years and a B or better was achieved.

Select one of the following

EPID 503	(3)	Strategies and Uses of Epidemiology
EPID 600	(3)	Introduction to Epidemiology
EPID 601	(4)	Principles and Methods in Epidemiology

EHS Departmental Course Requirements

EHS 688	(1)	Topics in Environmental Health Sciences
EHS 899	(6)	Advanced Research
EHS 869	(1)	Doctoral Seminar in Environmental Health Sciences ¹

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

¹EHS 869 is a doctoral seminar that students register for until they have passed their DQE. Upon completion of their DQE, they will present a seminar once a year until completion of their doctoral program. It is expected that they will attend the seminars throughout their doctoral program but do not need to register after successfully passing the DQE.

Major Area Course Requirements

Toxicology

EHS 506	(2)	Principles of Toxicology
EHS 612	(3)	Biochemical and Molecular Toxicology
EHS 616	(2)	Toxicologic Pathology
EHS 717	(1)	Toxicological Pathology Laboratory

Must select one (1) of the following

EHS 620	(2)	Mechanisms of Endocrine Toxicology & Hormone Metabolism
EHS 621	(3)	Mechanisms of Carcinogenesis
EHS 622	(2)	Mechanisms of Developmental Toxicology
EHS 623	(2)	Mechanisms of Reproductive Toxicology
EHS 624	(2)	Mechanisms of Neurotoxicology

Must select two (2) of the following:

BIOCHEM 550	(3)	Protein Structure and Function
HG 541	(3)	Molecular Genetics
CDB 530	(3)	Cell Biology

**SCHOOL OF PUBLIC HEALTH
ENVIRONMENTAL HEALTH SCIENCES**
Breadth, Integration and Capstone Requirements
for the degree
MASTER OF PUBLIC HEALTH
2006-2007

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. Individual plans for BIC, which are to be developed by each student with his/her faculty advisor, must be filed on special forms with the EHS Office of Student Affairs within two weeks after enrollment. Any changes in the BIC plan also must be filed with the EHS Office of Student Affairs on forms provided by that office.

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 - collection, storage, retrieval, analysis and interpretation of health data; design and analysis of health-related surveys and experiments; and concepts and practice of statistical data analysis.

Epidemiology - distributions and determinants of disease, disabilities and death in human populations; the characteristics and dynamics of human populations; and the natural history of disease and biologic basis of health

Environmental health sciences - environmental factors including biological, physical and chemical factors which affect the health of a community.

Health services administration - planning, organization, administration, management, evaluation and policy analysis of health programs.

Social and behavioral sciences - concepts and methods of social behavioral sciences relevant to the identification and the solution of public health problems.

IV. COURSES REQUIREMENTS IN PUBLIC HEALTH

A. Methodological Core

1. Biostatistics (select one of the following)

BIOSTAT 503	(4)	Introduction to Biostatistics
BIOSTAT 553	(4)	Applied Biostatistics
STAT 400	(4)	Applied Statistical Methods

2. Epidemiology (select one of the following)

EPID 503	(3)	Strategies and Uses of Epidemiology
EPID 600	(3)	Introduction to Epidemiology
EPID 601	(4)	Principles and Methods of Epidemiology

B. Breadth and Integration

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

HBHE 600	(3)	Psychosocial Factors in Health Related Behavior
HBHE 615	(3)	Mass Media, Public Health Practice and Intervention
HBHE 622	(3)	Program Evaluation in Health Education
HBHE 631	(3)	Budget Practices in Health Education Programs
HBHE 640	(3)	Community Organization of Health Education
HBHE 667	(3)	Bioterrorism: Community Preparation and Response
HBHE 690	(3)	Environmental Health Education
HBHE 692	(3)	Women's Health and Reproductive Health

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

HMP 602	(4)	Medical Care Organization and Delivery
HMP 615	(3)	Introduction to Public Health Policy
HMP 617	(3)	Understanding Health Care Organizations
HMP 620	(3)	Understanding Structure & Management of Nonprofit Hlth Organizations
HMP 640	(3)	Program Evaluation in Public Health
HMP 643	(3)	Interpersonal Dynamics and Small Groups
HMP 653	(3)	Law and Public Health
HMP 675	(3)	Sociology of Medicine
HMP 677	(3)	Health Care Organizations: International Perspective
HMP 695	(3)	Public Health Policy Issues in Women's Health

3. Environmental Health Sciences (select one of the following)

EHS 501	(2)	Occupational and Environmental Disease
EHS 506	(2)	Principles of Toxicology
EHS 507	(2)	Principles of Exposure Assessment
EHS 508	(2)	Principles of Risk Assessment

C. Capstone

EHS 600	(1)	Professional Perspectives in Environmental Health
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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

Exemption from the Biostatistics component of BIC may be attained by the following procedures:

1. Students who have satisfactorily completed one of the options above or Statistics 350 (B or better grade) at the University of Michigan within the last five years are exempt from this requirement.
2. Students who pass an exemption examination offered and graded by the faculty of Biostatistics will be exempted from the requirement.
3. Students who are concurrently enrolled in other degree programs on campus, which have a statistics requirement may be able to substitute such requirements but only in consultation and with prior approval from the current Biostatistics 503 faculty member.

If you qualify for an exemption on the basis of prior course work, you must obtain an exemption form from the student services staff member in your department and have it signed by your department curriculum committee chair. After the exemption form is prepared and signed, the Biostatistics 503 instructor will also sign the exemption.

For those students in departments that require more than one course in biostatistics, completing 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.

