

# PGS - Pharmacy Graduate Studies

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## Pharmacy Graduate Studies: PGS

### Lower-Division Courses

### Upper-Division Courses

### Graduate Courses

#### **PGS 480E. Concepts in Biomedical Pharmacology.**

Explore fundamental concepts of pharmacology, pharmacologic agents and relevant physiology and disease pathophysiology in the areas of neuropharmacology; cardiovascular; gastrointestinal; renal; hematopoiesis; immune/asthma/allergy; endocrine; anti-virals and anti-retrovirals; cancer therapeutics and immunotherapy. Four lecture hours a week for one semester Pharmacy Graduate Studies 380G and 480E may not both be counted. Offered on the letter-grade basis only. Prerequisite: Graduate standing and experience or prior coursework in physiology, biochemistry, or organic chemistry.

#### **PGS 180J, 280J, 380J. Advanced Pharmaceutics: Laboratory Research.**

Three, six, or nine laboratory hours a week for one semester. May be repeated for credit. Prerequisite: Graduate standing and consent of instructor.

#### **PGS 180M, 280M, 380M. Topics in Advanced Pharmaceutics.**

For each semester hour of credit earned, one lecture hour a week for one semester. Pharmacy 180M, 280M, 380M and Pharmacy Graduate Studies 180M, 280M, 380M may not both be counted unless the topics vary. May be repeated for credit when the topics vary. Prerequisite: Graduate standing; additional prerequisites vary with the topic.

#### **PGS 380S. Basic Principles in Experimental Design and Statistics.**

Basic principles in experimental design and statistics with a focus on real world situations that may be encountered while performing scientific research. Three lecture hours a week for one semester. Prerequisite: Graduate standing and consent of instructor.

#### **PGS 380T. Texas Venture Labs Startup Practicum.**

Places students in teams and connects them with Austin-area startup companies. The teams then execute business consulting projects for the startup companies. Explores how these projects help companies better understand their market, competition, business model, etc, in order to accelerate their path to market and funding decisions. Three lecture hours a week for one semester Only one of the following may be counted: Aerospace Engineering 396 (Topic: Texas Venture Labs Practicum), Electrical Engineering 390V (Topic: Texas Venture Labs Practicum), Engineering Mechanics 397 (Topic: Texas Venture Labs Practicum), Management 385 (Topic: Texas Venture Labs Practicum), Mechanical Engineering 397 (Topic: Texas Venture Labs Practicum), Pharmacy Graduate Studies 380M (Topic: Texas Venture Labs Startup Practicum). Prerequisite: Graduate standing.

#### **PGS 381F. Product Development.**

Application of physical-chemical principles to the formulation and development of stable and bioavailable drug delivery systems. Three lecture hours a week for one semester. Offered on the letter-grade basis only. Prerequisite: Graduate standing in the College of Pharmacy, or consent of instructor.

#### **PGS 381G. Advanced Manufacturing Pharmacy.**

Physical-mechanical properties of compacts, drugs, and polymers. Properties of biodegradable and nonbiodegradable polymers in pharmaceutical formulations. Process validation and pilot plant scale-up. Three lecture hours a week for one semester. Offered on the letter-grade basis only. Prerequisite: Graduate standing in the College of Pharmacy, or consent of instructor.

#### **PGS 381H. Advanced Pharmaceutical Processing.**

Didactic and laboratory exposure to pharmaceutical processes used in the design, development, and optimization of drug delivery systems. Emphasis on equipment and machinery used in pharmaceutical manufacturing of these dosage forms, with discussion of other issues, such as technology transfer and scale-up. Three lecture hours a week for one semester. Offered on the letter-grade basis only. Prerequisite: Graduate standing in the College of Pharmacy, or consent of instructor.

#### **PGS 181J, 281J, 381J. Advanced Pharmacy Administration: Laboratory Research.**

Three, six, or nine laboratory hours a week for one semester. May be repeated for credit. Prerequisite: Graduate standing and consent of instructor.

#### **PGS 181M, 281M, 381M. Topics in Advanced Pharmacy Administration.**

For each semester hour of credit earned, one lecture hour a week for one semester. Pharmacy 181M, 281M, 381M and Pharmacy Graduate Studies 181M, 281M, 381M may not both be counted unless the topics vary. May be repeated for credit when the topics vary. Prerequisite: Graduate standing; additional prerequisites vary with the topic.

