

# Department of Epidemiology and Population Health Student-Faculty Handbook

## Introduction and Mission Statement

Epidemiology is the core science of public health. The broad mission of public health, as defined in 1978 by the Council on Education for Public Health (CEPH), is “enhancing health in human populations through organized community effort.” The science of epidemiology is directed at identifying the determinants of health, disease, disability and death in populations for the purposes of health promotion and disease control and prevention. It thereby provides much of the information necessary to fulfill this mission, playing a major role in the development and evaluation of public health policy and law. A strong teaching and research program in epidemiology is vital to a school of public health.

Modern epidemiology is a quantitative “*transdisciplinary*” science that bridges population with basic and clinical research. Epidemiologists discover and integrate new knowledge on disease etiology and mechanisms using in population-based studies and test preventive interventions. They play a significant role in designing clinical trials to test new treatments to ameliorate disease or improve prognosis. A good curriculum in epidemiology must begin with a sound knowledge base in human biology to which rigorous training is added in the philosophy, terminology, and methods of epidemiology, specialized statistical analytic methods, and concepts and methods from biomedical, environmental, ecological, social and behavioral sciences. This breadth of knowledge, and the ability to integrate diverse types of information to bear on the control, prevention and treatment of disease and other health-related outcomes, is necessary for epidemiologic practice and research. It is vitally important to have strong faculty who can serve as role models for students and opportunities for hands-on involvement epidemiologic research.

Accordingly, the **mission** of the Department of Epidemiology & Population Health is to:

- provide the highest possible quality education and training in the philosophy, principles and practice of modern epidemiology;
- conduct innovative, interdisciplinary research on the causes and consequences of disease in populations using state-of-the-art methods;
- conduct translational research;
- help build epidemiologic capacity and infrastructure at local, state and federal levels;
- promote interdisciplinary teaching and health research within the school and across the university; and
- become recognized as a major provider of education, research and service throughout the region.

## Faculty Profiles

**Dr. Richard Baumgartner**, PhD, Professor, Chair, and Distinguished University Scholar, is an internationally recognized expert in the nutritional epidemiology of age-related chronic diseases and conditions. He is best known for his pioneering work on the epidemiology of sarcopenia, or age-related muscle loss. His current research concerns nutritional, molecular and genetic risk factors for breast cancer. He joined the faculty at the University of Louisville after 15 years in the University of New Mexico School of Medicine, where he served as Interim Chief of the Division of Epidemiology and Preventive Medicine, Associate Director for Science in the Institute of Public Health, and Director of the Aging and Genetic Epidemiology Program. Dr. Baumgartner is a Fellow and member of the Board of Directors of the American College of Epidemiology.

**Dr. Kathy Baumgartner**, PhD, Professor, Associate Dean for Academic Affairs, is a nationally recognized cancer epidemiologist with extensive experience designing and conducting large population-based studies. Her current research is focused on the contradiction between breast cancer incidence rates and prevalence of exposures among the primary ethnic groups in the Southwest US (Hispanic, American Indian, non-Hispanic White). She is currently involved in research studies evaluating breast cancer risk as well as prognosis including recurrence, survival and quality of life issues among long-term survivors. She was previously involved in studies of cervical cancer and respiratory disease.

**Dr. Rose Devasia**, MD, MPH, Assistant Professor, received her medical degree from the University of Louisville and MPH from Vanderbilt University. She is a former Epidemic Intelligence Service (EIS) Officer with the Centers for Disease Control and Prevention and has expertise in the epidemiology of infectious diseases.

**Dr. Frank Groves**, MD, MPH, Assistant Professor, is the Epidemiology MPH-Concentration Coordinator. Dr. Groves' principal research focus is on the etiology of childhood acute lymphoblastic leukemia. Risk factors currently under investigation include birth weight, family structure, housing characteristics, urbanization, residential mobility, and socioeconomic status.

**Dr. Carlton Hornung**, PhD, Professor, is a nationally and internationally recognized expert in cardiovascular disease epidemiology, clinical translational research, the design and conduct of clinical trials, and therapeutics. He is the former Chair of the department, former Director of the Clinical Research, Epidemiology and Statistics Training Program (CREST), and is currently leading the development of the new Clinical Translational Sciences Institute. He is highly regarded for his expertise in the design of interdisciplinary clinical research education programs.

**Dr. Richard Kerber**, PhD, Associate Professor, is a nationally recognized expert in the genetic and molecular basis of aging, longevity, cancer, and in statistical methods in population genetics. He joined the faculty of the University of Louisville in fall 2008 after 20 years at the University of Utah, where he held several important positions including Interim Director of the SEER Cancer Registry.

**Dr. Susan Muldoon**, PhD, Assistant Professor, is the Acting Director of Clinical Research, Epidemiology and Statistics Training Program (CREST), and Associate Dean of Student Services. Dr. Muldoon's broad research interests include the epidemiology of aging, chronic disease management and end of life care. Specifically she is interested in patient outcomes following long-term acute care; management of breast cancer as a chronic disease; and doctor-patient-caregiver communication at the end of life.

**Dr. Elizabeth O'Brien**, PhD, Assistant Professor, has expertise in population genetics and research experience related to cancer, aging and longevity. She joined the University of Louisville in fall 2008 after 20 years at the University of Utah.

**Dr. Kira Taylor, PhD**, Assistant Professor, has expertise in the genetic epidemiology of cardiovascular diseases. She joined the University of Louisville in fall 2011 after completing a post-doctoral fellowship at the University of North Carolina. She is a graduate of the Emory University School of Public Health. Dr. Taylor is leading the development of the BA/BS undergraduate degree program in SPHIS.

**Dr. Dongyan Yang**, MD, MS, Assistant Professor, teaches epidemiology methods in the curriculum. Her MS is in biostatistics from the University of Alabama, and she provides expert assistance to students and faculty in SAS programming and data analysis. Her research interests are in breast cancer.

**Dr. Kristina Zierold**, PhD, Assistant Professor, is a former Epidemic Intelligence Service (EIS) Officer with the Centers for Disease Control and Prevention. Her research interests include developmental disorders, injury, birth defects, and the health effects associated with exposure to lead and metals.

