

Master of Advanced Study in Clinical Research

Course Descriptions

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Please Note: All courses require approval of instructor for enrollment. Contact Stacy Hayashi with enrollment questions (sahayashi@ucdavis.edu).

Introduction to Translational Research: CLH 200

Summer – 1 unit

This foundational course introduces the scholar to the faculty responsible for the master's degree in clinical research, introduces select topics such as the development of conceptual models, career planning and development in translational research including facilitating the interaction of the scholar with other faculty who have successfully completed the program. The course combines some didactic presentations with interactive scholar centric exercises.

Introduction to Clinical Research: CLH 202

Summer – 3 units

This intensive 8-day course in clinical research methods covers developing a research question, study design, questionnaire design, data collection, data management, analysis, and preparing abstracts and publications, with a practical component focused on students' own research projects.

Methods in Clinical Research: CLH 203

Winter – 2 units

This survey course will expose scholars to a variety of different methods and approaches that may be used in clinical and translational science. Laboratory, pre-clinical, clinical, and epidemiological methods will be discussed, as well as methods in health services research and health informatics. In addition, the course is designed to be interactive and includes some sessions on scientific communication (peer to peer, and to the public). Scholars are expected to be active participants in each discussion.

The Ethics of Research: CLH 204

Spring – 3 units

This course will address several topics in research ethics. Students will acquire information about the ethical responsibilities that biomedical researchers face, explore some of the major questions in ethics and values generated by contemporary biomedical research, discuss the application of ethical principles and concepts to ethically challenging aspects of scientific research, and gain an appreciation of the role of trust in biomedical research.

Epidemiology for Health Professionals: SPH 205AY**Fall – 4 units**

This is an introductory course to cohort research, population research, and the rich interaction between these two methods of clinical-translational investigation. The student is expected to learn basic epidemiologic concepts and study design of clinical trials and population health issues. The course covers a wide spectrum of topics, e.g., measures of morbidity and mortality, diagnostic and screening tests, clinical and epidemiologic study design, confounding, interaction, bias, measures of risk and effect, and criteria for causality.

Team Science: CLH 207**Spring – 1 unit**

This course focuses on skills required to build and participate effectively in interdisciplinary research teams, challenging perceptions and building team work skills. Topics include leadership, conflict management, roles on teams, and effective communication. The course includes weekly reading assignments that are the basis for the discussion sections. Visiting faculty who bring real world academic experience to team science are featured weekly.

Critical Assessment of the Biomedical Literature: CLH 211**Fall, Winter, Spring – 1 unit**

This course has a journal club format, and exposes students to topical issues and controversies in the design of interdisciplinary translational research, with an emphasis on critical assessment of the biomedical and health sciences literature.

Introduction to Health Sciences Statistics: CLH 244/SPH 244**Fall – 4 units**

This course provides a basic introduction to the foundations of probability and statistics by focusing on quantitative methods for describing and visualizing data, statistical inference, and determining appropriate statistical tests for a variety of data types. Examples and instruction will be in SAS.

Biostatistics for the Health Sciences: CLH 245/SPH 245**Winter - 4 units**

This course covers the basic concepts of experimental study designs and statistical methods that are commonly used in health science research for inference and group comparison. Major topics include experimental design, ANOVA, linear regression methods, and logistic regression.

Biostatistics for Clinical and Population Research: CLH 246/SPH 246**Spring – 4 units**

Emphasizes critical biostatistics for clinical research and targets biomedical audience. Students will develop understanding for basic planning and analysis of clinical studies and learn to develop collaborations with biostatisticians.

CLH Electives

Introduction to Grant Writing, I: CLH 208

Fall – 2 units

This is the first in a two-quarter series (Fall/Winter). Scholars are expected to enroll in both classes. The two-course sequence provides training in practical aspects of competitive grant writing. The focus is on NIH format, but the information is applicable to other funding agencies. During the Fall quarter, scholars will write several sections of an NIH-format proposal. This is expected to be original work, not part of a previously submitted proposal or written by the mentor. Instruction will take place in both lecture format and small writing groups led by the course instructors. Scholars review each other's work weekly.

