

## **CURRICULUM**

### **Graduate Certificate in Implementation Science**

Students take two required Implementation Science Core courses (6 hours) and six hours of optional courses chosen from one of five topic areas (detailed below).

#### **REQUIRED COURSES**

*HPMT 6319 - Implementation Research in Clinical Practice (3 credit hours)*

Examines the theoretical frameworks relevant for studying diffusion of innovations and implementation of change in clinical practice settings, assesses the empirical evidence on strategies for adopting and implementing change, and considers methods for evaluating change processes.

*HPMT 6329 - Advanced Topics in Implementation Science (3 credit hours)*

Examines research design and methodological approaches consistent with high quality and extramurally funded implementation research. Topic areas include: pilot and small (developmental) study designs, cluster randomized trials, stepped wedge designs, effectiveness-implementation hybrid designs, and mixed-method approaches. Other methodological topics to be covered included partnering/stakeholder engagement, adaptation (of clinical/prevention interventions and implementation strategies) for new populations/contexts, promoting health equity in implementation science, and evaluating sustainability.

#### **OPTIONAL COURSES**

Select six credits from the following tracks: Community-Based Participatory Research, Healthcare Administration, Informatics, Pharmaceutical Evaluation and Policy, and Research Methods. All six credits must come from one track. All courses listed below are three credit hours, unless otherwise specified. Prerequisites are not listed, but might apply (please check with relevant program director).

#### **COMMUNITY-BASED PARTICIPATORY RESEARCH**

*HBHE 6021 - Advanced Health Behavior Theory (3 credit hours)*

This course will review the major theories of behavior change and explore the complex relationships between socio-demographic factors and theory constructs. Students will gain substantial experience in designing behavioral theory-based public health interventions.

*COPH 6303 - Community Based Program Design (3 credit hours)*

This course covers community-based program design using an interdisciplinary approach that emphasizes the socio-ecologic model and community-based participatory research, although traditional and hybrid approaches are also addressed. Students will learn about social and structural issues affecting both communities and program effectiveness. Principles of community engagement and partnership building will be explored through didactic discussion of literature and through virtual visits with community partners involved in projects in Arkansas. The role of the practitioner in engaging communities in issue selection, program design and implementation will also be examined. A range of interventions, as well as the levels they target,

will be studied using intervention mapping, illustrative case studies, and course assignments. Formative evaluation will be introduced.

*COPH 6403 - Community Based Program Evaluation (3 credit hours)*

Evaluation frameworks, needs assessments, and logic models will be studied with a particular emphasis on evaluating community-based programs. Performance evaluation as well as formative, process, impact, and outcome evaluation purposes and techniques will be compared. Theoretical and pragmatic approaches to the design and implementation of evaluation protocols will be explored, along with the role of both quantitative and qualitative methods.

*HBHE 5324 - Program Planning and Evaluation (3 credit hours)*

This is a course in health promotion program planning. It is designed to help the learner develop the fundamental understanding and skills necessary to implement program planning, implementation, and evaluation irrespective of setting. It provides both theoretical and practical information in program development and community-based participatory research.

*HPMT 5426 & 6426 - Racial and Ethnic Health and Healthcare Disparities (3 credit hours each)*

This course explores racial and ethnic health and healthcare equity and disparities in the United States. Students will examine the literature on health and healthcare equity and disparities; the historical and social structural determinants pertinent to the etiology of disparities; and policy and programmatic strategies for improving equity and reducing disparities. This course uses traditional approaches to learning (such as assigned readings, analysis, and discussion) combined with personal and group experiential learning. Students will be required to engage in active discussion of readings and to participate in service learning activities which will include preparation, reflection and practice components. Therefore students will spend time in class with instructors and as a group in the community with community based partners and instructors.

## **RESEARCH METHODS**

*BIOS 5233 - Statistical Methods for Clinical Trials (3 credit hours)*

Principles underlying the planning, management, and implementation of modern clinical trials, the application of statistical methods used in the analysis of data from clinical trials, and the interpretation of results. Basic statistical techniques used in design and analysis of Phase I-III single- and multicenter trials. Recommended prerequisites include knowledge of basic statistics, familiarity with SAS software, and knowledge of a clinical area.

*HPMT 5344 - Healthcare Operations Management: Performance and Quality Improvement (3 credit hours)*

This course is designed to provide an introduction to the Lean Six Sigma philosophy and terminology and provide the necessary tools to address complex problems. The Lean methodology focuses on the removal of waste and non-value added work, while the Six Sigma methodology focuses on the reduction of defects and minimizing process variation. The material covered aims to provide students with the practical and analytical tools required to make effective tactical and operational decisions in a health care environment. This course uses a combination of lectures, in-class studies, problems, and exams. At the successful completion of this course, students will be able to obtain their Lean Six Sigma Green Belt certification from a certified provider. Specific topics include value stream mapping, Six Sigma DMAIC model, understanding data and variation, and learning to use Minitab statistical software.

