OPHTHALMOLOGY

OPH 610. Anatomy and Physiology of the Eye. 1 Credit Hour.
This course introduces the major anatomical and physiological regions
of the eye, including cornea, lens, retina, optic nerve, cranial nerves and
extraocular tissues. Emphasis is placed on the relationship between the
eye and other systems. Demonstrations include eye dissection, visual
testing and visual perception experimentation.

Components: LEC.
Grading: GRD.
Typically Offered: Fall.

OPH 615. Pathology of Eye Diseases. 1 Credit Hour.
This course covers in detail the major pathologies of the eye, including
congenital diseases and syndromes, infectious diseases, tumors and
adult-onset degenerations. Emphasis is placed on pathophysiological
mechanisms contributing to pathology, and also covers examination of
the eye, diagnostic features, and management of major eye diseases.
Demonstrations include histological sections, OCT, visual field and
angiogram, and associated diagnostic criteria.

Components: LEC.
Grading: GRD.
Typically Offered: Fall.

OPH 620. Ocular Pharmacology, Epidemiology, and Biostatistics. 1 Credit
Hour.
Course will teach local anesthetics, anti-infectious, anti-allergic agents,
control of ocular pain, adverse ocular and systemic reactions caused
by therapeutic agents will be part of the course. Ocular therapeutic
principles (pharmacokinetics and pharmacodynamics, toxicity),
 sources of drug information, new drug development, drug regulations
as applicable to different areas of operation including prescription
writing will be discussed. An introductory course in epidemiologic and
biostatistics methodology covering study design for investigation of
both infectious and chronic diseases of the eye; screening programs and
health services research will also be discussed. Outbreak investigation,
natural history of infectious diseases, validity of clinical tests, survival
analysis, and clinical trial and etiologic studies will be discussed.
Methods of biostatistician evaluation of experiment design and analyses
of data to decipher significant from non-significant results and general
tools for statistical analyses will be reviewed.

Components: LEC.
Grading: GRD.
Typically Offered: Fall.

OPH 625. Microbiology and Immunology of the Eye. 1 Credit Hour.
Students will learn concepts and terminologies of immunology,
bacteriology, virology, parasitology and mycology with an emphasis
on mechanisms of microbial disease transmission and host defense
mechanisms. Students become familiar with the types of organisms
responsible for human disease, the mechanisms by which they produce
disease, and the application of this knowledge to the treatment of
patients. This course integrates the biomedical disciplines of
immunology and medical microbiology. Infectious and immunological
diseases with relevance to the clinical setting and pharmacological
approaches will be presented. A basic understanding of the classification
and characteristics of infectious microorganisms, the mechanisms by
which infectious agents cause disease, and methods of both prevention
and treatment are highlighted. Causes and treatment of immune diseases
will also be presented. Concepts of inflammation, sepsis, cell injury,
tissue repair, hemodynamic disorders, genetic disorders, environmental
and nutritional pathology, immunodeficiency diseases, autoimmune
and metabolic diseases will be presented. Throughout the course, small group
tutorials and interactive clinical correlations based on clinical cases
linking basic science concepts to clinical medicine will be presented.
Tutorials, clinico-pathological correlations and laboratories emphasize
problem-solving skills, integration of knowledge and independent
learning.

Components: LEC.
Grading: GRD.
Typically Offered: Fall.

OPH 630. Ophthalmic Genetics. 1 Credit Hour.
This course provides an overview of the influence of genetics in
ophthalmology with respect to understanding pathogenic mechanisms of
eye diseases, and the development of novel therapeutic strategies. The
course will provide an introduction to complex and Mendelian genetics,
and research strategies involved in identifying disease-associated
genetic changes. Specific topics include hereditary retinal diseases,
genetic associations in age related macular degeneration and glaucoma,
genetics of myopia and optic nerve diseases, and mitochondrial disorders
affecting the eye. Additional discussions include current gene therapy
clinical trials.

Components: LEC.
Grading: GRD.
Typically Offered: Spring.

OPH 635. Electrophysiology of the eye. 1 Credit Hour.
This course will introduce the basic principles of electrophysiology of the
eye, identify neural signals, neurotransmitters, molecular signaling within
neurons. Additionally, the sensation and sensory systems. Emphasis is
placed on the relationship between the eye and other signals and senses.
Corequisite: OPH 663.