# Curricula

## **MPH Concentration in Epidemiology**

### **Introduction**

Students in the Master's of Public Health program can elect to concentrate their course of study in epidemiology during the second year. The department has developed a program study designed to meet the core competencies defined by the Association of Schools of Public Health (ASPH) and prepare students for epidemiologic practice in local, state and federal health agencies.

### **Competencies**

Requirements for the MPH degree are:

- Successful completion of core, concentration, practicum experience, and integrating experience coursework
- Completion of all deliverables for the practicum experience
- Comprehensive written examination on the core MPH competencies

The MPH program has adopted the competencies published by the Association of Schools of Public Health. (ASPH Education Committee. "Master's Degree in Public Health Core Competency Development Project, Version 2.3."

<http://www.asph.org/userfiles/version2.3.pdf>.)

The following competencies are identified for epidemiology:

The student must display the ability to:

1. Identify key sources of data for epidemiologic purposes.
2. Identify the principles and limitations of public health screening programs.
3. Describe a public health problem in terms of magnitude, person, time and place.
4. Explain the importance of epidemiology for informing scientific, ethical, economic and political discussion of health issues.
5. Comprehend basic ethical and legal principles pertaining to the collection, maintenance, use and dissemination of epidemiologic data.
6. Apply the basic terminology and definitions of epidemiology.
7. Calculate basic epidemiology measures.
8. Communicate epidemiologic information to lay and professional audiences.
9. Draw appropriate inferences from epidemiologic data.
10. Evaluate the strengths and limitations of epidemiologic reports.

The department also considers the following cross-competencies in public health biology to be particularly important for the epidemiology concentration:

1. To incorporate public health biology – the biological and molecular context of public health into public health practice.
2. Specify the role of the immune system in population health.
3. Describe how behavior alters human biology.
4. Identify the ethical, social and legal issues implied by public health biology.
5. Explain the biological and molecular basis of public health.
6. Explain the role of biology in the ecological model of population-based health.
7. Explain how genetics and genomics affect disease processes and public health policy and practice.
8. Articulate how biological, chemical and physical agents affect human health.
9. Apply biological principles to development and implementation of disease prevention, control, or management programs.
10. Apply evidence-based biological and molecular concepts to inform public health laws, policies, and regulations.
11. Integrate general biological and molecular concepts into public health.

### **Admission**

Second year MPH students selecting the epidemiology concentration must be in good standing, have completed all core courses, and have good grades in PHEP 601 Introduction to Epidemiology and PHST-600 Biostatistics I.

### **Faculty Advisor**

Upon admission to the MPH concentration, each student is assigned a faculty advisor who works with the student in the Practicum Experience. The general role of the advisor and requirements for the Practicum are described in the MPH Practicum Manual.

The department seeks to match students to the best extent possible with faculty who share their interests, but recognizes that any faculty member is capable of advising a student in the epidemiology concentration curriculum and the accomplishment of their practicum project. Once a student-faculty advisor assignment has been made, the department strongly discourages any subsequent reassignment as this may disrupt progress in the practicum.

### **Curriculum**

Epidemiology Concentration Coursework			
Semester	Course #	Course Title	Credit-Hours
Fall II	PHEP-602	Epidemiologic Methods	3
	PHEP-616	Descriptive Epidemiology and Health Statistics	3
	PHxx-xxx	Concentration elective course	3
	PHEP-679	Practicum Experience: Epidemiology	3
	Semester Total		

Epidemiology Concentration Coursework			
Semester	Course #	Course Title	Credit-Hours
Spring II	PHEP-617	Field Epidemiology	3
	PHEP-655	Emerging Issues in Epidemiology	3
	PHEP-679	Practicum Experience: Epidemiology	3
	PHMS-697	Integrating Learning and Experience in Public Health	3
	Semester Total		12
Concentration Total			24

### **Electives**

The elective courses in the epidemiology concentration may be selected from any 3 credit-hour, graduate-level course in the University with approval of the student's faculty advisor and the concentration coordinator.

### **Practicum**

Preference is given to Practicum Experiences that are relevant to the science and practice of Epidemiology. Students are encouraged to seek out practicing Epidemiologists in local and state agencies, faculty outside the School of Public Health with on-going research projects that involve aspects of epidemiology, or individuals in other organizational settings who are interested in supporting a Practicum Experience with appropriate relevance.

## **Masters of Science in Epidemiology**

### **Introduction**

The MS program in Epidemiology is designed to prepare students for a career in epidemiologic research, as opposed to practice.

### **Competencies**

The MS Program in Epidemiology is designed to achieve the following educational goals for students:

- Knowledge of the principles and methods of epidemiologic, observational study design, including surveillance and screening;
- Knowledge of the socioeconomic and geographic distribution and risk factors for major acute, infectious and chronic morbidity and mortality;
- Mastery of basic methods for collection, management and analysis of epidemiologic data;
- Ability to review epidemiologic literature, synthesize and critically analyze information relevant to the etiology and control of diseases and promotion of health in populations

These goals are consistent with those needed for a career as a research staff scientist supporting epidemiologic, clinical and public health research.

To meet these goals upon graduation from the MS Program, students will be able to:

1. Recall and discuss merits and limitations of epidemiologic study designs (cohort, case-control, matched case-control, cross sectional, intervention, and ecologic) including issues of cost-efficiency, sample size and precision, subject selection and information biases
2. Describe and explain variation in the distribution of disease, disability and death within and between populations using descriptive epidemiology methods, including rates, ratios, and proportions
3. Identify and describe appropriate disease surveillance and screening methods for case ascertainment and performance measures (sensitivity, specificity, positive and negative predictive value)
4. Identify and describe methods of population-based sampling and selection of controls
5. Critically evaluate methods for measuring disease exposures and biomarkers
6. Calculate, apply and interpret basic epidemiologic measures of disease risk and association including odds ratios, rate and hazard ratios, relative and attributable risks
7. Generate and properly express an hypothesis concerning the etiology and control of health problems that could be tested using a population-based study and identify the optimal study design
8. Analyze multivariate data sets to evaluate research questions involving relationships between exposure and disease variables
9. Differentiate confounders, effect mediators and effect modifiers in causal pathways

10. Explain and apply methods for control confounding and detect effect modification through statistical adjustment or stratification in data analysis
11. Evaluate and correctly interpret analysis results with regard to data measurement errors, information and selection biases
12. Calculate sample size and statistical power needed to test an hypothesis in various epidemiologic study designs
13. Describe the relationships among sample size, statistical power, effect size and variance and their importance in hypothesis testing
14. Differentiate between association and causality in the interpretation of findings
15. Demonstrate the ability to read, synthesize and critically assess epidemiologic, medical and public health literature
16. Analyze, synthesize and evaluate information on disease etiology across multiple levels
17. Demonstrate ability to write an original, publication-quality, epidemiologic research report
18. Demonstrate knowledge of methods of research management, including principles of teamwork, budgeting, design of data collection instruments, and quality control in data collection
19. Use computer based analytic software program for management and analysis of epidemiologic data (e.g., SAS, STATA)
20. Describe the historical and contemporary ethical concerns associated with human subjects, epidemiologic and public health research

These competencies are demonstrated through the successful completion of the coursework and the design, execution, documentation, and presentation of the student's research thesis.