#### **PGS 381N. Health Care Systems.**

Overview of the health care system in the United States and examination of the classic and contemporary literature on managed health care systems, with emphasis on pharmacy-related issues. Studies the advantages, disadvantages, and effects of these systems on patients, providers, and payers. Three lecture hours a week for one semester. Prerequisite: Graduate standing.

#### **PGS 381V. Communication Skills for Translational Scientists.**

Explores oral and written communication skills for scientists conducting translational research at the interface of basic and clinical science. Introduction to the skills necessary to successfully convey medication and healthcare-related data in a professional manner. Involves discussions addressing subjects such as medical writing, grant writing, abstract development, and poster design. Three lecture hours a week for one semester Prerequisite: Graduate standing and consent of instructor.

#### **PGS 381W. Molecular and Pharmacological Basis of Therapeutics.**

Broad issues of molecular pharmacotherapeutics, including potential and challenge for optimization of drug therapy, implications for drug development and regulation, ethical and social aspects of pharmacogenomics, signal transduction, use of knock-out mice, and informed consent process in pharmacogenomic research. Three lecture hours a week for one semester. Pharmacy 381W and Pharmacy Graduate Studies 381W may not both be counted. Offered on the letter-grade basis only. Prerequisite: Graduate standing and consent of instructor.

#### **PGS 382F. Analytical Methods in Biologics Formulation.**

Explore theory and practice of techniques used to characterize and analyze pre-formulated and formulated biologics, as well as basic biology specific to formulation sciences. Three lecture hours a week for one

semester. Offered on the letter-grade basis only. Prerequisite: Graduate standing.

#### **PGS 282J. Advanced Pharmacotherapy Seminar I.**

Discussion of advanced pharmacotherapeutics topics, case presentations, and journal clubs at the advanced practitioner level. Two lecture hours a week for one semester. Prerequisite: Graduate standing and consent of instructor.

#### **PGS 282K. Advanced Pharmacotherapy Seminar II.**

Discussion of advanced pharmacotherapeutics topics, case presentations, and journal clubs at the advanced practitioner level. Two lecture hours a week for one semester. Prerequisite: Graduate standing and consent of instructor.

#### **PGS 382R. Topics in Recent Advances in Pharmaceutics.**

Presentation of topics of current research interest in physical pharmacy, biopharmaceutics, and pharmacokinetics. Three lecture hours a week for one semester. May be repeated for credit when the topics vary. Prerequisite: Graduate standing.

#### **PGS 282S, 382S. Advanced Biopharmaceutics.**

Provides students with a more comprehensive background in biopharmaceutics and the drug approval process. For each semester hour of credit earned, one lecture hour a week for one semester. Only one of the following may be counted: Pharmacy 382S, Pharmacy Graduate Studies 280M (Topic: Advanced Biopharmaceutics), 282S, 382S. Prerequisite: Graduate standing or consent of instructor.

#### **PGS 382T. Basic Concepts of Tumor Biology.**

A survey of cancer biology that includes tumor pathology, initiation, progression and metastasis, genetic instability, DNA damage and repair, cell cycle control, oncogenes, tumor suppressor genes, and the immune response. Three lecture hours a week for one semester. Offered on the letter-grade basis only. Prerequisite: Graduate standing.

#### **PGS 382U. Drug Discovery and Development.**

Examine the fundamental principles of drug discovery and development including patenting, clinical trials, and marketing. Three lecture hours a week for one semester. Offered on the letter-grade basis only. Prerequisite: Graduate standing and consent of instructor.

#### **PGS 382V. Pharmaceutical Biotechnology.**

Application of protein, oligonucleotide, and related molecules as therapeutic agents: stability, formulation, kinetics, dynamics. Three lecture hours a week for one semester. Prerequisite: Graduate standing; and the following coursework: Pharmacy PharmD 387M, 287N, and 388M, or the equivalent; or consent of instructor.

#### **PGS 182W. Ethics in Science and Clinical Practice.**

Ethical considerations in the conduct of clinical research, including institutional review boards, adherence to protocol, Food and Drug Administration and related site reviews, protection of human subjects through informed consent and confidentiality, and the use of genetic banks in research. One lecture hour a week for one semester. Prerequisite: Graduate standing and consent of instructor.

#### **PGS 383D. Neuropharmacology I.**

An advanced survey of neurotransmitters and systems in the brain. Covers experimental approaches and pharmacological analysis at behavioral, neurochemical, and neuroanatomical levels to determine mechanisms of actions of drugs that act on the brain. Three lecture hours a week for one semester. Neuroscience 383D and Pharmacy

Graduate Studies 383D may not both be counted. Prerequisite: Graduate standing.