*HBHE 6120 - Introduction to Mixed Methods Research Design (3 credit hours)*

This course (3-credit hours) is designed to introduce an array of conceptual strategies and practical techniques for formulating, planning, and implementing a mixed methods research study. The course content includes philosophical and historical perspectives of mixed methods research, definitions of mixed methods research, objectives, purposes, and rationales for conducting a mixed methods study, and writing mixed methods research questions. Theoretical and conceptual frameworks for developing a mixed methods research design that fits the research question(s), selecting/constructing a mixed sampling design, techniques for collecting, analyzing, and integrating qualitative and quantitative data. Additionally, the application of quality criteria throughout a mixed methods study will be emphasized, including research ethics and protection of human subjects. The course also will cover approaches for applying guidelines when reporting results in publications.

*HPMT 6315 - Advanced Methods for Quality and Health Outcomes Research (3 credit hours)*

Examines conceptual models, methods, and dimensions of quality of care (QOC) research. Students will analyze the history and rationale of QOC assessment and methodological issues in measuring QOC in research. Prerequisites: Doctoral student status or permission of the instructor.

*NPHD 6102 - Qualitative Research Methodology (3 credit hours)*

Examines the philosophical foundation for and methodological issues in using qualitative approaches for scientific inquiry and knowledge development. Strategies for enhancing scientific and methodological rigor are explored.

*NPHD 6103 - Quantitative Methodology in Nursing Research (3 credit hours)*

Examines the philosophical foundation for and characteristics of designs and methods associated with quantitative approaches to scientific inquiry and knowledge development. Characteristics of effective design and methods and strategies for enhancing the scientific and methodological rigor are explored.

*NPHD 6108 - Qualitative Data Analysis, Theory and Practicum (3 credit hours)*

Course examines approaches to collecting, reducing, managing, and analyzing qualitative software packages used in data management. Explores qualitative software packages used in data management. The practicum portion of the course includes practice sessions for interviewing, coding data, establishing inter-rater agreement and development themes.

## **INFORMATICS**

*BMIG 5001 - Data Information and Knowledge Representation (3 credit hours)*

This course provides students with the foundational ideas of how information is modelled to facilitate easy access to knowledge. The course defines data, information and knowledge and explains how the three are connected. The course introduces students to basic information modeling methodologies both in relational databases (RDB) and graph databases, in particular semantic web technologies.

*BMIG 5002 - Biomedicine for Informaticists (3 credit hours)*

This course is an introduction to the range of terminology, concepts, tools and methods used in biologic and clinical environments important to Biomedical Informaticists. The course focuses on the comprehension of key biomedical concepts important for interaction and communication with biologists and clinicians needed for graduate study in Biomedical Informatics.

*BMIG 5003 - Computational Methods in Biomedical Informatics (3 credit hours)*

This course is an introduction to the range of computational tools and techniques often used by Biomedical Informaticists. The course focuses on a series of hands-on exercises designed for the student to gain a basic knowledge of those tools, principles, and techniques demonstrating the basic computational competencies needed.

*BMIG 5103 - Foundations of Biomedical Informatics: Population Health Information (2 credit hours)*

An introduction to the discipline of biomedical informatics, this graduate course introduces Public and Population Health Informatics. The course will explore common information sources and uses in the domain, information-related challenges in the domain and application of Biomedical Informatics theories, methods and tools to overcome them.

*BMIG 6011 - Clinical Trial Data Management (4 credit hours)*

This graduate course will provide a broad introduction to clinical trials with a special, in depth emphasis and practical experience in data management. The course covers information systems used in Clinical Trials with an emphasis on automation, system functionality, system integration, and information exchange. Common information-reliant and automated processes and methodology are explored.

## **HEALTHCARE ADMINISTRATION**

*HPMT 5114 - Management of Healthcare Organizations (3 credit hours)*

The purpose of this course is to expose graduate students to the fundamental management issues and techniques that can be used to administer a health care organization. Students will gain experience applying these issues and techniques to a health care organization. The students are also expected to identify and apply relevant methods for evaluating health policies and programs and for assessing the performance of organizations and professors in the areas of quality, safety, accessibility, efficiency and equity.