### **Admission**

Students with a prior baccalaureate or more advanced degree in an appropriate field of study, from a regionally accredited university or college are eligible for the MS program in Epidemiology. Previous coursework in mathematics and/or statistics and biological or health sciences (for example, biology, biochemistry, anatomy, physiology, microbiology) is strongly recommended. Applicants who are judged to not have sufficient prior coursework or experience in these areas may be required to take additional coursework.

The following are additionally required for admission:

- Undergraduate GPA at least 3.0 on 4.0 scale
- GRE scores taken within the past 5 years (official from ETS). Scores > 50<sup>th</sup> percentiles on both the Quantitative and Verbal sections are recommended.
- If applicable, Test of English as a Foreign Language (TOEFL) score in at least 60<sup>th</sup> percentile

### **Faculty Advisor**

Upon admission to the MS program, each student is assigned a faculty advisor who works with the student to develop a program of study.

## Curriculum

The program is designed as a two-year program of coursework and thesis research and preparation. The student is expected to develop and plan his or her thesis research prior to the final semester in which the majority of the actual research is done.

## Degree Requirements

Degree requirements include required coursework in epidemiology, elective coursework in biostatistics and in public health sciences, and a thesis.

## Coursework

38 total credit-hours:

20 credit-hours of required coursework

6 credit-hours of elective coursework in biostatistics

6 credit-hours of elective coursework in public health

6 credit-hours of thesis research

<b>Required Coursework</b>			
<b>Semester</b>	<b>Course #</b>	<b>Course Title</b>	<b>Credit-Hours</b>
Fall I	PHEP-618	Epidemiologic Methods II	3
	PHEP-648	Data Management and Processing Lab	1
	PHEP-619	Biology of Disease in Populations	3
	PHxx-xxx	Elective*	3
	Semester Total		
Spring I	PHEP-702	Research Management I	3
	PHEP-701	Advanced Epidemiologic Methods	3
	PHEP-649	Data Analysis Lab	1
	PHxx-xxx	Elective*	3
	Semester Total		
Summer	PHEP-666	Thesis Research in Epidemiology (optional)	3
Fall II	PHxx-xxx	Elective*	3
	PHxx-xxx	Elective*	3
	PHEP-666	Thesis Research in Epidemiology	3
	Semester Total		
Spring II	PHxx-xxx	Elective*	3
	PHEP-666	Thesis Research in Epidemiology	3 to 6
	Semester Total		
Subsequent Semesters	MS Thesis Candidacy		1+
Degree Total			38+

## Electives

Program requirements include one elective course in epidemiology and four in a public health area.\* Elective courses can be selected from offerings within SPHIS with instructor and program permission. Elective courses in epidemiology (PHEP) and biostatistics (PHST) are strongly encouraged.

Selection of electives for both requirements is done by the student and his or her faculty advisor with approval of the program director or chair of the department.

Students may petition to take courses not on these lists with approval of the instructor, the student's faculty advisor, and the program director or chair of the department or his or her designee.

<i>Pre-Approved Electives</i>		
<b>Course #</b>	<b>Course Title</b>	<b>Credit-Hours</b>
PHCI-624	Clinical Trials I	3
PHST-650	Advanced Topics in Biostatistics	1-3
PHST-680	Biostatistical Methods I	3
PHST-681	Biostatistical Methods II	3
PHST-661	Probability	3
PHST-662	Mathematical Statistics	3
PHST-683	Survival Analysis	3
PHST-684	Categorical Data Analysis	3
PHST-682	Multivariate Analysis	3
PHCI-671	Preventive Medicine I	2
PHCI-672	Preventive Medicine II	2
PHCI-605	Survey Research Methods	2
PHCI-611	Introduction to Clinical Epidemiology	2
PHEH-650	Advanced Topics in Environmental and Occupational Health	3
PHPB-650	Advanced Topics in Health Promotion and Behavioral Sciences	1-3
PHMS-650	Advanced Topics in Health Management and Systems Sciences	3

## Thesis

A thesis is required of every candidate for the MS degree in Epidemiology. It is to be a scholarly achievement in research, and should demonstrate a thorough understanding of research techniques in epidemiology. The following sections summarize the basic requirements for the thesis committee, thesis proposal, and defense. Greater detail can be found in the section: ***Student Advising, Practicum, Thesis and Dissertation Research.***

### **Thesis Committee**

The thesis shall be read by a reading committee, chaired by the student's faculty advisor and approved by the department Chair and the Dean. This committee shall consist of three members, and must include one representative of an allied department. The thesis must be approved by the committee and the Chair of the department.

### **Thesis Proposal**

After successful completion of 20 credit-hours of coursework, each MS student must submit a written thesis proposal to their thesis committee.

### **Thesis Preparation**

The thesis is to be prepared in format and binding according to the guidelines of the School of Interdisciplinary and Graduate Studies.

### **Thesis Approval**

The thesis is to be submitted in completed form to the Chair of the department at least thirty days before the end of the term in which the candidate expects to be graduated, and the candidate is not eligible for final examination until the thesis has been accepted by the committee and Chair.

The thesis committee schedules an oral defense by the candidate. The time and place for the defense is published to the general academic community, members of which are free to attend the defense. The dissertation is approved by a majority vote of the committee and the concurrence of the department Chair.