C. Capstone

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

APPENDIX A

Masters Thesis Guidelines – Environmental Health
Masters Thesis Guidelines – Human Nutrition
Masters Thesis Guidelines – Toxicology

GUIDELINES AND PROCEDURES FOR MASTER OF SCIENCE THESIS IN ENVIRONMENTAL HEALTH

Introduction

A Master's thesis is required for the degree in Environmental Health based on a Master's project proposed and conducted by each student. The environmental health faculty conducts a formal process for these projects to familiarize students with the professional requirements such projects should meet. Most employers expect Masters level graduates to devise approaches to solve difficult and complex problems, to submit and obtain approval (or funding) for proposed work, to prepare a professional report or paper, and to respond to comments on the work done from various reviewers. A good thesis prepares them for this aspect of their professional work.

A thesis begins with a good idea. It can be part of ongoing research, in which some financial support may be available. Summer internships and work study can also provide content. The faculty expects the student to choose a topic of interest and of reasonable importance. The subject matter is the option of the student, but should generally deal with some issue in environmental health or protection. We can suggest areas, but the student still has the responsibility to select the specific project; to prepare a good proposal with defined objectives; to complete the work; and to write, present, and defend the results. Graduate students generally need guidance on the format and content of a proposal, which in many ways is the hardest part of the process - deciding on a relevant project, its significance, feasibility of its accomplishment and how it ought to be conducted is a large part of any professional work. The thesis expands upon the proposal and reports and interprets what was actually done.

The guidelines that follow are not the only way to do proposals and theses, but they do contain the major elements that each should have, in one way or another. The form and content apply not only for a thesis, but professional reports and peer-reviewed papers and publications.

Guidelines on Research Proposals and Theses

The object of a research proposal (or thesis) is to present the substance of what you propose to do (or have done) and its contribution to environmental health science. This written presentation should include the following:

1. **Introduction/Problem Statement:** A brief and clear statement of the problem your research addresses.
2. **Objectives:** The objectives to be met should be stated in terms of what is to be accomplished. They project the major anticipated findings that will form the major conclusions of the research; thus, they serve to guide the work to be done. Objectives and conclusions should match; i.e. if you state an objective, you should expect to produce a conclusion stating how, or if, the objective was met.
3. **Background:** A presentation of the current status of knowledge on your problem sufficient to demonstrate why the proposed work needs (or needed) to be done. Major studies from the existing literature or other documented experience should be presented. You should also point out the major deficiencies in existing knowledge, what needs to be done (i.e. why your research is justified), and how your research findings would improve existing knowledge.
4. **Approach/Method:** Proposals should develop the conceptual basis and general elements of what is to be done sufficient to demonstrate that it has been well thought out. The thesis should, of course, report what was actually done.

5. Results: Proposals could anticipate types of results that may be obtainable; however, it may not be possible to forecast the results at the proposal stage so it is reasonable to skip this section in a proposal. The thesis will, of course, present the data actually obtained. Any elaboration should be limited to understanding where the data came from (actual discussion occurs in the next section).
6. Discussion: The findings you draw from the data, how conclusions match your objectives, and why you feel they are the correct ones. A good discussion critiques the data, presents the strengths and weaknesses of the data, and interprets the facts (or lack thereof) that were developed in the research.
7. Conclusions: The major findings of the work in a brief synopsis. A conclusion should be stated for each of your objectives; other related significant findings should also be included. It ought to be possible to focus your conclusions into one or two pages of text in the thesis.
8. Available Resources for the Project: Details of the equipment to be used in the study and their accessibility to the student should be provided. An estimate of the cost of the research (materials, reagents, computer time, sample analysis, field work, equipment purchase or rental, etc.) should also be provided. Analysis (estimate) of the “cost for doing business” is an integral part of any research project and should be included in the thesis proposal.

Proposals are not expected to contain items 5, 6, or 7; however, these are necessary components of a thesis. Most proposals will substitute for these items a proposed schedule and any special equipment or resource needs, with justification. In a proposal, you need to demonstrate convincingly that your research could make a contribution to an environmental health issue or problem.

Approval of Proposals and Theses

For the Master's degree in each environmental health subject area, you will need a Research Advisor and at least one, but preferably two other faculty to review your proposal and thesis research. As you begin to consider ideas for your thesis topic, you will naturally gravitate to the faculty member with interests compatible with your own. You should initiate discussions concerning your ideas with the environmental health sciences faculty member that may be your Research Advisor. Depending on the topic, he/she will either agree to be your Research Advisor or direct you to the most appropriate faculty member to serve in that capacity.

You and your Research Advisor will discuss the specifics of your proposed project and you will write the formal proposal. Once your Advisor is satisfied with the content of the proposal, it will be submitted to the other two or three faculty for approval, and it will become the agreement between you and them on the project to be conducted. Besides your Advisor, other members of the EHS faculty should be involved in your thesis, as much as possible. The research advisor will circulate the approved proposal to other EHS faculty who may offer input, and he/she will communicate any additional suggestions to you after you begin your work. Deviations are expected due to the nature of research, but major deviations should be presented and discussed with your Advisor who may request a revised proposal if the changes are major. Review and approval of a revised proposal is in the student's interest to avoid future problems of misinterpretation.

The title page of the proposal should be similar to the example in Attachment A with your Advisor's name appearing first. The signed title page signifies faculty approval.

The thesis will contain the substance of the previous section. Each thesis will vary depending on the project undertaken. For example, theoretical work or modeling would generally have a greater emphasis on background literature and/or a separate section on significance may be appropriate. The thesis is a professional presentation of work performed; a good thesis will better prepare you for the defense. Your Research Advisor must be kept apprised of your progress throughout your work. You should present draft versions of your thesis to the Research Advisor at various stages of completion. When your advisor determines that the thesis is ready for defense, it will be distributed to the other EHS faculty that approved the proposal for review prior to the defense.