#### **PGS 383E. Neuropharmacology II.**

Same as Neuroscience 383E. Explore neuropharmacological concepts related to brain development, organization and anatomy; neuroendocrinology, neuroimmunology and neuroinflammation; gut-brain axis; neurobiology of addiction; and others. Three lecture hours a week for one semester. Only one of the following may be counted: Neuroscience 383E, 385L (Topic: Neuropharmacology II), Pharmacy Graduate Studies 383E. Prerequisite: Graduate standing and consent of instructor.

#### **PGS 383G. Analytical Methods in Biologic Formulations.**

Examine primary challenges in formulating biologics. Compare relevant techniques to characterize and analyze biopharmaceuticals and explore how they are applied in pre-formulated and formulated biologics. Three lecture hours a week for one semester. Pharmacy Graduate Studies 380M (Topic: Analytical Methods in Biologic Formulation) and 383G may not both be counted. Offered on the letter-grade basis only. Prerequisite: Graduate standing and a background in pharmaceutical sciences, mathematics, and chemistry.

#### **PGS 383M. Health Innovation Entrepreneurship.**

Explore a highly interactive and interdisciplinary approach for developing health innovation, including drug product, devices, and digital health solutions. Examine foundational entrepreneurial and innovation concepts for identifying and developing ideas, performing market validation, conducting customer discovery, assessing competition, and identifying skills for effectively working in teams. Three lecture hours a week for one semester. Only one of the following may be counted: Pharmacy Graduate Studies 380M (Topic: Entrepreneurship/Health Innovation), 383M, Pharmacy PharmD 382R (Topic: Entrepreneurship/Health Innovation), 383M. Offered on the letter-grade basis only. Prerequisite: Graduate standing.

#### **PGS 383N. Solution Theory and Disperse Systems.**

The theory and technology of solutions and heterogeneous systems; applications of scientific principles to the design of pharmaceutical products; a study of factors influencing physical chemical characteristics, stability, and biopharmaceutical activity of solutions and coarse dispersions; review of recent literature. Three lecture hours a week for one semester. Prerequisite: Graduate standing and consent of instructor.

#### **PGS 383P. Advanced Pharmacokinetics.**

Study of the kinetics of absorption, distribution, metabolism, and excretion of drugs in the intact organism. Three lecture hours a week for one semester. Prerequisite: Graduate standing, and Pharmacy 252C or an equivalent pharmacokinetics course.

#### **PGS 383Q. Statistics in Translational Science.**

Pharmaceutical statistical analysis with a focus on choosing the appropriate statistical test to address both basic science and clinical research hypotheses. Students use the JMP software package to execute statistical analysis on their own pharmaceutical research projects. Three lecture hours a week for one semester. Offered on the letter-grade basis only. Prerequisite: Graduate standing in the College of Pharmacy or Translational Science Graduate Program; and an introductory statistics course or consent of instructor.

#### **PGS 383R. Rate Processes in Pharmaceutical Systems.**

A study of decomposition and stabilization of drug molecules in solutions and in solid dosage forms; principles of kinetics and diffusion

as applied to pharmaceutical systems. Three lecture hours a week for one semester. Prerequisite: Graduate standing and consent of instructor.

### **PGS 383V. Research Design and Methods.**

Explore a practical approach to classical experimental design, hypothesis generation, development of translational research methods that incorporate principles of basic and clinical science. Examine writing with a focus on grantsmanship and protocol development. Three lecture hours a week for one semester. Prerequisite: Graduate standing and consent of instructor.

### **PGS 383W. Biopharmaceutical Analysis.**

Analytical methods for the isolation and identification of drugs and their metabolites, specific genes, and proteins in biological fluids. Three lecture hours a week for one semester. Prerequisite: Graduate standing in pharmacy, completion of a PharmD degree, and concurrent enrollment in Pharmacy Graduate Studies 184U.

### **PGS 384G. Pharmacological Mechanisms of Addiction.**

Overview of neurobiological and pharmacological mechanisms of addiction, with in-depth discussion of recent literature in the field of addiction and animal models of addiction. Three hours of lecture per week for one semester. Only one of the following may be counted: Neuroscience 385L (Topic: Pharmacolgc1 Mechs of Addictn), Pharmacy Graduate Studies 384G, 388K (Topic: Pharmacolgc1 Mechs of Addictn). Offered on the letter-grade basis only. Prerequisite: Graduate standing and consent of instructor.