*HPMT 5214 - Decision Analytics in Healthcare (3 credit hours)*

Decisions can be made at different levels and can have significant impact on success or failure of an organization. Decision Analysis helps you evaluate the alternatives on hand considering uncertainties, value preferences and risk preferences. This course will introduce the growing range of applications of decision making in healthcare using arrays of predictive and prescriptive analytic methods. These methods are used by health analytic practitioners to evaluate efficiency and effectiveness in healthcare. This course will serve the dual purpose of understanding the mechanisms of quantitative decision models as well as techniques or software packages that are most commonly used for decision-making.

*HPMT 5344 - Healthcare Quality and Performance Improvement (3 credit hours)*

This course is designed to provide an introduction to performance improvement. In the first half, the course will focus on the Lean Six Sigma philosophy and terminology and provide the necessary tools to address complex problems. In the second half, the course will cover a variety of special topics related to performance improvement, such as patient safety, teamwork, and change management. The material covered aims to provide students with the conceptual, practical and analytical tools required to effectively develop and execute performance improvement initiatives in healthcare organizations. This course uses a combination of lectures, in-class studies, projects, assignments, and exams. Microsoft Excel will be used for learning data management, visualization, and analysis.

*HPMT 6213 - Variation in Health System Performance (3 credit hours)*

At its core, the field of health services research is devoted to the study of variation in health system performance and health care practice. This course will focus on what can be learned from studies of variation in health systems and services - investigating the causes, consequences, and solutions to harmful, wasteful, and inequitable variation. In doing so, this course will review conceptual foundations of health services and systems research (HSR), and examine current topics and ongoing research in this field. Students will examine current empirical research conducted by investigators concerning the development, organization, financing, and delivery of health services and their impact on population health. Students will also gain experience in conceptualizing research questions of interest in HSR, developing theoretical frameworks to inform these questions, and critically reviewing the empirical literature on topics of interest.

*HPMT 6315 - Advanced Methods for Quality & Health (3 credit hours)*

Examines conceptual models, methods, and dimensions of quality of care (QOC) research. Students will analyze the history and rationale of QOC assessment and methodological issues in measuring QOC in research.

**PHARMACEUTICAL EVALUATION AND POLICY**

*PSGP 5116 - Foundations of Pharm Eval and Policy Res Methods (3 credit hours)*

The purpose of this course is to provide students with the introductory skills to become a researcher in Pharmaceutical Evaluation and Policy. The student will be exposed to a wide range of topics including sources for funding for research, identifying research problems and writing study objectives, disseminating research, study measures, and study design.

*PSGP 5118 - Applied Research Methods Using Retrospective Data (3 credit hours)*

This course will outfit students with the skills necessary to analyze and conduct studies using retrospective health care data with a focus on large administrative claims data such as Medicaid and private payer insurance claims. Students will use SAS to analyze actual health care data. Instruction on study design, statistical techniques, and data integrity issues specific to observational studies using these data sources will be offered.

*PSGP 5119 - Pharmacoeconomics and Health Technology Assessment (3 credit hours)*

The purpose of this course is to provide students with the skills to design, conduct, analyze and rate investigations that assess the value or outcomes of health care technologies with a focus on pharmacy related products and services. The course will also integrate the theoretical prefaces to health care technology assessment as well as provide real world applications using decision-modeling software to conduct cost effectiveness and other related studies.

*PSGP 6113 – Pharmacoepidemiology (3 credit hours)*

Pharmacoepidemiology is the study of the use of and the effects of medications in large numbers of people. This specialty combines information from clinical pharmacology (the study of effects of drugs in humans) and epidemiology (the use and effects of exposure in large populations) to form a unique area of study.

*PSGP 5123 - Patient-Reported Outcomes Measures (3 credit hours)*

This course will provide graduate students a solid grounding in patient reported outcomes (PROs) and health related quality of life (HRQL) concepts and how to measure them. Materials will cover PRO instrument development, including psychometric and utility theory. The course will provide students hands on experience with statistical analyses and psychometric testing

using SAS. It will cover how to select appropriate PRO instruments for clinical studies to comply with governmental regulatory guidance. The course also offers students opportunities to assess and evaluate literature involved with HRQL information and PRO instruments in specific diseases/conditions as well.

### **Ideal Plan of Study**

#### **FALL**

- HPMT 6319 - Implementation Research in Clinical Practice (3 hours)
- Selective (3 hours) from topic area: Community-Based Participatory Research, Research Methods, Informatics, Healthcare Administration, Pharmaceutical Evaluation and Policy

#### **SPRING**

- HPMT 6329 - Advanced Topics in Implementation Science (3 hours)
- Selective (3 hours) from topic area: Community-Based Participatory Research, Research Methods, Informatics, Healthcare Administration, Pharmaceutical Evaluation and Policy