Thesis Defense and Final Approval

An oral defense of the thesis is required; it will be scheduled after your Advisor is satisfied that the draft is defensible. The defense is your formal presentation of the thesis to the faculty, all of whom make every effort to attend. The defense begins with your brief, (5 to 8 minutes), uninterrupted oral statement of the problem you addressed, your method of tackling the problem, and your findings. After the oral presentation, questions will be asked by the faculty to determine your understanding of the subject and your interpretations of the data. Questions on other subjects, but related to your work, may also be asked. The defense will continue until the faculty are convinced that you have satisfactorily defended your thesis. After questioning, you will be asked to leave the room while the faculty discuss your performance and whether additional work is required before final acceptance.

After the defense portion of the work is successfully completed, you will make any requested revisions and/or present additional work. Your Research Advisor will assure that all requested revisions have been made, thereafter accepting the final version of the thesis. The degree will be awarded once the faculty have signed the title page, thus signifying their final approval (Attachment A). An unbound original copy of the thesis must be logged in with the program secretary. The copy will be bound and kept as a permanent record in the program office.

ATTACHMENT A

Master of Science Project Proposal

THE ENVIRONMENTAL SIGNIFICANCE OF

by

Graduate Aspirant

A Thesis Submitted in
Partial Fulfillment of the Requirements
for the Degree of Master of Science
(Environmental Health Sciences)
at the University of Michigan.

2005

Approved: _____, 2005

O Great Guru, Ph.D., Advisor
(title)

Knowledgeable Person, Ph.D.
(title)

Knowledgeable Person, Ph.D.
(title)

Guidelines for MS Thesis in Human Nutrition

1. Each student is required to complete a research project and a thesis or manuscript as a partial fulfillment of the degree requirements. Following the first or second term of a student's enrollment in the Human Nutrition program, he/she is encouraged to explore a research topic with his/her academic advisor. With guidance from the advisor, the student will select courses to be completed which will enhance the degree program.

Research projects are not limited to laboratory or biochemical research with either animals or humans. Students are also encouraged to consider surveying a group of individuals or a community to gather and analyze nutrition related information related to dietary intake, food behaviors, or other topics.

2. A research committee must be selected to aid in supervision and assist in completion of the research work. The committee will be composed of three faculty members, at least one of who shall be from another program/department.
3. The student will submit a research proposal (Table 1) to the committee. After approval of the proposal, the student will conduct the study, analyze the data, and prepare either a thesis or a manuscript for publication in a peer-reviewed scientific journal. Upon approval of the thesis or journal manuscript by the committee, the student will fulfill the thesis requirement for the MS degree.

TABLE 1 Guideline for the Research Proposal

Title	The title should be short and concise, yet reflect the major focus and content of the study. If the research will include animals, the species should be reflected in the title.
Objectives	State the overall goal of the proposed research. State specific aims (the hypotheses for the research). These may be stated in the form of questions to be answered or hypotheses to be tested.
Rational and Background	What is the importance of doing the research and how does it add to what others have done? A review of the pertinent literature must be included to identify the current state of information on the topic and the need for the proposed research. Cited references must support your hypothesis or reason for conducting the research.
Methodology	Study Design: Describe as precisely as possible the design of the study (crossover, completely randomized, etc). Identify the dependent and independent variables in the study design. Estimate the duration of time needed to complete the study and describe the time schedule. Human subjects or animals: Who/what they are; how subjects or animals are chosen/recruited; inclusion/exclusion criteria. Procedures: <i>Animal studies:</i> diet composition (including major organic nutrient and mineral/vitamin composition); feeding methods and duration; methods of animal care; time of sacrificing, methods of sampling; sample processing; methods of laboratory determinations; data collection; methods of statistical analysis of data (analysis of variance, linear regression, descriptive statistics). <i>Human studies:</i> Questionnaires/surveys to be used; methods of data collection; methods of statistical analysis of data. For Human studies, an IRB (Institutional Review Board) document <u>must</u> be submitted. The Current IRB form can be retrieved from: http://www.irb.research.umich.edu/ Equipment needed: Identify research instruments needed (questionnaires, surveys, laboratory instruments and supplies, software programs
Budget	Estimate the cost of doing the proposed research, excluding the cost of your own time. Estimate the cost of equipment, supplies, time (if a research assistant or statistician will be hired).
Expected Results	Indicate the possible outcomes of the study. Sham tables may be constructed to illustrate the outcomes and show how the data will be treated statistically.
Significance of the Study	Discuss the significance of the proposed research from the nutritional, biochemical, physiological or health standpoint. Identify how and what will be contributed to the advancement of science or to the betterment of human nutrition and health.
References	List all references cited for the proposed study according to the method used by the Journal of Nutrition or the American Journal of Clinical Nutrition.

GUIDELINES FOR THE M.S. THESIS IN TOXICOLOGY AND ITS DEFENSE

Approved: 12/14/88 (Revised 9/15/2003)

The M.S. thesis is a written research-based product founded on a significant laboratory experience involving at least two research rotations (for a minimum of 6 credit hours in EHS 698).in toxicology. The M.S. thesis is a requirement for the M.S. degree in toxicology. The M.S. candidate should select a research laboratory no later than the end of the second semester in residence. The student will develop specific research objectives and hypothesis to be tested in conjunction with the sponsoring advisor/mentor. The project and hypothesis to be tested should have fundamental importance to the science of toxicology.

The written thesis will have the form of a full-length manuscript suitable for submission to a toxicologic or other scientific journal. The student and mentor may choose a peer-reviewed journal and format most directly related to the topic of the thesis research. If a more general approach is taken, the thesis should be submitted as a manuscript in the style specified for the journal, Toxicological Sciences. The thesis will consist of the following parts:

1. Cover Letter – addressed to the research advisor stating the objectives of the work and specific hypothesis tested.
2. Title Page – as specified in the chosen journal’s Instructions to Authors
3. Abstract – should succinctly summarize the findings and not exceed the length specified in the instructions.
4. Introduction – provide relevant background information and describing rationale and objectives for the studies to be reported.
5. Materials and Methods – giving a clear description of the procedures used to carry out the research, including the choice of controls, data management and statistical analysis
6. Results – describe how experiments were done, how data were analyzed, what was found and the statistical significance of the results
7. Discussion – relates the significance of the data reported in the thesis to existing knowledge in the field of toxicology and their possible mechanistic implications.
8. References – accurately document all references with appropriate citations from the primary scientific literature.