### **PGS 384K. Fundamentals of Toxicology.**

An organ system approach to advanced topics in general toxicology. Three lecture hours a week for one semester. Required course for pharmacology and toxicology graduate students specializing in toxicology. Offered on the letter-grade basis only. Prerequisite: Graduate standing, and some background in pharmacology or consent of instructor.

### **PGS 384L. Biochemical and Molecular Toxicology.**

Discussion of mechanisms of selected drugs and toxicants. Three lecture hours a week for one semester. Offered on the letter-grade basis only. Prerequisite: Graduate standing, and some background in pharmacology or consent of instructor.

### **PGS 384N. Health Behavior Theory and Medication Use Process.**

In-depth analysis of the social and behavioral issues that affect medication use, using the content, theories, and methodologies associated with patient compliance research. Three lecture hours a week for one semester. Prerequisite: Graduate standing.

### **PGS 384S. Introduction to Epidemiology.**

Principles of epidemiology; descriptive analytic, and clinical epidemiology; epidemiologic perspective for health care management; epidemiology and the public policy process; pharmacoepidemiology. Three lecture hours a week for one semester. Prerequisite: Graduate standing; with consent of instructor, may be taken by students in the professional pharmacy curriculum.

### **PGS 384T. Advanced Epidemiology.**

Review of major research methods and current issues within drug epidemiology. Emphasis on application of methods by reviewing historical and contemporary literature/examples. Areas presented include: how to read, interpret, design, conduct, review, critique and evaluate pharmacoepidemiology studies. Three lecture hours a week for one semester. Pharmacy 381M (Topic: Advanced Epidemiology) and Pharmacy Graduate Studies 384T may not both be counted. Prerequisite:

Graduate standing, and Pharmacy Graduate Studies 384S or consent of instructor.

### **PGS 184U. Biopharmaceutical Analysis Laboratory.**

Analytical methods for the isolation and identification of drugs and their metabolites, specific genes, and proteins in biological fluids. One lecture hour and three laboratory hours a week for one semester. Prerequisite: Graduate standing in pharmacy, registration for Pharmacy Graduate Studies 383W, and completion of a PharmD degree.

### **PGS 185D. Responsible Conduct of Science.**

Ethical considerations in the conduct of science, including issues of animal welfare and/or human subjects research, data analysis, fraud, publications, misconduct, intellectual property, grants, peer review, and mentor responsibility. One lecture hour a week for one semester. Neuroscience 185D and Pharmacy Graduate Studies 185D may not both be counted. Offered on the credit/no credit basis only. Prerequisite: Graduate standing and admission to the doctoral program in pharmacy, or consent of instructor.

### **PGS 185G. Grant Writing for Pharmacology and Toxicology.**

Subjects include federal and nonfederal grants, specific aims, preliminary data, hypothesis testing, experimental design, peer review, responding to critiques, biosketch, and budgeting. One lecture hour a week for one semester. Offered on the credit/no credit basis only. Prerequisite: Graduate standing in the pharmacology and toxicology program or consent of instructor.

### **PGS 185J, 285J, 385J. Advanced Pharmacotherapy Laboratory Research.**

Three, six, or nine laboratory hours a week for one semester. May be repeated for credit. Prerequisite: Graduate standing and consent of instructor.

### **PGS 385L. Clinical Pharmacokinetics.**

In-depth analysis of pharmacotherapeutic regimens, using complex mathematical models. Three lecture hours a week for one semester. Offered on the letter-grade basis only. Prerequisite: Graduate standing and consent of instructor.

### **PGS 385M. Advanced Pharmacokinetics and Pharmacodynamics.**

Continuation of Pharmacy Graduate Studies 385L. Advanced pharmacokinetic and pharmacodynamic concepts and their application. Three lecture hours a week for one semester. Prerequisite: Graduate standing, Pharmacy Graduate Studies 385L and consent of instructor.

### **PGS 185N. Translational Science PhD Seminar.**

Restricted to students pursuing a Doctor of Philosophy in Translational Science. Explore the scientific and operational principles underlying each step of the translational process, with an emphasis on multi-disciplinary, collaborative research and methods to move discovery more efficiently and effectively into application. One lecture hour a week for one semester. Pharmacy Graduate Studies 185N and 186N (Topic: Translational Sci PHD Seminar) may not both be counted. Offered on the letter-grade basis only. Prerequisite: Graduate standing.