### **Thesis Distribution**

One unbound copy of the thesis, signed by the thesis committee, must be deposited with the Office of the School of Interdisciplinary and Graduate Studies before graduation.

## **PhD in Public Health Sciences – Concentration in Epidemiology**

### **Introduction**

The concentration in Epidemiology in the PhD program in Public Health Sciences is designed to develop academic researchers in population-based epidemiology.

### **Competencies**

To graduate, students in the PhD concentration in Epidemiology must demonstrate the following competencies *in addition to those for the MS degree*:

The PhD Program in Epidemiology is designed to achieve the following educational goals for students:

- Mastery of the principles and methods of epidemiologic, observational study design;
- Knowledge of the socioeconomic and geographic distribution, risk factors, and etiology of major acute, infectious and chronic morbidity and mortality;
- Mastery of advanced methods of analysis of epidemiologic data;
- Ability to critically analyze and synthesize information across multiple levels (physical, biologic, sociocultural) and sources (publications, reports, databases) to develop new hypotheses on disease etiology
- Ability to design and complete studies to test hypotheses
- Ability to interact with other public health professionals in the development of programs and interventions to control and prevent disease and promote public health

In addition to the competencies expected for the MS Program, students in the PhD Program will be able to:

1. Identify and employ data from existing sources to describe the epidemiology of a health condition using appropriate measures and comparisons, evaluate the results and draw inferences for further investigation or public health action
2. Describe the etiology of communicable and non-communicable diseases across populations, integrating molecular, cellular, physiological, and ecological levels, and identify and explain associated risk factors, treatments and interventions
3. Recall and discuss the history of epidemiologic concepts and methods; describe and explain their role within public health and medicine
4. Recall and apply the principles of screening and surveillance systems, including methods for evaluating data validity, reliability and performance
5. Describe and analyze the global, cultural and social context of health problems and their impact on epidemiologic research and public health interventions
6. Review and critically analyze the epidemiologic literature to synthesize findings and identify meaningful gaps in knowledge and new research ideas to be pursued; demonstrate mastery of a specific research specialty within epidemiology

7. Design an epidemiologic research project, including optimal methods for population sampling, case ascertainment, data collection, management and analysis, evaluation of strengths and limitations with respect to hypotheses, potential biases, and public health impact
8. Identify and apply optimal methods and software for controlling the collection, organization, quality, and accessibility of epidemiologic study data
9. Apply methods and computer software to conduct advanced statistical analyses of epidemiologic data, including appropriate risk estimates, modeling of risk factors/exposures, control of confounders, and detection of effect modifiers with concise tables and figures
10. Evaluate results of an epidemiologic analysis, considering pros/cons of study design, data quality and quantity, and make valid interpretation and inferences with respect to causality, need for and mode of intervention
11. Demonstrate ability to communicate research results and recommendations in oral and written media using appropriate language, tables, and graphs
12. Identify, describe and apply principles of human subjects research and professional ethics in research practice, communications and self-conduct
13. Identify, describe and apply principles of designing and evaluating evidence-based public health recommendations and interventions, including theory, measurable goals, and logic models

### **Admission**

Students who have satisfactorily completed an MS degree in Epidemiology are eligible for the PhD concentration in Epidemiology. Students completing an MPH may be required to complete additional coursework to be accepted into the Epidemiology PhD concentration. Students with a Master's degree in a related discipline or an advanced degree (MD, PhD, DO) may be accepted also pending evaluation of appropriate training, experience, and coursework. Previous coursework in mathematics and/or statistics and biological or health sciences (for example, biology, biochemistry, anatomy, physiology, microbiology) is strongly recommended.

### **Curriculum**

#### ***Faculty Advisor***

Upon admission to the concentration, each student is assigned a faculty advisor who works with the student to develop a program of study.

#### ***Program of Study***

The program of study recognizes core elements of modern epidemiology as well as its breadth and multidisciplinary nature. This requires the selection of a minor field of concentration, such as biostatistics, environmental science, molecular genetics, behavioral science, health management and systems sciences, clinical research, or

another relevant area of study, and the completion of at least 6 hours of coursework in this field.

## **Degree Requirements**

The emphasis in doctoral training goes beyond accumulating course credit. Our curriculum is organized into two 25 credit hour blocks of coursework. Completion of the first block of coursework (25 credits) is prerequisite for sitting for the Proficiency Examination. The student can proceed with the second block of coursework only after passing this examination. Successful completion of the second 25 credit hour block (cumulative 50 credit hours) is prerequisite to sitting for the Candidacy Examination. The student is admitted to doctoral candidacy only after passing this examination. A doctoral candidate must then successfully develop and defend a dissertation proposal that describes an original and independent research project. Upon successful defense of the proposal, the student may then register for Doctoral Candidacy Hours (DOC) and proceed to dissertation research. Upon successful completion of the research, oral defense of the dissertation, and demonstration of the required competencies listed above, a student is awarded the PhD degree.

The PhD concentration in Epidemiology is designed to consist of 50 credit-hours coursework (minimum two years) plus one to four years (minimum to maximum) towards completion of the dissertation. The curriculum outlined below represents the “ideal” sequence for a full-time student. It is recognized that part-time students will deviate from this sequence, however, all students are expected to complete required courses in basic and advanced epidemiologic methods that cover core areas including study design, research management, data base management, statistical analysis and disease biology/pathophysiology during the first 26 credit hour block and successfully pass the Proficiency Examination before preceding to minor electives and individual studies (PHEP 777 - Mentored Readings and Research) during the second 24 credit hour block. A minimum of 6 credit hours in Seminars in Epidemiology must be included in the first 26 credit hour block, and an additional 3 hours in the second 24 credit hour block. Exceptions may be granted pending review and approval by the student’s advisor and the department Chair.