The written thesis should represent the student’s original work. Secondhand information, unsubstantiated references, non-peer-reviewed citations and excessive speculation will not be acceptable.

The thesis will be evaluated by the student’s research advisor and at least one additional faculty member. Emphasis will be on originality of the work, soundness of methodology, quantity of data and the quality of writing. The thesis must be defended before the student’s advisor and the thesis reader in an oral exam format of approximately 2 hours in length in which the student makes a formal public presentation of 30-50 minutes followed by a question and answer period conducted by the faculty examiners.

The thesis and its defense must be rated satisfactory by the faculty examiners before the M.S. degree is awarded.

1. **Introduction/Problem Statement:** A brief and clear statement of the problem your research addresses.
2. **Objectives:** The objectives to be met should be stated in terms of what is to be accomplished. They project the major anticipated findings that will form the major conclusions of the research; thus, they serve to guide the work to be done. Objectives and conclusions should match; i.e. if you state an objective, you should expect to produce a conclusion stating how, or if, the objective was met.
3. **Background:** A presentation of the current status of knowledge on your problem sufficient to demonstrate why the proposed work needs (or needed) to be done. Major studies from the existing literature or other documented experience should be presented. You should also point out the major deficiencies in existing knowledge, what needs to be done (i.e. why your research is justified), and how your research findings would improve existing knowledge.
4. **Approach/Method:** Proposals should develop the conceptual basis and elements of what was done sufficient to demonstrate that it has been well thought out.
5. **Results:** describe how experiments were done, how data were analyzed, what was found and the statistical significance of the results.
6. **Discussion:** The findings you draw from the data, how conclusions match your objectives, and why you feel they are the correct ones. A good discussion critiques the data, presents the strengths and weaknesses of the data, and interprets the facts (or lack thereof) that was developed in the research.
7. **Conclusions:** The major findings of the work in a brief synopsis. A conclusion should be stated for each of your objectives; other related significant findings should also be included. It ought to be possible to focus your conclusions into one or two pages of text in the thesis.

Thesis Defense and Final Approval

An oral defense of the thesis is required; it will be scheduled after your Research Advisor is satisfied that the draft is defensible. The defense is your formal presentation of the thesis to the faculty, all of whom make every effort to attend. The defense begins with your brief, (5 to 8 minutes), uninterrupted oral statement of the problem you addressed, your method of tackling the problem, and your findings. After the oral presentation, questions will be asked by the faculty to determine your understanding of the subject and your interpretations of the data. Questions on other subjects, but related to your work, may also be asked. The defense will continue until the faculty members are convinced that you have satisfactorily defended your thesis. After questioning, you will be asked to leave the room while the faculty members discuss your performance and whether additional work is required before final acceptance.

After the defense portion of the work is successfully completed, you will make any requested revisions and/or present additional work. Your Research Advisor will assure that all requested revisions have been made, thereafter accepting the final version of the thesis. The degree will be awarded once the faculty members have signed the title page, thus signifying their final approval (Figure 2). An unbound original copy of the thesis is submitted to the student services office.

APPENDIX B

EHS Doctoral Guidelines

**Department of
Environmental Health Sciences
Guidelines for Doctoral Programs**

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General Information

All students should be thoroughly familiar with those sections of the current Rackham Graduate School Handbook, School of Public Health catalogue, and Department of Environmental Health brochures, which discuss various facets of the doctoral program.

The Environmental Health Sciences Doctoral Committee is charged with the responsibilities of interpreting policy, conducting the Doctoral Qualifying Examination (DQE), reviewing doctoral student progress, and handling other matters concerned with overall administration of the doctoral program. The Environmental Health Sciences Doctoral Committee is appointed by the Chair of the Department and is composed of three or more EHS instructional faculty members (with appointments of at least 25% in EHS) whose backgrounds represent diverse areas of departmental expertise (usually indicated by the three Ph.D. programs). Students and faculty members having questions about administrative matters should consult the chair of this Committee. Names of committee members may be obtained from the Student Services Office.

Admission to the Doctoral Program

1. Each application for admission to the doctoral program in Environmental Health Sciences is carefully reviewed by the departmental admissions committee. Admission is highly competitive and decisions are based primarily on grade point average of relevant courses; number, level and distribution of appropriate courses; Graduate Record Examination scores; and letters of recommendation. The Department requires each applicant to submit a statement of professional interests and objectives. This statement is very important in selecting students for admission. In some cases a personal interview with faculty members may be requested.
2. An applicant who is considered academically admissible is only recommended for final admission if a member of the faculty agrees to serve as the student's Academic Advisor.
3. Students completing masters programs within the Department must reapply to the department for admission to the doctoral program. Applicants will follow procedures as outlined by the Rackham Graduate School or the School of Public Health

Major Area of Study

1. The Ph.D. program has three major areas of study: (1) Environmental Health Sciences, (2) Industrial Health and (3) Toxicology. Each major area has specific coursework required as outlined in the departmental curricula guide which is published every year. Students along with the academic advisor should review the required curricula. An outline of how the requirements will be met will be submitted to the Student Services Office. The Academic Advisor along with the EHS Doctoral Committee will approve the proposed course of study.

2. The department requires that doctoral students maintain a GPA of 6.0. Students with GPAs that drop below 6.0 are placed on academic probation and can only continue with approval of the Departmental Chair.

