Committee on Clinical and Translational Science

Department Website: http://chess.uchicago.edu/CCTS

The Committee on Clinical & Translational Science (CCTS) is a freestanding academic unit housed within the Biological Sciences Division. Our mission is to enhance multidisciplinary training in clinical and translational science at the University of Chicago. We seek to offer high-quality curriculum and mentorship to a new generation of researchers who will synthesize social and biological science to significantly advance medical science and practice.

With joint input from CHeSS and the Institute for Translational Medicine, the CCTS mobilizes faculty from across the University of Chicago to enhance course offerings at the university in clinical and translational science. We organize these courses into coherent areas of concentration designed to provide graduate-level trainees, postdoctoral fellows, and junior faculty with state-of-the-art skills in the field. For more information contact Kelsey Bogue, committee administrator at kbogue@bsd.uchicago.edu. You can also visit our website at chess.uchicago.edu/CCTS.

Current Areas of Concentration include:

- Comparative Effectiveness Research
- Translational Informatics
- Health Services Research
- Quality & Safety
- Clinical Research
- Community-Based Research
- Global Health
- Pharmacogenomics

In the "courses" tab there is a list of graduate courses that have been offered over the past two years. Refer to the CCTS section of the CHeSS website for current course offerings and prerequisites for each course:

http://chess.uchicago.edu/CCTS
Clinical and Translational Science Courses

CCTS 31300. Infectious Disease Epidemiology; Networks and Modeling. 100 Units.
No description available.
Instructor(s): M. David, J. Schneider Terms Offered: Spring 2015
Prerequisite(s): PBHS 30700 or PBHS 30900 or introductory epidemiology or consent of instructor.
Equivalent Course(s): PBHS 31300,BIOS 25419,MEDC 31300

CCTS 32411. Mediation, Moderation, and Spillover Effects. 100 Units.
This course is designed for graduate students and advanced undergraduate students from social sciences, statistics, public health science, public policy, and social services administration who will be or are currently involved in quantitative research. Questions about why a treatment works, for whom, under what conditions, and whether one individual’s treatment could affect other individuals’ outcomes are often key to the advancement of scientific knowledge. We will clarify the theoretical concepts of mediated effects, moderated effects, and spillover effects under the potential outcomes framework. The course introduces cutting-edge methodological approaches and contrasts them with conventional strategies including multiple regression, path analysis, and structural equation modeling. The course content is organized around application examples. The textbook “Causality in a Social World: Moderation, Mediation, and Spill-Over” (Hong, 2015) will be supplemented with other readings reflecting latest developments and controversies. Weekly labs will provide tutorials and hands-on experiences. All students are expected to contribute to the knowledge building in class through participation in presentations and discussions. Students are encouraged to form study groups, while the written assignments are to be finished and graded on an individual basis. Intermediate Statistics, Introduction to Causal Inference, and their equivalent are prerequisites.
Instructor(s): G. Hong Terms Offered: Spring
Prerequisite(s): Intermediate Statistics such as STAT 224 and Introduction to Causal Inference or their equivalent
Note(s): CHDV Distribution: M; M*
Equivalent Course(s): PSYC 32411,PBPL 29411,STAT 33211,SOCI 30318,CHDV 32411

CCTS 32901. Introduction to Clinical Trials. 100 Units.
This course will review major components of clinical trial conduct, including the formulation of clinical hypotheses and study endpoints, trial design, development of the research protocol, trial progress monitoring, analysis, and the summary and reporting of results. Other aspects of clinical trials to be discussed include ethical and regulatory issues in human subjects research, data quality control, meta-analytic overviews and consensus in treatment strategy resulting from clinical trials, and the broader impact of clinical trials on public health.
Instructor(s): J. Dignam Terms Offered: Spring
Prerequisite(s): PBHS 32100 or STAT 22000; Introductory Statistics or Consent of Instructor
Equivalent Course(s): STAT 35201,PBHS 32901
CCTS 38300. Health Economics and Public Policy. 100 Units.
This course analyzes the economics of health and medical care in the United States with particular attention to the role of government. The first part of the course examines the demand for health and medical care and the structure and the consequences of public and private insurance. The second part of the course examines the supply of medical care, including professional training, specialization and compensation, hospital competition, and finance and the determinants and consequences of technological change in medicine. The course concludes with an examination of recent proposals and initiatives for health care reform.
Instructor(s): D. Meltzer Terms Offered: Spring
Prerequisite(s): PBPL 20000 or ECON 20000 and one undergraduate course in quantitative research methods (Statistics or Econometrics) or the equivalent or consent of the instructor
Equivalent Course(s): ECON 27700,PPHA 38300,PBHS 38300,PBPL 28300

