

# Drug Discovery and Development - DRDD

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## Courses

**DRDD 5800 SURVEY OF MULTI-MODALITY MOLECULAR IMAGING (2)** LEC. 2. Departmental approval. State-of-the-art survey of molecular imaging techniques that are available and their use to monitor the progression of various human diseases.

**DRDD 6800 SURVEY OF MULTI-MODALITY MOLECULAR IMAGING (2)** LEC. 2. Departmental approval. State-of-the-art survey of molecular imaging techniques that are available and their use to monitor the progression of various human diseases.

**DRDD 7000 INTRODUCTION TO GRANT WRITING (3)** LEC. 3. Course will train students to prepare NIH RO1 grant applications. Students will prepare mock applications on topics of their choosing.

**DRDD 7010 PHARMACOKINETICS (4)** LEC. 4. Departmental approval. Pharmacokinetic and pharmacodynamic principles and methods used to study the absorption, distribution, metabolism and excretion of drugs.

**DRDD 7020 SCIENCE AND TECHNOLOGY OF TABLETING (2)** LEC. 2. Pr. (PYPS 7030 or DRDD 7030) or Departmental approval. Formulation, compression, coating and evaluation of tablets.

**DRDD 7021 SCIENCE AND TECHNOLOGY OF TABLETING LAB (2)** LAB. 6. Pr. (PYPS 7020 or DRDD 7020). Actual formulation, compression, coating and evaluation of tablets.

**DRDD 7030 DRUG PRODUCTS AND BIOPHARM (4)** LEC. 4. Departmental approval. Formulation, evaluation, and use of various pharmaceutical dosage forms including biopharmaceutical aspects.

**DRDD 7040 PHYSICAL PHARMACY (4)** LEC. 4. Departmental approval. Application of physical chemical principles to dosage form design and evaluation.

**DRDD 7050 NOVEL DOSAGE FORMS (3)** LEC. 3. Pr. PYPS 7030 or DRDD 7030 or Departmental approval. Theoretical basis and design of controlled release and site specific drug delivery systems.

**DRDD 7060 FORMULATION AND DELIVERY OF PEPTIDE/PROTEIN DRUGS (3)** LEC. 3. Pr. PYPS 7030 or DRDD 7030 or Departmental approval. Formulation and delivery problems unique to peptide/protein pharmaceuticals and strategies to overcome such problems.

**DRDD 7070 TRANSPORT PHENOMENA IN PHARMACEUTICAL SYSTEMS (3)** LEC. 3. Departmental approval. Mechanisms of drug transport in various pharmaceutical dosage forms and biological systems. Elucidation of methods to characterize drug transport phenomena. Correlation of transport phenomena with drug disposition in the body. Emphasis on peptide, protein, and oligonucleotide drugs.

**DRDD 7080 ADVANCED BIOPHARMACEUTICS (3)** LEC. 3. Pr. PYPS 7010 or DRDD 7010. The mathematical and pharmacokinetic relationships between physical and chemical properties of a drug and its dosage form and biological effects.

**DRDD 7090 PHARMACEUTICAL SCIENCE I: TARGETS (4)** LEC. 4. Departmental Approval. Study of nature and function of drug targets, advanced molecular mechanisms by which drugs interact with these targets and the basic principles of drug design.

**DRDD 7100 PHARMACEUTICAL SCIENCE II: ADME (4)** LEC. 4. Departmental Approval. Study of the mechanisms of drug absorption, distribution, metabolism and elimination with an advanced study of drug design strategies and methods to optimize these processes.

**DRDD 7110 STABILITY KINETICS OF PHARMACEUTICALS (3)** LEC. 3. Pr. PYPS 7030 or DRDD 7030 or Departmental approval. Principles of chemical kinetics as applied to the unique stability problems of the various pharmaceutical dosage forms.

**DRDD 7200 NATURAL PRODUCTS CHEMISTRY (3)** LEC. 3. This course is designed as an introduction to the chemistry of natural products of plant origin with medicinal importance. Traditional and modern approaches to plant natural product drug discovery will be discussed. Major biosynthetic pathways of plant secondary metabolites will be covered and used to classify natural products into distinct groups (alkaloids, sesquiterpenoids, diterpenes, triterpenes, saponins, flavonoids, anthraquinones, coumarins, lignans, amino acids, and peptides) and to display the relationships between diverse structures encountered in nature.