The Academic Advisor

1. An Academic Advisor is appointed for each student when he/she begins the Ph.D. program. The Academic Advisor is a faculty member who has already agreed to mentor the student.

2. The Academic Advisor is a faculty member in the student's major program area and is responsible for guiding and administering the student's academic program. Based upon the student's background and goals, the student and his/her advisor should outline a program of study. They should also discuss areas of original research appropriate to the faculty, facilities available and any other factors relevant to a research topic. The student should select a specific research topic for the dissertation as soon as possible, so that it may be developed during the period of formal course work.

3. The student often has responsibilities for work on a research grant or as a teaching assistant. Time for this work must be allotted in the program of graduate courses, examinations, and research.

Doctoral Qualifying Examination (DQE)

1. The Doctoral Qualifying Examination (DQE) is an important milestone for the student. A student is eligible to take the Doctoral Qualifying Examination after completion of all required departmental doctoral coursework with an average GPA of 6.0 or better in required departmental doctoral courses, including no more than 6 independent study credits in calculation of the GPA (e.g., research, readings), and upon agreement with a faculty member willing to serve as the student's Doctoral Dissertation Advisor.

3. It is expected that a doctoral student takes the Doctoral Qualifying Examination no later than the end of the second year after entering the program, except in unusual circumstances. A written request to postpone taking the Doctoral Qualifying Examination (for the first time) beyond the two-year limit must be submitted to the departmental Student Services Office and approved by the Environmental Health Sciences Doctoral Committee.

4. The written examination is offered twice each year:
 - second week of October
 - second week of May.

5. At least two months before the written examination is scheduled, the student must notify the Academic Advisor and the Department Student Services Office of his/her readiness to take the examination by submitting the following materials:
 - A letter from the student indicating his/her desire to take the Doctoral Qualifying Examination;
 - *Curriculum vitae* from the student that includes a listing of educational institutions attended, relevant undergraduate and graduate courses taken, degrees completed, relevant work experience, and other appropriate information. Graduate courses taken here or elsewhere for credit should be designated as part of the major or the minor.

6. The following materials must be submitted by faculty prior to the examination:
 - A letter from the student's Academic Advisor certifying all the requirements of Item 5 above have been completed and that he/she approves the student's readiness to take the written examination.
 - A letter from a faculty member agreeing to serve as the Dissertation Advisor for the student.

7. Preparation, scheduling, administration and review of the examination are the responsibility of the Department Doctoral Committee. The Doctoral Committee requests questions covering the broad aspects of environmental health sciences and the major and the minor fields from appropriate faculty members. The Department Doctoral Committee consults with the student's Academic Advisor regarding the appropriateness, content, and time requirement of the questions.

8. The examination is divided as follows: (a) 25% on general knowledge in environmental health sciences, (b) 50% on the major field, and (c) 25% on the minor field. The examination is given in four 2-hour sections. Time allotments for each question may be provided in the examination for student guidance. All students taking the DQE will receive the same questions for the general knowledge of environmental health sciences and in the designated major area (i.e. Toxicology majors will all receive the same questions).

- General Knowledge of Environmental Health Sciences. The Doctoral Committee solicits two general examination questions and suggested reading(s), book(s), or seminar articles(s) from Faculty in each of the three doctoral program areas. From the questions submitted, the Doctoral Committee selects 3 questions for use on the examination.
- Major Area. Questions for this part of the examination are solicited from faculty members of the designated major area and can include adjunct professors or training grant mentors. The questions relate to the major area (environmental health sciences, industrial health or toxicology) covered by the courses and seminars as designated by the required curriculum. The questions are constructed in a way to encourage integration of information and approaches from various sources.
- Minor Area. Questions for this part of the examination are solicited from faculty members of the designated minor area which can include a wide variety of topics (water quality, environmental chemistry, industrial hygiene, nutrition, occupational epidemiology, neuropathology, genetics, reproductive health, etc). The questions are constructed in a way to encourage integration of information and approaches from various sources.

9. Each answer is evaluated by the faculty member who wrote the question, and rated according to the following scale and criteria:

- High Pass – Exceeds expectations for the exam
- Pass – Meets expectations for the exam
- Conditional Pass – Deficiencies or errors noted, but overall response may be acceptable pending remediation
- Fail – Does not meet expectations for doctoral level due to critical deficiencies or errors for the exam

The faculty members submit graded exam questions to the Doctoral Committee within two weeks of the exam. Reasons for a Failing grade should be provided in a written communication to the Doctoral Committee.

10. Identifying information on the DQE will be coded so that evaluations can be conducted in a “blind” fashion, to the extent possible.

11. The graded Qualifying Examination questions are evaluated by members of the Doctoral Committee, who then decide whether the student has passed the examination. 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. A student passes an examination only upon approval of at least two-thirds of the members of the Doctoral Committee. Results of the examination and the Committee's decision are sent to the Departmental Chair and should be available to the student within four weeks after the examination.

12. In the event of failure on only one part of the examination (general, major or minor area), the student should immediately review the examination in detail with his/her Advisor and other members of the faculty who were involved in its preparation and grading. The student may retake the portion which he/she failed (general, major or minor) at the next offering of the DQE or make up any identified deficiency as designated by the EHS Doctoral Committee. Students are allowed to retake the examination one time within a one-year period. A student who fails an examination (or a portion) a second time becomes ineligible for further doctoral work.

The Doctoral Dissertation Advisor

1. 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 dissertation advisor, to select a specific topic, and to obtain agreement of a faculty member to become the Dissertation Advisor, prior to taking the Doctoral Qualifying Examination.

2. The Dissertation Advisor must be a member of the department faculty and of the Graduate School Faculty. This advisor must be qualified to guide the student in the research program and must have time to devote without incurring an excessive load. If a student chooses a Dissertation Advisor who is not a member of the regular instructional department faculty, then a department faculty member must serve as a Dissertation Co-Advisor.