CCTS 40004. Advanced Clinical Pharmacology I. 050 Units.
This course provides an interactive introduction to fundamental principles of the practice of clinical pharmacology relevant to drug development and personalized therapeutics. Topics include: pharmacokinetics, drug metabolism, protein binding, absorption and renal and hepatic elimination, pharmacodynamics, introduction to modeling methods, evaluation of adverse events, and pre-clinical and clinical elements of drug development.
Instructor(s): N. Pinto, M. Sharma Terms Offered: Autumn
Prerequisite(s): MEDC 30777, equivalent Intro to Pharmacology course, or instructor approval.

CCTS 40006. Pharmacogenomics: Discovery and Implementation. 100 Units.
Pharmacogenomics is aimed at advancing our knowledge of the genetic basis for variable drug response. Advances in genetic knowledge gained through sequencing have been applied to drug response, and identifying heritable genetic variants that predict response and toxicity is an area of great interest to researchers. The ultimate goal is to identify clinically significant variations to predict the right choice and dose of medications for individuals—"personalizing medicine." The study of pharmacogenomics is complicated by the fact that response and toxicity are multigenic traits and are often confounded by nongenetic factors (e.g., age, co-morbidities, drug-drug interactions, environment, diet). Using knowledge of an individual's DNA sequence as an integral determinant of drug therapy has not yet become standard clinical practice; however, several genetics-guided recommendations for physicians have been developed and are highlighted. The ethics and economics of pharmacogenomics are also discussed.
Instructor(s): R. S. Huang, B. Stranger Terms Offered: Spring
Prerequisite(s): Ugrads (3 & 4 yrs only) must have taken BIOS 20187 & are required to email instructors for approval (bstranger@medicine.bsd.uchicago.edu & rhuang@medicine.bsd.uchicago.edu) prior to registering.
Equivalent Course(s): CABI 47510,BIOS 25310
CCTS 40300. Signal Transduction and Disease. 100 Units.
Topics include receptor ligands, membrane receptor tyrosine kinases and phosphatases, G proteins, proto-oncogenes, signaling pathways, cytoplasmic protein kinases and phosphatases, transcription factors, receptor-nucleus signaling, development and cancer, genetic dissection of signaling pathways, cell growth and cell proliferation, interplay of cell cycle regulators, cell cycle progression and apoptosis, and sensing of hypoxia and mechanical stimuli. The role of signaling in disease is a theme throughout the course.
Instructor(s): N. Dulin Terms Offered: Winter
Equivalent Course(s): MPMM 30600

CCTS 40400. Health Disparities in Breast Cancer. 100 Units.
Across the globe, breast cancer is the most common women’s cancer. In the last two decades, there have been significant advances in breast cancer detection and treatment that have resulted in improved survival rates. Yet, not all populations have benefited equally from these improvements, and there continues to be a disproportionate burden of breast cancer felt by different populations. In the U.S., for example, white women have the highest incidence of breast cancer but African-American women have the highest breast cancer mortality overall. The socioeconomic, environmental, biological, and cultural factors that collectively contribute to these disparities are being identified with a growing emphasis on health disparities research efforts. In this 10-week discussion-based course students will meet twice weekly and cover major aspects of breast cancer disparities.
Instructor(s): E. Dolan and S. Conzen Terms Offered: Winter. Course not offered every year.
Prerequisite(s): Biology majors: Three quarters of a Biological Sciences Fundamentals sequence and third or fourth year standing
Equivalent Course(s): CCTS 20400,BIOS 25327

CCTS 45000. Introduction to Biostatistics. 100 Units.
This course will provide an introduction to the basic concepts of statistics as applied to the bio-medical and public health sciences. Emphasis is on the use and interpretation of statistical tools for data analysis. Topics include (i) descriptive statistics; (ii) probability and sampling; (iii) the methods of statistical inference; and (iv) an introduction to linear and logistics regression.
Instructor(s): J. Cursio Terms Offered: Summer
Prerequisite(s): 2 quarters of pre-calculus
Note(s): *In addition to the course, there is a statistical computing workshop on Wednesdays from 10-11:30am.
Equivalent Course(s): PBHS 32100
CCTS 45100. Clinical Epidemiology. 100 Units.
Clinical epidemiology is the "application of epidemiologic principles and methods to problems encountered in clinical medicine." This course introduces the basic principles of epidemiologic study design, analysis and interpretation, with a particular focus on clinical applications. The course includes lectures and discussions based on critical appraisal of significant research articles. The course is primarily intended for, but not restricted to, students with prior clinical training. Public Health Sciences 30700 and 30900 may not both be taken for credit, either will fulfill the basic epidemiology requirement for the MSCP in Public Health Sciences and either will serve as the epidemiology prerequisite for Public Health Sciences 31001.
Instructor(s): B. Chiu, D. Lauderdale Terms Offered: Summer
Prerequisite(s): Introductory statistics recommended, may be taken concurrently.
Equivalent Course(s): PBHS 30700