### Coursework

50 total credit hours (beyond admission requirements) consisting of the following:

- 9 credit-hours of required courses
- 9 credit-hours of seminars in epidemiology
- 18-21 credit hours of epidemiology electives
- 6 credit hours of minor electives (outside of epidemiology)
- 3-6 credit-hours of mentored readings and research in epidemiology

<b>Required Coursework</b>				
<b>Semester</b>	<b>Course #</b>	<b>Course Title</b>	<b>Credit-Hours</b>	
Block 1				
Fall I	PHEP 618	Epidemiologic Methods II <sup>B1</sup>	3	
	-OR- PHEP-xxx	-OR if already taken - Epidemiology elective	3	
	PHEP 648	Data Management and Processing Lab <sup>B1</sup>	1	
	PHEP-619	Biology of Disease in Populations <sup>B1</sup>	3	
	PHEP-xxx -OR- PHST-xxx	Epidemiology elective -OR- Biostatistics elective	3	
	PHEP-750	Seminars in Epidemiology <sup>B1</sup>	3	
	Semester total			13
Spring I	PHEP-701	Advanced Epidemiologic Methods <sup>B1</sup>	3	
	PHEP 648	Data Management and Processing Lab <sup>B1</sup>	1	
	PHEP-702	Epidemiologic Research Management <sup>B1</sup>	3	
	PHEP-xxx -OR- PHST-xxx	Epidemiology elective -OR- Biostatistics elective	3	
	PHEP-750	Seminars in Epidemiology <sup>B1</sup>	3	
	Semester total			13
	Block 1 total			26

<b>Required Coursework</b>			
<b>Semester</b>	<b>Course #</b>	<b>Course Title</b>	<b>Credit-Hours</b>
Block 2			
Fall II	PHEP-xxx	Epidemiology elective	3
	PHEP-xxx	Epidemiology elective	3
	-OR- various	-OR- Minor elective	3
	various	Minor elective	3
	PHEP-750	Seminars in Epidemiology <sup>B2</sup>	3
	Semester total		12
Spring II	PHEP-xxx	Epidemiology elective	3
	Two of: PHEP-xxx various	Two of: Epidemiology elective Minor Elective	3 3
	PHEP-778	Readings and Research in Epidemiology	3
	PHEP-778	Readings and Research in Epidemiology <sup>B2</sup>	3
		Semester total	
Block 2 Total			24
Subsequent Semesters	Doctoral Candidacy (DOC)		1
Degree Total			50+

Key: <sup>B1</sup> = required in Block 1  
<sup>B2</sup> = required in Block 2

### Minor Elective Requirement

As a part of their approved program of study, students are required to complete 6 credit-hours of coursework in a minor field of concentration. Areas directly relevant to the science of epidemiology are preferred including, but not limited to, biostatistics, bioinformatics, medical geography, molecular or population genetics, environmental health, toxicology, microbiology, health management, health promotion and behavioral science, and clinical research. These courses may be selected from ones offered within the School of Public Health and Information Sciences, other departments within the University, or from sources outside the University with permission and acceptance of credit by the Graduate School.

Minor courses should be chosen by the student in consultation with his or her advisor and the respective course directors. Students may petition to take courses not on this list with approval of the instructor and the Chair of the Department of Epidemiology and Population Health. All students **must** provide a written rationale for their choice of minor coursework in a program of study. The following table provides a partial list of

acceptable minor courses. Some courses may have prerequisites and the student will be expected to either meet these or obtain permission from the instructor before registering.

Acceptable Electives for Minor Requirement		
Course #	Course Title	Credit-Hours
BIOC-641	Advanced Eukaryotic Genetics	3
BIOC-660	Molecular Endocrinology	3
BIOC 661	Molecular Mechanisms of Toxicology (cross-listed as PHTX-661)	3
BIOC-667 or BIOC-668	Molecular Biology	3
BIOC-675	Cancer Biology	3
EXP-600	Physiology of Exercise	3
EXP-605	Human Physiology	3
GEOG-656	Spatial Statistics	3
GEOG-657	Geographic Information Systems	3
MBIO-687	Microbial Pathogenesis	3
MBIO-618	Topics in Advanced Microbiology	3
MBIO-680	Genetics of Infectious Diseases	3
NURS-670	Cancer Epidemiology and Pathophysiology	3
PHBI-750	Statistical Methods for Bioinformatics	3
PHBI-751	High-throughput Data Analysis	3
PHCI-501	Bench to Bedside	1
PHCI-602	Health Services and Outcomes Research	2
PHCI-610	New Drug and Device Development	2
PHCI-624	Clinical Trials I: Planning and Design	2
PHCI-625	Clinical Trials II	2
PHCI-632	Ethical Conduct of Healthcare Research	2
PHCI-650	Medical Decision Analysis	2
PHEH-650	Advanced Topics in Environmental and Occupational Health	3
PHMS-650	Advanced Topics in Health Management and Systems Science	3
PHPB-650	Advanced Topics in Health Promotion and Behavioral Science	1-3
PHST-650	Advanced Topics in Biostatistics	3
PHST-680	Biostatistical Methods I	3
PHST-681	Biostatistical Methods II	3
PHST-661	Probability	3
PHST-662	Mathematical Statistics	3
PHST-683	Survival Analysis	3
PHST-682	Multivariate Analysis	3
PHST-684	Categorical Data Analysis	3
PHST-785	Nonlinear Regression	3
PHTX-607	Seminar in Genetics and Molecular Medicine	3
PHTX-618	Topics in Pharmacology & Toxicology	1-3

Acceptable Electives for Minor Requirement		
Course #	Course Title	Credit-Hours
PHTX-630	Toxicology: Principles and Application	3
PHTX-661	Molecular Mechanisms of Toxicology (cross-listed as BIOC 661)	3
PHZB-605	Systemic Physiology I	3
PHZB-611	Advanced Human Physiology	3

### **Proficiency Examination**

Upon successful completion of the first 26 credit hour block of required coursework, students shall be eligible to sit for the written **Proficiency Examination** that will determine the student's competency in basic knowledge of disease biology/pathophysiology and theory and skills in epidemiologic research methods, including study design and quantitative analytic methods. The objective of this examination is to determine if the student is sufficiently capable and prepared to continue with more advanced elective and independent study towards a doctoral degree. It will be administered and graded by a committee of faculty appointed by the department Chair. A student who does not successfully pass the examination will be dismissed from the doctoral program and allowed to complete a terminal MS degree.

### **Candidacy Examination**

After passing the proficiency examination, and upon completion of the second 24 credit hour block (cumulative 50 credit-hours including minor electives), the student will sit for the **Candidacy Examination**. The objective of this examination is to determine if the student meets all of the required program competencies needed to embark on dissertation research. It will be administered and graded by a committee of department faculty appointed by the Chair.

