

# CURRICULUM

## Graduate Certificate in Implementation Science

The goal of this certificate is to train learners from various academic backgrounds and focus areas (Community-Based Participatory Research, Healthcare Administration, Informatics, Pharmaceutical Evaluation and Policy, and Research Methods) in implementation science methods and approaches to assist them in implementing evidence-based practices (EBP) in various topic areas and to study how best to support the implementation of EBP.

Requirements for the Implementation Science Certificate Program:

- Application (Deadline Open)
- Current CV/Resume
- Post-doctoral certificate offered as a standalone certificate for individuals with clinical or professional degrees (e.g., MD, DNP, MSN, PharmD, JD, PhD, SciD, DrPH, etc.). Also offered to students, including international students, completing PhDs from the COPH, COP, CON, the UAMS Graduate School, and clinical/professional degrees noted above
- Candidate's written statement of application that describes how they believe the certificate will enhance their education and/or career
- One letter of recommendation from an individual who can speak to the applicant's academic experience
- Transcripts from qualifying degree program

### **Implementation Science Certificate Coursework**

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 63193 - Implementation Research in Clinical Practice*

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 63303 - Advanced Topics in Implementation Science*

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 60233 - Advanced Health Behavior Theory*

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 63033 - Community Based Program Design*

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 54203 Rural and Global Health Program Evaluation and Impact Assessment*

This course brings together natural and social science theory of assessment to explore the health impacts of policies, programs and projects on population health. The course provides an overview of the history and rationale for HIA and explores specific methods so that students are provided with the knowledge and skills to evaluate, synthesize and communicate the evidence to assess potential health risks stemming from public intervention across a wide range of sectors and geographical locations. This course is designed for a high level of participation from students and interaction between the students and the instructor. Students will serve as discussants in each session.

### *HPMT 54263 & 64263 - Racial and Ethnic Health and Healthcare Disparities*

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 52333 - Statistical Methods for Clinical Trials*

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 53443 - Healthcare Quality and Performance Improvement*

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.

#### *HPMT 5448 - Social Network Analysis*

*This course provides essential knowledge necessary for social network (henceforth, called network) analysis in health-related sciences and professions. In this course, students will learn how to follow a methodological approach to (i) design social network studies, (ii) identify, evaluate, and/or collect network data (iii) conduct descriptive and inferential network analysis. The course first introduces the nature of network problems along with mathematical formulations. The course then discusses how to design studies/initiatives investigating network problems, followed by data collection, maintenance, analysis, and visualization. Students will learn both descriptive and inferential analysis techniques. The course will present several examples of social network analysis on existing data sets using the basic R programming language. A review of R language as needed for course purposes will be provided at the beginning of the semester*

#### *HBHE 61203 - Introduction to Mixed Methods Research Design*

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 63153 - Advanced Methods for Quality and Health Outcomes Research*

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.

#### *ENVH 54103/64103 - Geographic Information Systems in Public Health*

This course provides an introduction to Geographic Information Systems and geospatial technologies, with an emphasis on their practical applications in public health and related fields. Students will learn both theory and practice, including basics of working with geospatial data, principles of cartography, the use of ArcGIS Pro and ArcGIS Online (industry-leading GIS software), and numerous hands-on lab assignments examining real-world public health problems with actual data. Student will also complete a final project relevant to their professional interests, and will develop an interactive online map to present their findings

#### *NURS 61033 - Qualitative Research Methodology*

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.

*NURS 61043 - Quantitative Methodology in Nursing Research*

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.

*NURS 61083 - Qualitative Data Analysis, Theory and Practicum*

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 50103 - Data Information and Knowledge Representation*

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 50203 - Biomedicine for Informaticists*

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 50303 - Computational Methods in Biomedical Informatics*

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 51202 - Foundations of Biomedical Informatics: Population Health Information*

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. (2 credit)

*BMIG 60104 - Clinical Trial Data Management*

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. (4 credit)

**HEALTHCARE ADMINISTRATION**

*HPMT 51143 - Management of Healthcare Organizations*

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 52173 - Decision Analytics in Healthcare*

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 53443 - Healthcare Quality and Performance Improvement*

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 62133 - Variation in Health System Performance*

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 63153 - Advanced Methods for Quality & Health*

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.

*HPMT 63173 - Performance Measurement, Reporting and Incentives*

This course will assist students to develop competence in conducting performance measurement in healthcare and public health environments. Subjects addressed will include crafting program or organizational mission and objectives, engaging a performance measurement team, creating logic models to reflect program or organizational processes and

outcomes, identifying or crafting appropriate indicators, benchmarks, and targets, and communicating performance results to key audiences.

## **PHARMACEUTICAL EVALUATION AND POLICY**

### *PSCI 51173 - Foundations of Pharmaceutical Evaluation and Policy Research Methods*

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.

### *PSCI 51193- Applied Research Methods Using Retrospective Data*

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.

### *PSCI 51203 - Pharmacoeconomics and Health Technology Assessment*

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.

*PSCI 61153 - 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.

*PSCI 51263 - Patient-Reported Outcomes Measures* 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 63193 - 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 63303 - 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