CCTS 45200. Fundamentals of Health Services Research: Theory, Methods & Applications. 100 Units.
This course is designed to provide an introduction to the fundamentals of health services research. The basic concepts of health services research will be taught with emphasis on both their social scientific foundations and the methods needed for their practical application to empirically relevant research. Theoretical foundations will draw on principles from economics, sociology, psychology, and the other social sciences. Methodological topics to be covered will include techniques for data collection and analysis, including outcomes measurement, survey methods, large data set research, population-based study design, community based participatory research, research based in clinical settings, qualitative methods, cost-effectiveness analysis, and tools of economic and sociological analysis. The theoretical and empirical techniques taught will emphasize those relevant to the examination of health care costs, quality, and access. Major applications will include: measurement and improvement of health care quality, analysis of health disparities, analysis of health care technology, and analysis of health care systems and markets.
Instructor(s): D. Meltzer, M. H. Chin Terms Offered: Summer

CCTS 45300. Methods of Systematic Review. 025 Units.
This short course will introduce you to methods used to develop systematic reviews (both qualitative and quantitative i.e. meta-analysis) which have become increasingly popular in answering important health related questions. Students will work through the process of developing a review, including developing a sound clinical question, identifying, selecting, and assessing the quality of studies, identifying heterogeneity, and pooling results. Additional topics including identifying publication bias, subgroup and sensitivity analyses and emerging methods for meta-analysis will be covered very briefly. Students will also receive a brief introduction to meta-analysis software.
Instructor(s): E. Huang and G. Rao Terms Offered: Winter. This is a mini-course that lasts 4 weeks. Not offered every year.
Note(s): Course is open to faculty and staff who wish to audit.
CCTS 46001. Fundamentals of Quality Improvement and Patient Safety (QI & PS 101) 025 Units.
Quality Improvement & Patient Safety was designed for faculty and staff at University of Chicago Medicine with the support of the Center for Clinical and Translational Science (CCTS). The course provides an overview of concepts and methodologies for improving the quality and safety of care. Participants will design quality improvement projects using skills learned in class. In addition, UCMC leaders will speak on key topics throughout the course. Participants will become familiar with tools for improving quality of care and service delivery, such as the Model for Improvement and Lean Performance Improvement. Participants will design an actual quality improvement project and complete a personal improvement project using skills learned in the class. Participants will understand the factors impacting the delivery of safe and high quality care in health care organizations such as teamwork, good communication and organization culture. Participants will understand “Systems Thinking” and other key concepts in patient safety such as Human Factors and Reliability. Participants will understand the key role of QI in today’s health care environment as a mechanism for improving organizational effectiveness and the patient experience.
The course is comprised of seven classes total. Faculty, staff, and students/trainees at the University of Chicago Medical Center are welcome to audit the course and should contact Kelsey Bogue at kbogue@bsd.uchicago.edu to register.
Instructor(s): A. Davis, L. Botwinick Terms Offered: Autumn

CCTS 47001. Advanced Community Based Participatory Research (CBPR) Training Program 1. 000 Units.
The goal of health-related research is to improve the lives of people in the community studied. In traditional research, the community is not actively involved in designing the projects. Community-based participatory research is a partnership approach to research that equitably involves community members, organizational representatives, and academic researchers in all aspects of the research process. The Advanced CBPR Training Program is designed to help meet the growing need and demand for educational resources that help build the knowledge and skills needed to develop and sustain effective CBPR partnerships. The Program consists of six sessions that are offered on various Fridays throughout the year.
Instructor(s): D. Miller, D. Burnet Terms Offered: Autumn. Students must register for two-course sequence in order to receive course credit; CCTS 47001 and CCTS 47002 in Winter Quarter. Students must also register online. Contact CCTS administrator Kelsey Bogue at kbogue@bsd.uchicago.edu for more details.
CCTS 47002. Advanced Community Based Participatory Research (CBPR) Training Program 2. 025 Units.
The goal of health-related research is to improve the lives of people in the community studied. In traditional research, the community is not actively involved in designing the projects. Community-based participatory research is a partnership approach to research that equitably involves community members, organizational representatives, and academic researchers in all aspects of the research process. The Advanced CBPR Training Program is designed to help meet the growing need and demand for educational resources that help build the knowledge and skills needed to develop and sustain effective CBPR partnerships. The Program consists of six sessions that are offered on various Fridays throughout the year.
Instructor(s): D. Miller, D. Burnet Terms Offered: Winter. Students must register for two-course sequence in order to receive course credit; CCTS 47001 and CCTS 47002 in Winter Quarter. Students must also register online. Contact CCTS administrator Kelsey Bogue at kbogue@bsd.uchicago.edu for more details.