The exam will be organized in two parts: (1) a comprehensive written examination; and (2) an oral presentation of a *potential* dissertation topic. The purpose of the written examination is to determine whether the student meets all the program competencies including specialized knowledge pertaining to the student's minor field of concentration. The purpose of the oral presentation is to evaluate the student's oral presentation skills and their ability to assemble and defend a complete and coherent research proposal on a topic of their choice. Minimally it must include a background overview and rationale, study objective and aims, data collection and statistical analytic methods and should be sufficiently detailed to serve as a *potential* dissertation pre-proposal. The oral presentation is open to all faculty and students, but is graded by the exam committee.

Successful completion of the candidacy examination admits the student to doctoral candidacy. A student who does not successfully complete the candidacy examination may be required to take additional or remedial coursework beyond the required 50

credit hours and will be allowed *one* opportunity to retake the exam. Failing the candidacy examination a second time will result in dismissal from the program.

### **Dissertation**

A dissertation is required of every candidate for the degree of Doctor of Philosophy in Public Health Sciences with a concentration in Epidemiology. It is to be a scholarly achievement in research, and should demonstrate a thorough understanding of research techniques in epidemiology and the ability to conduct independent research. The following sections summarize the basic requirements for the dissertation committee, dissertation proposal, and defense. Greater detail can be found in the department's document: ***Student Advising, Thesis and Dissertation***.

### **Dissertation Committee**

The dissertation shall be read by a reading committee, chaired by the student's primary mentor, and appointed by the Dean upon the recommendation of the department Chair. This committee shall consist of five members, and must include one representative of an allied department. The dissertation must be approved by the committee and accepted by the department Chair.

### **Dissertation Proposal**

After successful completion of the candidacy examination, each doctoral candidate must submit a written dissertation proposal to all members of the dissertation committee. The candidate is then orally examined on the dissertation proposal.

### **Dissertation Preparation**

The dissertation is to be prepared in format and binding according to the guidelines of the School of Interdisciplinary and Graduate Studies.

### **Dissertation Approval**

The dissertation is to be submitted in completed form to the Chair of the department at least thirty days before the end of the term in which the candidate expects to be graduated, and the candidate is not eligible for final examination until the dissertation has been accepted by the committee and Chair.

The dissertation committee schedules an oral defense by the candidate. The time and place for the defense is published to the general academic community, members of which are free to attend the defense. The dissertation is approved by a majority vote of the committee and the concurrence of the department Chair.

### **Dissertation Distribution**

One unbound copy of the dissertation, signed by the dissertation committee, must be deposited with the Office of the School of Interdisciplinary and Graduate Studies before graduation.

## Student Advising and Program of Study

### I. Student Advisor

Upon acceptance and admission to the MPH, MS or PhD programs, each new student will be assigned an advisor by the department Chair.

The student's advisor must be a faculty member or associate member\* of the department.

Students and/or advisors who wish to change their assigned relationship must make a written request to the department Chair.

The responsibilities of the student advisor are:

1. To assist the student in the development and revision of their **Program of Study**
2. To advise the student on the appropriate selection of courses
3. To monitor the student's performance in the curriculum, notify the Chair in the event of poor performance, and recommend remedial action when needed
4. To mentor the student in the development of professional behavior
5. To advocate for the student's nomination for financial aid, honors, and awards

### II. Program of Study

All new and continuing students must develop a one page written document that describes their planned **Program of Study** including the following information:

- a. A brief statement of the student's academic goals, including their minor field of study
- b. A tentative listing of elective or minor courses to be taken

The Program of Study must be signed by both the student and advisor and submitted to and approved by the department Chair. Students must meet with their advisor at least two weeks prior to the start of each semester to review and make any amendments to their Program of Study.

Upon matriculation to the MS/PhD program, students may be provided screening examinations that assess basic quantitative and writing skills. The results will be used to recommend remedial courses in mathematics or statistics, or writing as offered by the University Writing Center (<http://louisville.edu/writingcenter/>).

\* Associate Faculty are non-department faculty who have been granted associate membership by the Chair and membership in the Graduate School Faculty

## **MS and PhD Programs**

### **Thesis and Dissertation**

#### **I. MS Thesis**

All basic Policies and Procedures of the Graduate School and the School of Public Health and Information Sciences that pertain to the appointment, composition, and responsibilities of thesis committees must be met. In addition to these, the department has established the following supplementary Policies and Procedures:

Students must complete a written, research thesis and present an oral defense to the faculty to graduate with the MS degree. At least 20 credit hours of required course work must be completed before work on the thesis can be initiated. Ordinarily, this would not occur earlier than the summer semester of the 1<sup>st</sup> year. At this time, students are expected to identify a primary mentor with whom to explore potential thesis research topics and opportunities. PHEP 666 Thesis Research is the independent study course that students will use for this purpose. Students are allowed to take up to 15 credit hours of PHEP 666 that may be applied to their thesis research. If a student has not completed their thesis by the end of the second year, or after accumulating a total of 38 credit hours, they must register for MS Candidacy each subsequent semester until their thesis is complete for the degree to be awarded. Students must understand that the MS-Epidemiology degree requires more than the completion of a prescribed curriculum of course work. Completion of a written thesis, in keeping with the guidelines below, and its successful oral presentation and defense are required to graduate with the MS-Epidemiology degree. By its nature, thesis research cannot always be completed within a specific period of time. Students who have not completed their thesis three years after the completion of all other coursework may be dropped from the program.

#### **Thesis Committee**

The MS thesis committee must include at least three committee members all of whom are members of the Graduate Faculty. One member must serve as the committee chair. At least one member, but no more than one-third of the committee, must be from another department.

The thesis committee chair must be a faculty member or associate member of the department, and a Senior Graduate Faculty member. He/she will replace the student's advisor with regard to continuing responsibility for their Program of Study. Students may choose to have their advisor continue as committee chair or select a new faculty member.

The thesis committee may serve as both the reading committee and oral examination committee.

A form, signed by the student, the Mentor, and other thesis committee members, must be filed with the Department Chair no later than the end of the Fall II semester.