**DRDD 7230 ADVANCED MEDICINAL CHEMISTRY I (3)** LEC. 3. Departmental approval. Explanation of the principles of Medicinal Chemistry progressing to qualitative and quantitative descriptions of the synthesis, influence of physical and chemical properties of chemical substances on biological activity and biodisposition.

**DRDD 7240 ADVANCED MEDICINAL CHEMISTRY II (3)** LEC. 3. Pr. PYPS 7230. Departmental approval. Advanced study of organic medicinal agents featuring organic synthesis, chemical and pharmacological properties and current literature topics.

**DRDD 7250 DRUG ACTION AND DESIGN (3)** LEC. 3. Pr. (PYPS 7230 or DRDD 7230) and (PYPS 7240 or DRDD 7240). Modern molecular modeling methods with emphasis on computer-aided drug design, quantitative structure activity relationships and combinatorial chemistry.

**DRDD 7260 SEPARATION SCIENCE (4)** LEC. 4. Departmental approval. A survey of modern separation science with emphasis on analytical scale techniques including gas chromatography, liquid chromatography and electrokinetic separations.

**DRDD 7270 MASS SPECTROMETRY OF ORGANIC COMPOUNDS (4)** LEC. 4. Departmental approval. A survey of modern techniques in mass spectrometry with emphasis on fragmentation chemistry and structure education.

**DRDD 7280 NEUROSCIENCE METHODS (3)** LEC. 3. This course is designed to provide a conceptual and practical understanding of several of the most common techniques in neuroscience. The interactive lectures will serve to illustrate the ways in which various experimental approaches have been used to advance specific areas of neuroscience, particularly in the context of neuropsychological diseases or processes.

**DRDD 7290 NEUROPHARMACOLOGY OF DRUG ABUSE (2)** LEC. 2. Departmental approval. An in-depth study of drugs of abuse, including mechanisms of action, pharmacokinetics, addiction, physical dependence and the effects of drug use during pregnancy. Substance abuse treatment strategies will also be discussed.

**DRDD 7300 NEUROPHARMACOLOGY (3)** LEC. 3. Neurochemical mechanisms related to the pharmacological actions of medicinal agents affecting the central nervous system.

**DRDD 7310 PSYCHOPHARMACOLOGY I (3)** LEC. 3. Discussions on anxiety, depression and related disorders.

**DRDD 7320 PSYCHOPHARMACOLOGY II (3)** LEC. 3. Discussions on schizophrenia, Alzheimer's disease, experimental methods and animal models of disorders.

**DRDD 7330 PHARMACOLOGY RESEARCH METHODS (3)** LEC. 1. LAB. 9. Experimental design, research methods and data analysis in pharmacology.

**DRDD 7340 ORGAN SYSTEMS PHARMACOLOGY I (3)** LEC. 3. The course will evaluate the basic principles and rationale for current and novel pharmacological therapeutics for various disease states.

**DRDD 7350 ORGAN SYSTEMS PHARMACOLOGY II (3)** LEC. 3. The course will evaluate the mechanism of action and rationale for current and novel pharmacological therapeutics for various disease states.

**DRDD 7360 CELLULAR & MOLECULAR PHARMACOLOGY & TOXICOLOGY I (3)** LEC. 3. Cellular biology course integrated with pharmaceutical sciences for the study of pharmacologically related mechanisms at the molecular and cellular levels.

**DRDD 7370 CELLULAR & MOLECULAR PHARMACOLOGY & TOXICOLOGY II (3)** LEC. 3. Pr. PYPS 7360 or DRDD 7360. Cellular biology course integrated with pharmaceutical sciences for the study of pharmacologically related mechanisms at the molecular and cellular levels. This is a continuation of PYPS 7360/DRDD 7360.