Components: LEC.
Grading: GRD.
Typically Offered: Spring.
Typically Offered:

Grading:

Components:

Corequisite: OPH 640.

aberrometry, corneal topography and optical coherence tomography.

or demonstration of ophthalmic diagnostic techniques and instruments,

system setup on an optical bench, and provide basic hand-on training

systems, provide an initial hands-on experience with basic optical

of geometrical theory to the design and calculation of optical

course. It will include practical hands-on examples of the application

blotting), and determination of enzyme kinetic parameters.

chromatography, affinity chromatography, SDS-PAGE, and immuno-

protein purification and analysis (salt fractionation, ion exchange

Experiments related to molecular biology (includes PCR, DNA cloning,

hybridization analysis, restriction mapping, and DNA sequence analysis),

protein purification and analysis (salt fractionation, ion exchange

chromatography, affinity chromatography, SDS-PAGE, and immuno-

blotting), and determination of enzyme kinetic parameters.

Components: LAB.

Grading: GRD.

Typically Offered: Fall.

OPH 641. Lab: Electrophysiology, Clinical Testing and Applications. 1 Credit Hour.

This laboratory work will introduce the students to novel clinical recording techniques, electrophysiologic tests, and clinical applications of ERG, EOG, and VEP. Emphasis is placed on novel and specialized clinical applications and recordings. The course will be divided in two sections. Section one ends with focus on the effects of maturation, aging, and testing in infants. Section two will conclude with electrophysiologic findings of many clinical conditions and clinical applications of ERG, EOG, and VEP of various eye disorders/diseases.

Corequisite: OPH 635.

Components: LAB.

Grading: GRD.

Typically Offered: Spring.

OPH 645. Biochemistry, Cellular and Molecular Ophthalmology. 2 Credit Hours.

An introduction to biochemistry with emphasis on ocular clinical applications. Topics will include nutrition, cellular biology, biochemistry of tears, conjunctiva, and cornea. The structure and functions of proteins and enzymes as well as metabolism of carbohydrates and lipids will be discussed. Case studies and journal articles will be used to demonstrate the useful applications of these principles to ocular health-related issues.

Components: LEC.

Grading: GRD.

Typically Offered: Spring.

OPH 640. Vision and Optics. 2 Credit Hours.

This course will provide an introduction to the principles of geometrical optics and its application to the study and assessment of the visual system. Topic covered will include fundamental of geometrical optics, principles of optical system components (lenses, mirrors, prisms, light sources), optics of the eye and vision correction, basic principles of visual optical instruments (loupe, microscopes, telescopes), and principles and applications of ophthalmic diagnostic and imaging systems, including ophthalmoscopes, retinoscopes, slit-lamp, keratometers, corneal topography systems, aberrometers and optical coherence tomography.

Typically Offered:

Grading:

Components:

Corequisite: OPH 640.
**OPH 773. PBL: Animal models, Regulatory issues and Research methods.**

2 Credit Hours.

Part I: The aim of this Problem-Based learning course is to provide students the basic understanding and expertise pertaining to generation and implementation of preclinical research IACUC protocol. This course consists of a problem based learning module with a focus on developing students' understanding of various animal models in preclinical research and how to refine animal research models that meet the requirement of IACUC regulation. Part II: The purpose of this course is to provide clinical research regulatory expertise with an aim to create future leaders in the drug development industry. This regulatory science course uses a multidisciplinary approach and encompasses course work in regulatory writing techniques, quality systems, and medical device and pharmaceutical regulation. The concentration is designed to develop the student's understanding of how to meet regulatory oversight requirements as they relate to the conduct of clinical studies. This course will prepare students to play critical roles throughout the lifecycle of pharmaceuticals, medical devices, and biologics. They provide strategic, tactical and operational direction, and support for working within regulations to expedite the development and delivery of safe and effective healthcare products to individuals around the world. The regulatory professional's services can be utilized in research and development, clinical trials, extension of premarket approvals, manufacturing, labeling and advertising, and post-market surveillance. Knowledge of clinical research conduct and management which involves the design, execution and management of clinical trials as well as quality assurance and compliance principles are important to regulatory professionals. Course also provides highlight on how to effectively partner with experts such as writers drafting pre- and post- approval regulatory FDA submission documentation (INDs, NDAs, PMA etc.) for product clearance or licensure, IRB reviewers and investigational Pharmacists to enhance the development of healthcare products.

**Components:** ENS.

**Grading:** GRD.

**Typically Offered:** Spring.

**OPH 810. Ophthalmology Research Thesis. 1-7 Credit Hours.**

The course allows the student to work full-time on a research project of interest under the supervision of research/clinical faculty or a team of faculty members.

**Components:** THE.

**Grading:** SUS.

**Typically Offered:** Fall.