*The thesis committee must be approved by the Dean upon recommendation by the department Chair.*

## **Thesis**

The student must prepare a minimum two page proposal that is unanimously approved by their committee before beginning work on their thesis. *A copy of this proposal, signed by all committee members, must be submitted to and accepted by the department Chair.* In the event that a proposal is not unanimously approved by the committee or is deemed unacceptable by the department Chair, the student may petition the faculty of the department to vote on approval and acceptance. In this event, the department Chair serves as a mediator in the dispute, and reserves the right to break any tied vote within the department.

It is expected that the thesis will be original, professional quality, and will form the basis for one or more potentially publishable papers. The following examples may be acceptable for the MS thesis:

- (1) a systematic, critical review of the contemporary epidemiologic literature on a specific disease and its risk factors;
- (2) a meta-analysis of results from several epidemiologic studies of a specific disease or risk factor;
- (3) a research report on the results of analyses by the student of primary or secondary data for a disease or health condition and its associated risk factors;

The student must meet at least monthly with their committee chair to monitor progress on their thesis until it is completed. *The committee chair will provide a brief, written report on the student's progress to the department Chair at the end of each semester.*

Upon completion of a rough draft of the thesis, the student may petition the committee to schedule a Thesis Examination. This examination cannot be scheduled until all committee members have read and approved the rough draft of the thesis, and the committee chair has notified the department Chair. The department administrator schedules the examination using either the on-line or hardcopy form required by the Graduate School. This form must be submitted no later than *two weeks* before the date of the oral examination.

The Thesis Examination consists of two parts: (1) an oral presentation of the thesis, and (2) an oral examination of the student's knowledge base and skills. The oral presentation should take the form of a professional talk accompanied by PowerPoint slides and should not exceed 30 minutes. Other faculty, students and members of the general public may attend the oral presentation and ask questions. The oral examination follows the presentation and is conducted exclusively and in privacy by the thesis committee. This examination assesses the candidate for the general competencies listed below. When the oral presentation and examination are complete,

the committee chair asks the candidate to leave the room and the committee votes on a grade and any required revisions to the written thesis. It is the committee chair's responsibility to ensure fair and appropriate conduct of the thesis presentation, oral examination, and grading.

All committee members must be present at the Thesis Examination. No changes may be made to the committee membership later than 30 days prior to the scheduled presentation and defense. Any exceptions to this rule must be approved in advance by the department Chair.

The final thesis must adhere to Graduate School guidelines and be completed and approved by the committee and submitted to the Graduate School at least 30 days in advance of the graduation date for the semester.

Ordinarily, the student should complete their thesis within one-year following the completion of all coursework and approval of their thesis topic. Extensions in time may be granted.

## **II. Dissertation**

All basic Policies and Procedures of the Graduate School and the School of Public Health and Information Sciences that pertain to the appointment, composition, and responsibilities of dissertation committees must be met. In addition to these, the department has established the following supplementary Policies and Procedures:

### **Dissertation Committee**

PhD students cannot form a committee and begin *formal* work on their dissertation until they have completed at least 50 credit hours of course work, taken and passed the **Proficiency** and **Candidacy** examinations, and have been accepted to "doctoral candidacy" by the Graduate School. Prior informal work towards a dissertation topic is allowed and is provided for in PHEP 778 Mentored Readings and Research.

The PhD dissertation committee must include at least five persons all of whom are members of the Graduate Faculty. At least **three** members must be from the department. One member must be from another department in the School of Public Health and Information Sciences and one from a unit outside the department and school.

The dissertation committee chair must be a faculty member or associate member of the department. He/she will replace the student's advisor with regard to continuing responsibility for the completion of the dissertation. Students may choose to have their advisor continue as committee chair or select a new faculty member.

*The dissertation committee must be approved by the Dean upon recommendation by the department Chair.*

## Dissertation

The student must prepare a five page (minimum) pre-proposal that is approved by a majority of their committee before beginning work on a full dissertation proposal. This pre-proposal should minimally include the following elements:

1. Rationale
2. Brief synopsis of background literature and/or preliminary studies
3. Specific aims
4. Overview of study design or approach
5. Statistical analytic plan including power analysis
6. Assessment of feasibility
7. List of key references

A copy of this pre-proposal, signed by all committee members, must be submitted to and accepted by the department Chair.

Upon acceptance of the pre-proposal, the student then develops a full proposal. The full proposal should expand on the elements in the pre-proposal in the general format of an NIH application (PHS 398 format) and be 20 to 25 pages in length. (*See instructions for NIH proposal Guidelines (<http://grants1.nih.gov/grants/funding/phs398/phs398.html>)*). The full proposal must be approved by a majority of the committee. A copy, signed by all committee members showing their approval or dissent, and reasons for dissent, must be submitted to and accepted by the department Chair before the student can proceed with their dissertation research.

In the event that a proposal is not approved by a majority of the committee or is deemed unacceptable by the department Chair upon review of the dissenting opinions, the student may petition the faculty of the department to vote on approval and acceptance. In this event, the department Chair serves as a mediator in the dispute, and reserves the right to break any tied vote within the department.

The student will then provide a 20 minute, oral, PowerPoint presentation summarizing the proposal that is open to faculty, students and the general public for questions and comments. The student may then begin research and work on the final, written dissertation.

The student must meet at least twice per semester with their committee to monitor progress on their dissertation research and writing until it is completed. It is recommended that they meet more frequently with their committee chair. The committee chair will provide a brief, written report on the student's progress to the department Chair at the end of each semester.

The dissertation must be an original contribution and demonstrate the student's mastery of the discipline of epidemiology. It must present a study design and data of sufficient quality and quantity as to convince the doctoral committee that the student possesses

the ability to pursue independent and original research. Students may choose either a traditional dissertation format or one consisting of three or more publishable, related manuscripts. If the student chooses the later format, the dissertation must include an introduction that provides an overall literature review and a summary and discussion that ties the results of the manuscripts together.

Upon completion of a rough draft of the dissertation, the student may petition the committee to schedule a Dissertation Defense. The defense cannot be scheduled until all committee members have read and approved the rough draft of the dissertation, and the committee chair has notified the department Chair. The department administrator schedules the dissertation defense using either the on-line or hardcopy form required by the university. This form must be submitted no later than two weeks before the date of the defense. The Graduate Dean's Office shall notify all members of the Graduate Faculty at least one week in advance that they are invited to participate in the examination, but only members of the committee may vote.