### **PGS 185W, 285W, 385W. Advanced Topics in Pharmacotherapy.**

One, two, or three lecture hours a week for one semester. Pharmacy 185W and Pharmacy Graduate Studies 185W, 285W, 385W may not both be counted unless the topics vary. May be repeated for credit when the topics vary. Prerequisite: Graduate standing and consent of instructor; additional prerequisites vary with the topic.

**PGS 386C, 486C. Cellular and Systems Physiology I.**

Basic principles of human physiology and anatomy in relation to drug action. Includes cellular and subcellular physiology, membrane transport, electrophysiology, synaptic transmission, and autonomic, neurological, and cardiovascular physiology and anatomy. For each semester hour of credit earned, one lecture hour a week for one semester. Offered on the letter-grade basis only. Prerequisite: Graduate standing in the Institute for Cellular and Molecular Biology, the Institute for Neuroscience, pharmacy, or psychology; and consent of instructor.

**PGS 386D, 486D. Cellular and Systems Physiology II.**

Principles of cellular and systems physiology. Subjects include immunology, kidney function, respiration, acid-base balance, blood and hematopoiesis, general endocrinology, neuroendocrinology, and reproduction. For each semester hour of credit earned, one lecture hour a week for one semester. Offered on the letter-grade basis only. Prerequisite: Graduate standing, and Pharmacy Graduate Studies 386C, 486C or consent of instructor.

**PGS 186J, 286J, 386J. Advanced Medicinal Chemistry: Laboratory Research.**

Modern laboratory techniques used in medicinal and natural products chemistry. Three, six, or nine laboratory hours a week for one semester. May be repeated for credit. Prerequisite: Graduate standing and consent of instructor.

**PGS 386M. Pharmaceutical Industry and Marketing.**

Subjects include the structure, size, and regulation of the pharmaceutical industry, including good manufacturing practices; drug development, pricing, marketing, and channels of distribution; and issues that impact the drug development industry, including generic drug competition, patent life, active ingredient importation and finished drug product importation, drug counterfeiting and safety concerns, direct-to-consumer advertising, and the drug approval process. Three lecture hours a week for one semester. Prerequisite: Graduate standing and consent of instructor.

**PGS 186N, 286N, 386N, 486N. Topics in Pharmacy.**

Current issues in translational science. For each semester hour of credit earned, one lecture hour a week for one semester. Pharmacy 186N, 286N, 386N, 486N and Pharmacy Graduate Studies 186N, 286N, 386N, 486N may not both be counted unless the topics vary. May be repeated for credit when the topics vary. Prerequisite: Graduate standing and admission to the Doctor of Philosophy in Translational Science degree program; additional prerequisites vary with the topic.

**PGS 387G. Manuscripts in Pharmaceutical Science.**

Explore skills essential for scientific leaders including scientific reviewing, reasoning, and writing, and their application to critically reviewing and communicating research plans and data. Three lecture hours a week for one semester. Pharmacy Graduate Studies 382R (Topic: Manuscripts in Pharmaceutical Sci) and 387G may not both be counted. Offered on the letter-grade basis only.

**PGS 387Q, 487Q. Communication Skills for Scientists.**

Designed to enhance written and oral communication skills through lectures and practice. Covers grant writing, journal paper writing, poster presentation writing, and delivery. For every hour of credit earned, one lecture hour a week for one semester. Pharmacy 487Q and Pharmacy Graduate Studies 387Q, 487Q may not both be counted. Offered on the letter-grade basis only. Graduate standing in pharmacy, neuroscience, or a biological science; additional prerequisite for international students: completion of the University's English Certification Program or consent of instructor.

**PGS 388C. Introductory Bioorganic Chemistry.**

Survey of enzyme-catalyzed reactions, with emphasis on mechanism, experimental design, and applications in natural products biosynthesis. Three lecture hours a week for one semester. Prerequisite: Graduate standing, and undergraduate courses in organic chemistry and biochemistry or consent of instructor.

**PGS 188G. Dialogue Across Difference.**

Develop framework, terminology, and critical thinking and empathy tools for engaging in productive conversations around difficult topics. Explore both differences and commonalities across and within social identities, dialogue about issues pertaining to systems of oppression and enhance intercultural competencies. Examine the meaning of social identities and how they intersect, influence and/or are influenced by others. One lecture hour a week for one semester. Pharmacy Graduate Studies 180M (Topic: Dialogue Across Difference) and 188G may not both be counted. Prerequisite: Graduate standing in pharmaceutical or translational sciences.