3. The Dissertation Advisor (or Co-Advisor) assumes the functions of the Academic Advisor and responsibility for directing all aspects of the student's program. A major responsibility at this stage is assembling the most appropriate members to serve as the Doctoral Preliminary Examination Committee.

Doctoral Preliminary Examination

1. The Doctoral Preliminary Examination has two components: (1) a written dissertation proposal, and (2) an Oral Examination.
2. The Doctoral Preliminary Examination should be taken within 12 months following successful completion of the DQE. It is scheduled by the student and his/her Dissertation Advisor. A written request to postpone taking the Doctoral Preliminary Examination beyond the 12-month limit must be submitted in writing to the departmental Student Services Office and approved by the Environmental Health Sciences Doctoral Committee.
3. Each student has an individual Doctoral Preliminary Examination Committee. Members of the student's Preliminary Examination Committee are chosen by discussion and agreement between the student and his/her Doctoral Dissertation Advisor. The committee membership is submitted to the EHS Doctoral Committee for approval. In most cases, this committee also serves as the Doctoral Dissertation Committee. Therefore, the committee membership must meet the requirements of the Graduate School for a Doctoral Dissertation Committee.
4. To be able to take the Doctoral Preliminary Examination, the form, "Request for Student to Take Preliminary Examination" must be obtained from the Student Services Office, completed and returned for approval by the departmental Doctoral Committee. The student must have passed the Doctoral Qualifying Examination and prepared a written dissertation prospectus acceptable to his/her Dissertation Advisor. This proposal should be available to the committee members two weeks prior to the Oral Examination and a copy submitted to the Student Services Office for reference to the departmental Doctoral Committee.
5. All Preliminary Examinations are announced to the faculty at least once week prior to the examination. Students must provide an abstract of the research proposal to the Student Services Office for distribution to all departmental faculty.
6. The Preliminary Examination is administered by the Doctoral Preliminary Examination Committee with the Dissertation Advisor serving as chair. All members of the committee must be present (or actively participating via telephone, teleconferencing, etc) in order for the examination to be valid. The Oral 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 background for and ability to successfully complete his/her research. The Preliminary Examination Committee is responsible for the evaluation of the student's qualifications and progress toward achieving the doctoral degree, including appraisal of the student's coursework, feasibility and quality of the research project, and all aspects of the student's performance. The Oral Examination is typically two to three hours in duration.

7. A student passes the Preliminary Examination only upon approval of at least three-fourths of the members of the Preliminary Examination Committee. Failed students can retake the examination at a later date or can be allowed to submit a revised dissertation proposal for approval by the examining committee. Results of the examination are reported to the department faculty at the next meeting of the EHS faculty.
8. After approval of the dissertation proposal in writing by the Preliminary Examination Committee, significant changes in direction, depth, or should be discussed with the departmental Doctoral Dissertation Committee.
9. Once the Preliminary Examination is passed, including acceptance of the dissertation proposal by the Preliminary Examination Committee, the student advances to candidacy. A certificate of admission to candidacy is issued by the Graduate School when all requirements are met.

The Doctoral Preliminary Examination Committee and the 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 faculty members of the committee must have both a faculty appointment in EHS (may include Faculty with a primary appointment in a department other than EHS and who have a non-paid appointment in EHS) and be a member of the Rackham Graduate Faculty.
 - c. The committee chair or a co-chair must have a primary faculty appointment ($\geq 50\%$ paid appointment) in the Department of Environmental Health Sciences.
 - d. include at least one faculty member (cognate) whose primary appointment is in another department (EHS Faculty, including Adjunct and Joint Faculty, are ineligible).
 - e. 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 outside committee members may be selected from scholars in other departments or from other institutions where scholarly work is performed.
 - f. Any other criteria of the Rackham Graduate School or School of Public Health.

2. The Dissertation Committee is responsible for the evaluation of the student's qualifications and progress toward achieving the doctoral degree. The committee composition is usually the same as the Preliminary Examination Committee. Requirements for membership of the Doctoral Dissertation Committee are the same as described for the Preliminary Examination Committee.
3. The official Dissertation Committee form is submitted to the Rackham Graduate School or School of Public Health within 3 months after advancement to candidacy.
4. Members of the student's Doctoral Dissertation Committee play a central role in helping earn his/her degree and should be consulted regularly for academic and technical advice. Meetings of the committee members (with or without the student, at their discretion) will be called as needed. A report is put in the student's file after each meeting. The advisor meets with the student to discuss the progress report.
5. Once a Doctoral Dissertation Committee has been established, any changes in the committee need to be submitted to the EHS Doctoral Committee. A memo should be submitted by the student and endorsed by the student's Dissertation Committee chair to the departmental Student Services Office. The memo should indicate what changes are being requested, justification for the change and a listing of the revised committee membership. The request is reviewed by the Department Doctoral Committee for approval and then forwarded to the appropriate offices for processing

The Research Program

1. Original research requires abilities different from those required to pass formal courses and examinations. Accordingly, great weight is placed on a student's research performance from the initial literature review and development of techniques to the final interpretation of findings and drawing of conclusions.
2. Advice and aid should be sought whenever necessary from members of the Doctoral Dissertation Committee, from other members of the EHS faculty, or from any other qualified scholars to provide critical consultation. 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 skillfulness of its presentation as a written document.
3. After advancing to candidacy, students are expected to register for EHS 995 for any term they draw on University resources, which includes faculty and staff time.
4. Students must submit a written progress report to their Doctoral Dissertation Committee and the EHS Student Services office at least once a year.

5. Students are expected to give at least one departmental seminar describing research and pertinent findings prior to the Oral Dissertation Defense seminar.

6. Students are expected to write a dissertation and prepare at least one manuscript suitable for publication based upon their research.