CCTS 47005. Methods in Health and Biomedical Informatics. 100 Units.
Most Health and Biomedical Informatics (HBMI) Graduate Programs around the country have independently come to the conclusion that the computational methods that informatics graduate students need to be familiar with is too broad and numerous to be addressed by a series of independent courses. Therefore, most programs have created a set of integrated courses that expose the students to a wide variety of informatics methods in short modules. Typically, these required methods series are organized as a series of required courses taken during the first year of graduate study. This course is the result of discussions by Health and Biomedical Informatics researchers and educators from the Chicago Biomedical Informatics Training (CBIT) initiative. This course is designed as the first course of a year-long sequence and is worth 100 units. Registration for the full year is expected.
Instructor(s): S. Volchenboum, D. McClintock, UIC & NU faculty Terms Offered: Autumn. Course location rotates between Northwestern's downtown campus, UChicago, and UIC Prerequisite(s): Basic understanding of Python programming language; prior or simultaneous enrollment in Health & Biomedical Informatics (HBMI) intro course.

CCTS 47006. Methods in Health and Biomedical Informatics II. 100 Units.
Most Health and Biomedical Informatics (HBMI) Graduate Programs around the country have independently come to the conclusion that the computational methods that informatics graduate students need to be familiar with is too broad and numerous to be addressed by a series of independent courses. Therefore, most programs have created a set of integrated courses that expose the students to a wide variety of informatics methods in short modules. Typically, these required methods series are organized as a series of required courses taken during the first year of graduate study. This course is the result of discussions by Health and Biomedical Informatics researchers and educators from the Chicago Biomedical Informatics Training (CBIT) initiative. This course is designed as the second course of a year-long sequence and is worth 100 units. Registration for the full year is expected.
Instructor(s): David McClintock and Samuel Volchenboum; Northwestern and UIC faculty Terms Offered: Winter. Course location rotates between Northwestern's downtown campus, UChicago, and UIC Prerequisite(s): CCTS 47005 in Autumn Quarter.
CCTS 47007. Methods in Health and Biomedical Informatics III. 100 Units.
Most Health and Biomedical Informatics (HBMI) Graduate Programs around the country have independently come to the conclusion that the computational methods that informatics graduate students need to be familiar with is too broad and numerous to be addressed by a series of independent courses. Therefore, most programs have created a set of integrated courses that expose the students to a wide variety of informatics methods in short modules. Typically, these required methods series are organized as a series of required courses taken during the first year of graduate study. This course is the result of discussions by Health and Biomedical Informatics researchers and educators from the Chicago Biomedical Informatics Training (CBIT) initiative. This course is designed as the third course of a year-long sequence and is worth 100 units. Registration for the full year is expected.
Instructor(s): David McClintock and Samuel Volchenboum; Northwestern and UIC faculty
Terms Offered: Spring. Course location rotates between Northwestern's downtown campus, UChicago, and UIC
Prerequisite(s): CCTS 47005 in Autumn Quarter and CCTS 47006 in Winter Quarter.

CCTS 47100. Bioinformatics Analysis of Integrative ‘Omics Data. 100 Units.
The workshop will focus on the integration of multiple ‘omic/clinical data sets to answer complex questions on Biomedical research. Strong focus will be placed on the use of NGS based ChIP-seq analysis pipeline and its integration with gene expression and clinical information.
Instructor(s): S. Volchenboum, J. Andrade Terms Offered: Autumn. Autumn (not offered every year); Meets over 4 days in December.
Prerequisite(s): Instructor consent is required. Visit chess.uchicago.edu/ccts for more information on how to apply to the course.
Equivalent Course(s): CCTS 27100
Font Notice

This document should contain certain fonts with restrictive licenses. For this draft, substitutions were made using less legally restrictive fonts. Specifically:

Times was used instead of Trajan.

Times was used instead of Palatino.

The editor may contact Leepfrog for a draft with the correct fonts in place.