**PGS 188J, 288J, 388J. Advanced Pharmacology: Laboratory Research.**

Three, six, or nine laboratory hours a week for one semester. May be repeated for credit. Prerequisite: Graduate standing and consent of instructor.

**PGS 188K, 288K, 388K. Topics in Advanced Pharmacology.**

For each semester hour of credit earned, one lecture hour a week for one semester. Pharmacy 188K, 288K, 388K and Pharmacy Graduate Studies 188K, 288K, 388K may not both be counted unless the topics vary. May be repeated for credit when the topics vary. Prerequisite: Graduate standing and consent of instructor; additional prerequisites vary with the topic.

**PGS 288M. Fundamentals of Fluorescence Microscopy.**

Same as Neuroscience 288M. Explores optics, image formation, functioning of epifluorescent and confocal microscopes, detector technology (cameras and photomultiplier tubes), immunofluorescence techniques, image analyses, and image presentation for publication. Study of the technology and science behind widely-used high-end microscope systems. One lecture hours and two lab hours a week for one semester Only one of the following may be counted: Neuroscience 285L (Topic: Fundamentals of Fluorescence Microscopy), 288M, Pharmacy Graduate Studies 288K (Topic: Fundamentals of Fluorescence Microscopy), 288M. Offered on the letter-grade basis only. Prerequisite: Graduate standing and consent of instructor.

**PGS 389C. Pharmacy Association Management.**

An introduction to the principles involved in managing pharmacy associations. Nine hours of fieldwork a week for one semester. Pharmacy 329C and Pharmacy Graduate Studies 389C may not both be counted. Prerequisite: Graduate standing and consent of instructor.

**PGS 389J. Advanced Pharmacotherapeutics of Cardiovascular Disorders.**

Designed to provide the student with a sound knowledge and comprehension of contemporary pharmacotherapeutic regimens used in treating cardiovascular diseases. Three lecture hours a week for one semester. Offered on the letter-grade basis only. Prerequisite: Graduate standing and consent of instructor.

**PGS 389M. Fundamentals of Health Innovations.**

Explore foundational innovation and entrepreneurship concepts related to the process of developing novel drug therapies, medical devices, diagnostics, and digital health products and services. Three lecture hours a week for one semester Only one of the following may be counted:



Pharmacy Graduate Studies 380M (Topic: Fundamentals of Health Innovations), 389M, Pharmacy PharmD 382R (Topic: Fundamentals of Health Innovations), 389M. Offered on the letter-grade basis only. Prerequisite: Graduate standing.

### **PGS 389P. Advanced Pharmacotherapeutics of Infectious Diseases.**

Designed to provide the student with a sound knowledge and comprehension of contemporary therapeutic principles used in treating infectious diseases. Three lecture hours a week for one semester. Offered on the letter-grade basis only. Prerequisite: Graduate standing and consent of instructor.

### **PGS 189Q. Seminar in Alcohol Studies.**

Presentations and discussion of current research topics in alcohol studies. One lecture hour a week for one semester. Offered on the credit/no credit basis only. Prerequisite: Graduate standing and consent of instructor.

### **PGS 190G, 290G, 390G. Topics in Advanced Pharmacotherapeutics of Human Diseases and Illnesses.**

A comprehensive analysis of disease processes and a determination of appropriate therapeutic interventions for the treatment of those diseases. For each semester hour of credit earned, one lecture hour a week for one semester. May be repeated for credit when the topics vary. Prerequisite: Graduate standing and consent of instructor; additional prerequisites vary with the topic.

### **PGS 190H. Advanced Pharmaceutics Research Conference.**

One lecture hour a week for one semester. May be repeated for credit. Offered on the letter-grade basis only. Prerequisite: Graduate standing.

### **PGS 390J. Data Analysis in Health Care.**

Statistical analysis of research data using the computer and various statistical software programs. Three lecture hours a week for one semester. Prerequisite: Graduate standing, and an introductory course in statistics or consent of instructor.

### **PGS 390K. Experimental Design and Research Methodology in Health Care.**

Principles and procedures of experimental, quasi-experimental, and non-experimental research designs; includes reliability, validity, data collection methods, qualitative study designs, and survey methodologies. Three lecture hours a week for one semester. Prerequisite: Graduate standing.