Data Review Meeting

1. At least one month prior to scheduling the defense of the dissertation, a data review meeting will be held with members of the dissertation committee. The defense should not be scheduled prior to this meeting.

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

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, conclusions and recommendations for future research.

5. The committee deliberates immediately following the presentation and 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 needs additional analysis, the committee should provide the student with detailed suggestions on what needs to be done.

6. Official notification is provided to the EHS Doctoral Committee by the Dissertation Committee Chair that the student is approved for the dissertation defense.

The Dissertation

1. The dissertation topic, its scholarly value, and its feasibility shall be approved by the Doctoral Dissertation Committee at the time of the Doctoral Preliminary Examination (see above). It must be a significant, original contribution to knowledge, logically and skillfully presented with due regard to the literate usage of the English language. The student's Doctoral Dissertation Committee plays an important role in aiding the student to achieve this excellence. The student is encouraged to consult with his/her committee members during the writing.
2. Other persons within or outside the University may be requested by the Doctoral Dissertation Committee to review and comment on the dissertation.
3. At least three weeks before the defense of the dissertation, the final draft of the dissertation must be available to each member of the Doctoral Dissertation committee.

Final Oral Examination and Defense of the Dissertation

1. Permission for the student to set the date for the final oral examination is given by the advisor when the dissertation is completed. The student must be registered in the semester in which the final oral examination is taken.
2. The Final Oral Defense is held only after all members of the Doctoral Dissertation Committee have had adequate opportunity to review the final draft of the dissertation. The dissertation advisor is responsible to the members of the student's committee for determining that the draft is in appropriate form for their evaluation.
3. The Final Oral Examination should be a true defense of the dissertation. The examination is open to the public and notices of the examination are posted within the department; notices are also sent to other interested departments. The candidate gives a lecture which presents the major findings of the research and the conclusions in relation to the current status of knowledge in that field. Following the lecture, the candidate answers questions from the audience and from the Dissertation Committee.
4. All members of the Doctoral Dissertation Committee must be present for the final oral examination.
5. The Dissertation Committee may, at the time of the final oral but not later, require alterations or corrections to the dissertation. The Report of the Final Oral Examination is submitted, and the dissertation in final form is registered with the Rackham Graduate School (see Rackham Graduate School Handbook) or the School of Public Health.

DOCTOR OF PHILOSOPHY (PhD)

Departmental Course Requirements

Select one (1) of the following

BIOSTAT 503	(4)	Introduction to Biostatistics
BIOSTAT 553	(4)	Applied Biostatistics
STAT 400	(4)	Applied Statistical Methods

Select one (1) of the following

EPID 503	(3)	Strategies and Uses of Epidemiology
EPID 601	(4)	Principles and Methods in Epidemiology
BIOSTAT 523	(3)	Biostatistics Analysis for Health-Related Studies
EHS 688	(1)	Topics in Environmental Health Sciences*
EHS 899	(6)	Advanced Research
EHS 869	(1)	Doctoral Seminar in Environmental Health Sciences**

*EHS 688 is a departmental seminar that students register for each Fall Term until they have passed their DQE. It is expected that they will attend seminars throughout their doctoral program but they do not have to officially register.

**EHS 869 is a doctoral seminar that students register for until they have passed their DQE. Upon completion of their DQE, they will present a seminar once a year until completion of their doctoral program. It is expected that they will attend the seminars throughout their doctoral program but do not need to register after successfully passing the DQE.

Major Area Course Requirements (*requirements are only completed in one designated major area*)

Environmental Health Sciences

EHS 507	(2)	Principles of Exposure Assessment
EHS 508	(2)	Principles of Risk Assessment
EHS 572	(2)	Environmental Impact Assessment
EHS 574	(3)	Environmental Chemistry

Industrial Health

EHS 501	(2)	Occupational and Environmental Disease
EHS 507	(2)	Principles of Exposure Assessment

Must select one (1) of the following

EHS 550	(3)	Principles of Industrial Hygiene
EHS 652	(3)	Evaluation of Chemical Hazards
EHS 654	(3)	Ventilation of Contaminant Controls
EHS 556	(3)	Occupational Ergonomics

Toxicology

EHS 506	(2)	Principles of Toxicology
EHS 612	(3)	Biochemical and Molecular Toxicology
EHS 616	(2)	Toxicologic Pathology
EHS 717	(1)	Topicalogic Pathology Laboratory

Select one (1) of the following

EHS 620	(2)	Mechanisms of Endocrine Toxicology & Hormone Metabolism
EHS 621	(3)	Mechanisms of Carcinogenesis
EHS 622	(2)	Mechanisms of Developmental Toxicology
EHS 623	(2)	Mechanisms of Reproductive Toxicology
EHS 624	(2)	Mechanisms of Neurotoxicology

Select two (2) of the following:

BIOCHEM 550	(3)	Protein Structure and Function
HG 541	(3)	Molecular Genetics
CDB 530	(3)	Cell Biology

Minor Area Course Requirements

No formal course requirements for a minor area are required. However the student should have the equivalent of 9 credit hours of coursework. The student and academic advisor will submit to the Student Services office a plan stating the minor and how the student will meet course requirements whether by previous or current coursework. The Doctoral Committee will review and approve the plan. This should be done within the first term of enrollment.

ATTACHMENT 1

DEPARTMENT OF ENVIRONMENTAL HEALTH SCIENCES
Request to Take Preliminary Examination
(Ph.D.)

Date of Examination: _____ Time: _____ Place: _____

Name: _____ I.D. No: _____

Address (home): _____

Major Area: _____

Proposal Title: _____

Summary of Proposed Research (attach copy and provide a disk/electronic version):

	Name	Rank	Department/Unit
Chair/Co-Chair	_____	_____	_____
Chair/Co-Chair	_____	_____	_____
Cognate	_____	_____	_____
Member*	_____	_____	_____
Member*	_____	_____	_____
Member*	_____	_____	_____

_____*

*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

EHS Doctoral Committee Chair Date

ATTACHMENT 2

DEPARTMENT OF ENVIRONMENTAL HEALTH SCIENCES
Preliminary Examination Recommendation
(Ph.D.)