**DRDD 7380 DRUG DISCOVERY (3)** LEC. 3. This course is a survey of modern approaches to drug discovery. It is designed to familiarize students with different steps of drug discovery from target identification to the development of clinical candidates. (Clinical trials, and approval process will be covered in Drug Development class, which will be offered in spring 2020.) We will discuss the techniques used at the different stages of drug discovery process in the course are also widely used in basic biomedical research laboratories.

**DRDD 7390 CANCER PHARMACOLOGY AND DRUG DISCOVERY (3)** LEC. 3. Pr. VBMS 7970. This course is designed as an introduction to anti-cancer drugs and anti-cancer drug discovery. The course will build on the principles of cancer biology that are introduced in VBMS 7970 Cancer Biology. This course will begin with a survey of anticancer drugs. Classic cytotoxic agents will be discussed, followed by targeted chemotherapeutic agents. A discussion of strategies used to discover classic cytotoxic agents will be followed by strategies used to discover targeted chemotherapeutic agents. The discussion of targeted drug discovery will focus on target identification and validation, hit generation and optimization, and preclinical lead evaluation. Course meetings will feature the primary literature so as to enable students to translate lecture topics to application.

**DRDD 7400 PHARMACOGENOMICS AND TRANSLATIONAL RESEARCH METHODS ORIENTATION (3)** LLB. Departmental approval. This course consists of lectures and laboratory orientation sessions designed to introduce the basic concepts of pharmacogenomics and translational research in precision medicine.

**DRDD 7500 METABOLISM AND DISPOSITION XENOBIOTICS (2)** LEC. 2. Portals of entry, absorption, distribution and elimination of drugs and xenobiotics. Metabolic mechanisms relevant to chemical structure and principles of pharmacokinetics will be emphasized.

**DRDD 7510 ENVIRONMENTAL TOXICOLOGY (3)** LEC. 3. Mechanisms of action of agricultural and industrial chemicals, drugs, radiation, metals, gases, air particulates, food additives, plant and food poisons in the environment.

**DRDD 7600 HETEROCYCLIC MEDICINAL CHEMISTRY (3)** LEC. 3. Pr. CHEM 7220. Departmental approval. A survey of chemical nature of heterocyclic moieties of medicinal substances with emphasis on methods of synthesis of medicinally important compounds containing a heterocyclic ring.

**DRDD 7930 DIRECTED STUDIES IN PHARMACAL SCIENCES (1-3)** LEC. Departmental approval. Selected laboratory research topics in the pharmaceutical sciences. Course may be repeated for a maximum of 98 credit hours.

**DRDD 7950 SEMINAR (1)** SEM. 1. SU. 1 CR; may be repeated multiple times for credit. Course may be repeated for a maximum of 6 credit hours.

**DRDD 7960 SPEC PROB IN PHARM SCIE (1-3)** IND. At least 6 credits each with a minimum grade of B in DRDD 7000-7999 Selected study topics in the pharmaceutical sciences. Departmental approval and 6 hours of 7000-level courses. Course may be repeated for a maximum of 6 credit hours.

**DRDD 7980 NON-THESIS RESEARCH (1-3)** RES. Non-thesis research project, to be determined by faculty advisor and student's graduate advisory committee. Course may be repeated for a maximum of 14 credit hours.

**DRDD 7990 RESEARCH AND THESIS (1-10)** MST. Research And Thesis. Course may be repeated with change in topics.

**DRDD 8930 DIRECTED STUDIES IN PHARMACAL SCIENCES (1-3)** LEC. Departmental approval. Selected laboratory research topics in the pharmaceutical sciences. Course may be repeated for a maximum of 6 credit hours.

**DRDD 8950 SEMINAR (1)** SEM. 1. SU. 1 CR; may be repeated multiple times for credit. Course may be repeated for a maximum of 10 credit hours.

**DRDD 8960 DIRECTED READINGS IN PHARMACAL SCIENCES (1-3)** IND. Pr. At least 6 credits each with a minimum grade of B in DRDD 7000-7999. Selected study topics in the pharmaceutical sciences. Course may be repeated for a maximum of 6 credit hours.

**DRDD 8990 RESEARCH AND DISSERTATION (1-10)** DSR. Research for doctoral students. Course may be repeated with change in topics.