### **PGS 190R, 290R, 390R. Topics in Pharmacotherapy: Special Problems.**

Individual supervision of research problems in the clinical pharmacy sciences, including pharmacokinetics, pharmacodynamics, efficacy, safety, and pharmaceutical care. Three, six, or nine laboratory hours a week for one semester. Pharmacy 190R, 290R, 390R and Pharmacy Graduate Studies 190R, 290R, 390R may not both be counted unless the topics vary. May be repeated for credit when the topics vary. Prerequisite: Graduate standing and consent of instructor; additional prerequisites vary with the topic.

### **PGS 390U. Advanced Research Methods in Health Care.**

Advanced methodologies used in pharmacy administration research; designed to build upon the skills covered in Pharmacy 390K. Explores data management issues and statistical procedures, with emphasis on the application of research methodology concepts and principles. Three lecture hours a week for one semester. Prerequisite: Graduate standing and Pharmacy Graduate Studies 390K.

### **PGS 291E. Advanced Hematology and Oncology Seminar I.**

In-depth discussion of the contemporary pharmacotherapy and patient care relating to hematology, oncology, and bone marrow transplantation. Two lecture hours a week for one semester. Offered on the credit/no credit basis only. Prerequisite: Graduate standing and consent of instructor.

### **PGS 291F. Advanced Hematology and Oncology Seminar II.**

In-depth discussion of the contemporary pharmacotherapy and patient care relating to hematology, oncology, and bone marrow transplantation. Two lecture hours a week for one semester. Offered on the credit/no credit basis only. Prerequisite: Graduate standing and consent of instructor.

### **PGS 191H. Advanced Health Outcomes and Pharmacy Practice Research Conference.**

One lecture hour a week for one semester. May be repeated for credit. Offered on the letter-grade basis only. Prerequisite: Graduate standing.

### **PGS 292E. Clinical Research Methods I.**

Defining a research question, general study design issues, cross-sectional and case-control studies, and diagnostic test evaluation. Two lecture hours a week for one semester. Prerequisite: Graduate standing.

### **PGS 292F. Clinical Research Methods II.**

Prospective observational studies; randomized controlled trials, nonrandomized intervention studies; meta-analysis; and data synthesis, evaluation, and application. Two lecture hours a week for one semester. Pharmacy 292F and Pharmacy Graduate Studies 292F may not both be counted. Prerequisite: Graduate standing; and Pharmacy Graduate Studies 292E (or Pharmacy 292E) or consent of instructor.

### **PGS 192Q. Interdisciplinary Collaboration and Career Development.**

An overview of pharmacy and its primary disciplines of pharmaceutics, medicinal chemistry, pharmacy administration and practice, pharmacotherapy, and pharmacology/toxicology. One lecture hour a week for one semester. Only one of the following may be counted: Pharmacy Graduate Studies 191Q, 192Q, 194Q. Offered on the letter-grade basis only. Prerequisite: Graduate standing.

### **PGS 092T. Joint PhD Program with Partner Institutions.**

Translational science study at partner institutions. May not be taken concurrently with another course at the University of Texas at Austin. May be repeated for credit. Offered on the credit/no credit basis only. Prerequisite: Graduate standing and admission to the Doctor of Philosophy in Translational Science degree program.

### **PGS 393Q. Health-Related Quality of Life.**

Terms, concepts, procedures, methods, problems, and strengths associated with health-related quality of life (HRQOL) research. Three lecture hours a week for one semester. Prerequisite: Graduate standing.

### **PGS 393T. Pharmacoeconomics.**

Terms, concepts, procedures, methods, problems, and strengths associated with pharmacoeconomics. Three lecture hours a week for one semester. Only one of the following may be counted: Pharmacy 394F, Pharmacy Graduate Studies 393T, Pharmacy PharmD 393F, 394F. Offered on the letter-grade basis only. Prerequisite: Graduate standing and consent of instructor.

### **PGS 193U, 293U, 393U, 693U, 993U. Pharmacotherapy Master's Mentorship.**

Experience in pharmacy practice, research, and/or administration. For each semester hour of credit earned, three hours of fieldwork a week

for one semester. May be repeated for credit. Offered on the letter-grade basis only. Prerequisite: Graduate standing and consent of instructor.