Name: _____ I.D. No.: _____

Address (home): _____

Major Area: _____ Degree: _____

Preliminary Exam Date: _____

Proposal Title: _____

The above student's dissertation proposal is ___ APPROVED ___ NOT APPROVED.

The above student ___ PASSED ___ CONDITIONALLY PASSED ___ DID NOT PASS the oral preliminary exam on the above date. Explain 'conditionally passed' or 'did not pass'.

The undersigned faculty participated in the examination.

Chair/Co-Chair Dept/Unit Signature Date

Chair/Co-Chair Dept/Unit Signature Date

Cognate Dept/Unit Signature Date

Member Dept/Unit Signature Date

Member Dept/Unit Signature Date

Member Dept/Unit Signature Date

APPENDIX C

BIC Plan

BIC Request for Exemption or Special Substitution Form
Departmental Request for Exemption or Special Substitution Form

**DEPARTMENT OF ENVIRONMENTAL HEALTH SCIENCES
SCHOOL OF PUBLIC HEALTH
BREADTH, INTEGRATION AND CAPSTONE (BIC)**

Student's Name _____ Date _____

I.D.# _____ Enrolled (First Term) _____
TERM YR

Advisor _____ Sub-Plan EH HN HSAT IH
 OEE TX Dietetics

Original Plan _____ Student's Signature _____

Revised Plan _____ Advisor's Signature _____

METHODOLOGICAL CORE

Select one from each of the following areas:

Biostatistics

- _____ BIOSTAT 503 Introduction to Biostatistics
- _____ BIOSTAT 553 Applied Biostatistics
- _____ STAT 400 Applied Statistical Methods

Epidemiology

- _____ EPID 503 Strategies & Uses of Epidemiology
- _____ EPID 601 Principles and Methods of Epidemiology

BREADTH, INTEGRATION and CAPSTONE (BIC)

Select one from each of the following areas:

Environmental Health Sciences

- _____ EHS 501 Occupational Diseases
- _____ EHS 507 Principles of Exposure Assessment
- _____ EHS 508 Principles of Risk Assessment
- _____ OTHER (attach exemption form)

Health Behavior and Health Education

- _____ HBHE 600 Psychosocial Factors in Health Related Behavior
- _____ HBHE 615 Mass Media, Public Health Practice & Intervention
- _____ HBHE 622 Program Evaluation in Health Education
- _____ HBHE 631 Budget Practices in Health Education Programs
- _____ HBHE 640 Community Organization Hlth Education
- _____ HBHE 667 Bioterrorism: Community Prevention & Response
- _____ HBHE 690 Environmental Mental Health Education
- _____ HBHE 692 Women's Health & Reproductive Health
- _____ OTHER (attach exemption form)

Health Management and Policy

- _____ HMP 602 Medical Care Organization and Delivery
- _____ HMP 615 Introduction to Public Health Policy
- _____ HMP 617 Understanding Health Care Organizations
- _____ HMP 620 Understanding the Structure & Management of Nonprofit Organizations
- _____ HMP 640 Program Evaluation in Public Health
- _____ HMP 643 Individual & Group Behavior in Health Service Organizations
- _____ HMP 653 Law and Public Health
- _____ HMP 675 Sociology of Medicine
- _____ HMP 677 Health Care Organizations: International Perspective
- _____ HMP 695 Public Health Issues in Women's Health
- _____ OTHER (attach exemption form)

Capstone

- _____ EHS 600 Professional Perspectives in Environmental Health

APPROVED: _____ Date _____
EHS Department

DEPARTMENT OF ENVIRONMENTAL HEALTH SCIENCES
SCHOOL OF PUBLIC HEALTH
BREADTH, INTEGRATION AND CAPSTONE (BIC)

REQUEST FOR EXEMPTION OR SPECIAL SUBSTITUTION

Student's Name _____ Date _____

I.D.# _____ Enrolled (First Term) _____
TERM YR

Advisor _____ Sub-Plan EH HN HSAT IH
 OEE TX Dietetics

Area in which exemption or special substitution is requested:

- _____ *Health Behavior and Health Education*
- _____ *Health Management and Policy*
- _____ *Environmental Health Sciences*
- _____ *Capstone*

Student's Signature _____

Advisor's Signature _____

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

A. Relevant courses(s) completed or courses(s) to be substituted

Institution	Department	Course No	Title	Credit Hrs Semester or Qtr	Grade	Year Taken

B. Exemption by examination

Department	Course No	Title	Date of Examination	Grade

C. Other

_____ Approved
_____ Disapproved

_____ EHS Curriculum Chair or designate

_____ Date

DEPARTMENT OF ENVIRONMENTAL HEALTH SCIENCES

**REQUEST FOR EHS COURSE
EXEMPTION OR SPECIAL SUBSTITUTION**

Student's Name _____ Date _____

I.D.# _____ Degree _____ Enrolled (First Term) _____
TERM YR

Advisor _____ Sub-Plan EH HN HSAT IH
 OEE TX Dietetics

Student's Signature _____

Advisor's Signature _____

Course in which exemption or special substitution is requested:

Department	Course No	Title	Instructor

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

A. Relevant courses(s) completed or courses(s) to be substituted

Institution	Department	Course No	Title	Credit Hrs Semester or Qtr	Grade	Year Taken

B. Exemption by examination

Department	Course No	Title	Date of Examination	Grade

C. Other

_____ Approved _____ Disapproved

_____ EHS Curriculum Chair or designate

_____ Date