All committee members must be present at the dissertation defense. No changes may be made to the committee membership later than 30 days prior to the scheduled Dissertation Defense. Any exceptions to this rule must be approved in writing by the department Chair. It is the committee chair's responsibility to ensure fair and appropriate conduct of the dissertation presentation, oral examination, and grading.

The Dissertation Defense consists of two parts: (1) an oral presentation of the dissertation, and (2) an oral examination of the student's knowledge base and skills. The oral presentation should take the form of a professional talk accompanied by PowerPoint slides and should not exceed 45 minutes. Other faculty, students and members of the general public may attend the oral presentation and ask questions. The oral examination follows the presentation and is conducted exclusively and in privacy by the dissertation committee. This comprehensive examination assesses the candidate's competency in the discipline of epidemiology and is not limited to the dissertation topic. When the oral presentation and examination are complete, the committee chair asks the candidate to leave the room and the committee votes on a grade and specifies any required revisions to the written dissertation. To satisfactorily pass the dissertation defense, a student may not receive more than one unfavorable vote from a member of the dissertation committee. A written report stating the outcome of the examination and signed by each examiner will become a part of the student's record. Failure to pass the Dissertation Defense may result in the student being dismissed from the doctoral program with an MS degree.

The final written dissertation must adhere to the School of Graduate and Interdisciplinary Studies guidelines and be completed and approved by the committee and submitted to the Graduate School at least 30 days in advance of the graduation date for the semester.

Students are generally expected to complete their dissertation in no less than one year, and no more than four years, after entering doctoral candidacy. Extensions in time may be granted per Graduate School guidelines.

## Academic and Professional Behavior

The Department of Epidemiology and Population Health takes the policies on ***Student Academic Honesty*** of the School of Public Health and Information Sciences and the UofL Graduate School *very seriously*. All students in the MPH, MS and PhD programs in Epidemiology *must* sign the document certifying that they have read the SPHIS policy at the time of matriculation. Any questions a student has about the content of these policies *must* be discussed with their faculty advisor at the first opportunity following matriculation.

When a violation of academic honesty occurs within a course, the faculty course director will determine the nature and extent of any disciplinary action. If the violation occurs outside of a course, this responsibility falls upon the Department Chair. In either case, the violation is reported to the Associate Dean for Academic Affairs who may convene a committee to determine if further disciplinary action is warranted.

The nature and extent of disciplinary action may range from a simple written reprimand that may be filed with the student's records to expulsion from the SPHIS, depending on the severity of the violation.

The Department faculty considers the following violations to be sufficiently serious to warrant suspension or dismissal from the Epidemiology program:

- *Fabrication and falsification of data or research results*
- *Plagiarism*
- *Cheating in any oral or written examination*

Detailed definitions and examples of these can be found in SPHIS Student Academic Honesty policy and at the following university website addresses:

Video on Plagiarism Statement: <http://breeze.louisville.edu/plagiarism09/>

University's Plagiarism Statement: <http://louisville.edu/writingcenter/resources-for-faculty/plagiarism-1.html>

## Professional Ethics and Behavior

An important objective of the Department's MS and PhD program is for the student to learn and practice standards of professional ethics and conduct appropriate to the discipline of epidemiology and, more broadly, to public health and biomedical science. Epidemiology holds a unique place among the biomedical sciences in that it includes ethical obligations to communities as well as individual participants involved in health research. The information which epidemiologists produce on the distribution and

determinants of disease in populations can have enormous impact on society, so it is critically important that epidemiologists adhere to the highest ethical and scientific standards to preserve public trust.

The American College of Epidemiology has published ***Ethics Guidelines*** for the profession of epidemiology and students are expected to become thoroughly acquainted with this document which discusses the core values, duties, and virtues of the epidemiologist. A copy of the ACE Ethics Guidelines can be found in the appendix to the DEPH Student Handbook and at:

<http://acepidemiology.org/statement/ethics-guidelines>

All students in the MS and PhD Epidemiology program are expected to take CITI training in Human Subjects Research and to maintain certification which will be monitored by the Department.

Students in the Epidemiology program are expected to display professional behavior towards each other, students in other programs, faculty and staff at all times. A key aspect of professional behavior is respect. Violations of Academic Honesty clearly disrespect all members of the profession, as well as the public trust. Other forms of disrespect are more subtle; for example being chronically unprepared for class, turning homework in late, or using inappropriate language towards faculty or peers.

### **Grading and Course completion**

The Department follows the policies of the University of Louisville Graduate School on ***Grades and Grading*** with the following, allowable amendments.

#### **Grades of C or Lower**

Courses with grades of “C” or lower will not be counted towards the fulfillment of the degree requirements for the MS or PhD in Epidemiology. Students must repeat these courses to obtain credit towards their degree requirements. Exceptions may be granted for elective or minor coursework.

Grades of C or lower will be calculated in the graduate student's grade point average. However, when a student repeats a course, the grade point average will be calculated on the basis of the last grade earned, although all previous grades will remain on the transcript.

A student whose GPA falls below 3.0 will be placed on academic probation until he or she regains a 3.0 average. Students who are on academic probation for two consecutive semesters will be dismissed from the program.

Students with Graduate Research/Teaching Assistantships or Fellowships whose GPA falls below 3.0 or who have more than one incomplete grade in any semester may lose this financial support.

### **Incomplete work**

Department faculty may give a student an “I”, for “incomplete work”, when the student is unable to complete all work required for a course within the term. Generally, an “I” will be granted by the instructor *only* when the student provides *evidence for exceptional circumstances* that prevented them from completing the assigned work. Examples of “exceptional circumstances” would be a documented personal or family crisis or an illness or hospitalization with prolonged recuperation.

If the work is not completed by the end of the next term, *regardless of whether the student is enrolled*, the "I" will automatically become an "F", and the course will not be counted towards fulfillment of degree requirements. The student will be required to repeat the course and may be placed on academic probation if their GPA falls below 3.0.

### **Pass/Fail Grading Option**

Some courses in the Department may use a Pass/Fail Grading Option. Unless specified otherwise by the instructor in the course syllabus, grades of A+ through B- will be equivalent to a “Pass”. Grades of C and lower will be considered “Fail”. Students who “Fail” a course will not receive credit for that course towards their degree requirements and may be required to repeat the course.