#### **PGS 194Q. Professional Development for Pharmaceutical Scientists.**

Explore professional development skills (e.g., creating an individual development plan, understanding and capitalizing on strengths, curriculum vitae and resume writing, best practices in networking) and career pathways available to graduate students receiving advanced degrees in the pharmaceutical sciences. One lecture hour a week for one semester. Only one of the following may be counted: Pharmacy Graduate Studies 191Q, 192Q, 194Q. Offered on the letter-grade basis only. Prerequisite: Graduate standing.

#### **PGS 195H. Advanced Pharmacotherapy Research Conference.**

One lecture hour a week for one semester. May be repeated for credit. Offered on the letter-grade basis only. Prerequisite: Graduate standing.

#### **PGS 195S. Environmental and Molecular Mechanisms of Health and Disease.**

Present and discuss current research topics in environmental and molecular mechanisms of health and disease. One lecture hour a week for one semester. Offered on the credit/no credit basis only. Prerequisite: Graduate standing and consent of the instructor.

#### **PGS 196H. Advanced Medicinal Chemistry Research Conference.**

One lecture hour a week for one semester. May be repeated for credit. Offered on the letter-grade basis only. Prerequisite: Graduate standing.

#### **PGS 396M. Medicinal Chemistry: General Principles, Pharmacological Classification, and Mechanism of Action.**

Introduction to medicinal chemistry, covering drug classes according to their pharmacological classification, structural class, and mechanism of action. Three lecture hours a week for one semester. Only one of the following may be counted: Pharmacy Graduate Studies 396M, Pharmacy PharmD 382R (Topic: Mdrn Trends in Drug Design), 389E. Prerequisite: Graduate standing; and undergraduate coursework in organic chemistry and biochemistry, or consent of instructor.

#### **PGS 196S. Seminar in Pharmacy.**

One lecture hour a week for one semester. Pharmacy 196S and Pharmacy Graduate Studies 196S may not both be counted. Offered on the credit/no credit basis only. Prerequisite: Graduate standing in pharmacy.

#### **PGS 196T. Seminar in Toxicology.**

Presentations and discussion of current research topics in toxicology. One lecture hour a week for one semester. Offered on the credit/no credit basis only. Prerequisite: Graduate standing, and admission to the Toxicology Training Program or consent of instructor.

#### **PGS 097. Fundamentals for Teaching Assistants.**

Skills, behaviours, and strategies for effective college teaching, with emphasis on pharmacy-related courses. One lecture hour a week for one semester. Offered on the credit/no credit basis only. Prerequisite: Graduate standing; Consent of the graduate adviser.

#### **PGS 197H. Advanced Pharmacology Research Conference.**

One lecture hour a week for one semester. May be repeated for credit. Offered on the letter-grade basis only. Prerequisite: Graduate standing.

#### **PGS 397M. Drug Design and Synthetic Strategy.**

A multiperspective approach to modern concepts and drug design and synthetic strategy. Three lecture hours a week for one semester. Prerequisite: Graduate standing; and undergraduate courses in organic chemistry and biochemistry, or consent of instructor.

#### **PGS 197S. Seminar in Pharmacotherapy: Advanced Topics.**

One lecture hour a week for one semester. Offered on the credit/no credit basis only. Prerequisite: Graduate standing and consent of instructor.

#### **PGS 698. Thesis.**

The equivalent of three lecture hours a week for two semesters. Offered on the credit/no credit basis only. Prerequisite: For 698A, graduate standing in pharmacy and consent of the graduate adviser; for 698B, Pharmacy Graduate Studies 698A.

#### **PGS 398T. College Teaching Methodology.**

Interdisciplinary course intended to provide a foundation of theoretical and practical knowledge about teaching at the post-secondary level. Instructional methods; instructional design; practice teaching; teaching philosophy; instructional technology; assessment of learning; class discussions; individual consultations. Three lecture hours a week for one semester. Only one of the following may be counted: Pharmacy 368T, Pharmacy Graduate Studies 398T, and Pharmacy PharmD 398T. Offered on the letter-grade basis only. Prerequisite: Graduate standing or consent of instructor.

#### **PGS 399W, 699W, 799W, 899W, 999W. Dissertation.**

Pharmacy 399W, 699W, 799W, 899W, 999W and Pharmacy Graduate Studies 399W, 699W, 799W, 899W, 999W may not both be counted. May be repeated for credit. Offered on the credit/no credit basis only. Prerequisite: Admission to candidacy for the doctoral degree.

### **Professional Courses**