

COURSE DESCRIPTIONS

Department courses required by all students

CPTS 801 Research grant proposal I (2 credit). The purpose of this course is for the learner to gain knowledge and experience in writing innovative research questions and hypotheses for grant applications. The course consists of several interactive lectures and workshops about the process of grant writing. Students will select a topic from one of several options, and complete most aspects of an NIH R21/R02 grant. A writing group discussion and/or presentation to the group for peer feedback is expected several times throughout the course. Farris and Hertz, Fall.

CPTS 802 Research grant proposal II (2 credit). The purpose of this course is for the learner to gain knowledge and experience in synthesizing literature and writing a review article. The course consists of several interactive lectures and workshops about the process of researching and writing a review. Students will write a review article within the topic of their dissertation research and submit it for publication as a review article. Zhu and Dorsch, Winter.

CPTS 803 Research Grant Proposal III (2 credit). Students will build upon the proposal skills obtained in CP 801 and the background information reviewed in CP 802 to draft a research proposal in the format of an NIH R03/R21-type grant for submission. The finished product will serve as the dissertation proposal for candidacy, which will be orally presented to the CP faculty. Stringer and Farris, Fall.

Pharm 647 Clinical trial and observational research designs (2 credits). The purpose of this course is for the learner to gain knowledge in designing and conducting clinical and observational trials, with a focus on threats to internal and external validity. This interprofessional course will also include a longitudinal group project to develop a clinical trial protocol and informed consent document. Hertz and Ellingrod, Winter.

CPTS 850 (former SAS 839) Clinical Pharmacy Seminar (1-2 credits). Weekly presentations of graduate students, faculty and/or visitors regarding current studies in pharmaceutical clinical and translational sciences. Professional development and skill development such as writing specific aims or giving job/chalk talks will also be included. Rotated among faculty, Fall and Winter.

CPTS 990 Dissertation pre-candidacy (1-8 credits). Election for dissertation work by doctoral students not yet admitted to candidacy. Fall and Winter.

CPTS 995 Dissertation candidacy (4-8 credits). Election for dissertation work by doctoral student admitted to candidacy. Fall and Winter.

Precision Pharmacotherapy Focus

CPTS 820: Clinical Translation in Pharmacokinetics (1.0) Pai, Every other Fall. This course will be taken in combination with PS 700.

CPTS 822: Research and Clinical Translation in Pharmacogenomics (3.0). This course focuses on methods for research and clinical translation of DNA (genetics and epigenetics) and RNA (transcriptomics) in precision pharmacotherapy, which we globally refer to as "pharmacogenomics". Students will learn research methods such as genomic data generation, analysis, and experimental models. Students will also learn methods for clinical translation such as genomics-driven clinical trials and how pharmacogenetics is implemented in clinical practice. Luzum/Ward/Pasternak, Every Winter.

CPTS 824: Research and Clinical Translation in Metabolomics and Proteomics (3.0) The proteome and metabolome are critical to understanding functional genomics and systems biology of diseases and drug response. The close proximity of the proteome and metabolome (i.e., enzymes are proteins) make them important for the discovery and validation of biomarkers for precision pharmacotherapy and for the identification of molecular targets for therapy and prevention. This course will introduce students to the basic theories, analytical methods, data analysis approaches and bioinformatics for data interpretation in proteomics

and metabolomics. The complexity of specimens, nuances of sample collection and the extreme dynamic range of protein and metabolite concentrations will also be discussed. Stringer and Zhu, Every other Fall

BIOINF 527 (4 credits) Introduction to Bioinformatics & Computational Biology

Health Services Research Focus

CPTS 830: Health Services Research (3.0) (Coe, Farris) Patient behavior is an important factor in how medications are used and the ultimate impact that they have on health. The purpose of this course is to introduce the learner to relevant theory and study designs that are used to study medication use outcomes. Health behavior and topics including medication adherence, care transitions, health disparities and pharmacy practice form the context for this course, in that all methods will use these contexts as examples. Specific methods for health services research will include survey designs, qualitative methods, mixed methods, practice-based research and secondary datasets/analyses. Every Winter.

CPTS 832: Pharmacy Informatics Research (3.0) (Dorsch, Lester) Informatics is an important system factor in how medication use may be impacted. The purpose of this course is for the learner to gain knowledge and experience in the use of pharmacy informatics to support their research. This course is structured around three major components of pharmacy informatics research, including human factors engineering, medication data analytics, and human-computer interaction. Within each core module, we focus on theories, methodologies, and applications in pharmacy to answer interesting research questions in the discipline. Students will facilitate discussions based on the required readings each week. In addition, a semester-long project will hone their ability to apply the concepts learned and build their research skills. Every other Fall.

CPTS 834: (formerly P780) Patient Reported Outcomes (2.0) HSR Faculty. This course examines the role of patient-reported outcome measures in studying the impact of illness and the effects of pharmaceutical products and services. The course provides an overview of the theoretical foundations underlying the assessment of patient-reported outcomes, reviews methods used to develop and assess the psychometric properties of patient-reported outcome measures, and examines how these measures are currently used in research and practice. Every other Fall.

One additional statistics course that may include:
SOC 523 (3 credits) Qualitative Research Methods

Other courses required of all students

BIOSTAT 521 (3 credits) Applied Biostatistics or similar

BIOSTAT 522 (3 credits) Applied Biostatistical Analysis for Health-related Studies or similar

MEDICINAL CHEMISTRY 660: Responsible Conduct of Research and Scholarship (RCRS) in Pharmaceutical Sciences. This course is REQUIRED for the ALL first year graduate students entering the College of Pharmacy (this includes Medicinal Chemistry, Pharmaceutical Sciences and Clinical Pharmacy Translational Sciences) and is designed to satisfy the requirement of many government and national funding agencies for a standard course in the responsible conduct of research and scholarship in the biomedical sciences. This course meets once a month in the early evening for the entire school year (9 classes), and pizza and drinks are provided. Attendance and active participation is REQUIRED for every new graduate student in the COP. For each session, a chapter in an ethics book will be assigned to read as well as a short case study to each student to be presented to their classmates with class discussion following each presentation. Details about the requirements and procedures for this course can be found in the course syllabus.