All enrolled scholars (both for credit and auditing) must have:

- A research mentor with whom they are actively working
- A research project already designed with the mentor's input
- Faculty, postdoctoral, or medical resident status (second year or later)
- Plans to submit a grant proposal in next 6-12 months

Introduction to Grant Writing, II: CLH 209

Winter – 2 units

This is the second in a two-quarter series (Prerequisite: CLH 208). Scholars finish writing the 6-page NIH-format grant application begun in Fall. At the end of Winter quarter, scholars participate in mock study sections, reviewing proposals of their peers, and gaining experience in providing feedback using NIH scoring criteria and structured templates.

Principles and Methods of Comparative Effectiveness Research: CLH210y

Spring – 4 units

Comparative effectiveness research (CER) is the conduct and synthesis of research comparing the benefits and harms of different interventions and strategies to prevent, diagnose, treat, and monitor health conditions in “real world” settings. It is a priority for the physical and economic health of the nation. This course will provide an introduction to CER and methods for conducting CER. The course will cover four areas of research methodology:

- Design and Analysis of Randomized Clinical Trials
- Design and Analysis of Observational Studies and Large Datasets
- Research Synthesis, Systematic reviews, and Meta-analysis
- Economic Evaluations, Modeling, and Health Policy

Introduction to Stem Cell Biology: CLH 212

Fall – 3 units

This course will introduce students to Stem Cell Biology, including general concepts, stem cells in lower organisms, embryonic stem cells and cellular reprogramming. Lecture, speakers, and discussion of scientific literature and could be offered at either campus depending on type of student interests.

Clinical Trials in Medicine: CLH 215**Winter – 2 Units**

The Clinical Trials course will provide the learner with fundamental information on the design, implementation, analyses and reporting of clinical trials. It will discuss the importance of clinical trials in improving health as well as the ethics of conducting such studies. The course will not only provide a deep exploration of the basic methods employed in clinical trials but will also explore specific advanced concepts. By the end of the course, the learner will have the necessary tools to design a protocol to conduct a clinical trial. This course is targeted for those who intend to design, lead, organize or otherwise participate in conducting a clinical trial. Learners should have appropriate prerequisites prior to this course (Epidemiology and Biostatistics). The course will be a combination of recorded lectures, in-person group discussions and assigned readings. Lectures will be pre-recorded and available to the learner prior to the in-class group discussion which will focus on aspects of that lecture. It is expected that the learner will have watched the week's recorded lecture prior to group discussion for that week. Selected readings will be appropriate for and build on the weeks' recorded lectures and in person discussion.

Clinical Research Implementation: CLH 216**Spring – 3 Units**

A step-by-step examination of the process of constructing and implementing a formal translational clinical research protocol, emphasizing evaluation of study feasibility, design of the formal clinical study protocol suitable for IRB review, and use of appropriate institutional resources to conduct human clinical trials. Each student will develop a formal clinical research protocol based on a topic of their choosing. The protocol will be based on the student's own research question.

Research Integration: CLH 240**Fall, Winter – 1 unit**

This course exposes students to successful researchers who will use their area of research as a platform to encourage discussion of the strengths, limitations, and extrapolation of translational research methods and results to treating human disease. Entrepreneurial research skills consistent with the iCORPS at NCTS training program will be introduced. Focus will be upon critical assessment of these translational research methods and techniques. The format for this course will be interactive and will require oral presentations.

Healthcare Delivery Science: CLH 298**Spring – 1 Unit**

This course provides participants with a foundational understanding of methods for moving evidence-based interventions into real-world settings through Healthcare Delivery Science. Despite acceleration in the pace of new discoveries and therapies, the quality chasm in health care and gaps between scientific evidence and clinical care delivery are of growing concern. Healthcare Delivery Science covers the continuum of dissemination, improvement, and implementation science. Dissemination science develops effective ways to communicate information on evidence-based interventions to health practitioners. Improvement science creates and sustains improvements in healthcare delivery, while implementation science studies methods to promote the systematic uptake of evidence-based practices into routine care to improve health outcomes.