### COURSE INFORMATION

#### COURSE DESCRIPTION

**Ongoing; Year 1 (3 Rotations - Required)**

<table>
<thead>
<tr>
<th>Title:</th>
<th>Research in Pathobiology</th>
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<tbody>
<tr>
<td>Course Number:</td>
<td>ME.300.800</td>
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<tr>
<td>Course Director:</td>
<td>Lee Martin, Ph.D.</td>
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<tr>
<td>Dates &amp; Time:</td>
<td>By arrangement with course directors and individual mentors AUGUST – MAY (Ongoing, Year 1, 3 Rotations)</td>
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Long-term research projects will be undertaken with faculty members of the Graduate Program in Pathobiology serving as mentors. Course also covers the three required rotations for 1st Years.

#### COURSE DESCRIPTION

**Year 1, Semester 1 (Required)**

<table>
<thead>
<tr>
<th>Title:</th>
<th>Pathology for Graduate Students: Basic Mechanism of Disease</th>
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<tbody>
<tr>
<td>Course Number:</td>
<td>ME.300.713</td>
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<tr>
<td>Course Director:</td>
<td>Tamara Lotan, M.D. &amp; Kathy Gabrielson, D.V.M., Ph.D.</td>
</tr>
<tr>
<td>Dates &amp; Time:</td>
<td>AUGUST – SEPTEMBER; M,W,F; 9AM-1:00PM</td>
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<tr>
<td>Location:</td>
<td>Held remotely via Zoom (2020)</td>
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Pathology for Graduate Students: Basic Mechanisms will concentrate on the basic mechanisms of tissue injury and disease both at the molecular level and as they are manifested in human tissues. Normal tissue histology and function will be discussed in relation to organ systems as a basis for the understanding of disease mechanisms. A & P histology review lectures will be followed by faculty lectures and case studies. This block on basic pathogenic mechanisms will prepare students for more advanced topics on organ specific diseases that can be taken individually or in succession. The advanced blocks will be organized under 3 themes: 1) Neoplasia, 2) Immunopathology, and 3) Neuropathology.

#### COURSE DESCRIPTION

**Year 1, Semester 1 (Required)**

<table>
<thead>
<tr>
<th>Title:</th>
<th>Analysis of Macromolecules: Energetics, Structure and Function</th>
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<tbody>
<tr>
<td>Course Number:</td>
<td>ME.100.716</td>
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<tr>
<td>Course Director:</td>
<td>Herschel Wade, Ph.D. &amp; Dominique Frueh, Ph.D.</td>
</tr>
<tr>
<td>Dates &amp; Time:</td>
<td>SEPTEMBER – OCTOBER; M,T,Th,F; 9-10:30AM</td>
</tr>
<tr>
<td>Location:</td>
<td>Held remotely via Zoom/Blackboard (2020)</td>
</tr>
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</table>

The course will cover (1) macromolecules, (2) physical chemical principles dictating their biological behavior, and (3) methods to study them. Lectures will focus on practical application of the methods, experimental design, data collection, and elementary aspects of data analysis.
Title: Molecular Biology and Genomics  
Course Number: ME.260.709  
Course Director: Jeffry L. Corden, Ph.D.  
Dates & Times: NOVEMBER – DECEMBER; M,T,Th,F; 9-10:30AM  
Location: Held remotely via Zoom/Blackboard (2020)

This course module covers the Molecular Biology and Genomics of both prokaryotes (using E. coli as the model organism) and eukaryotes, with a focus on “model organisms” including yeast, flies, worms, mice as well as humans. Both the Molecular Biology (reductionist) perspective and the Genomics (systems biology) perspective will be provided on each topic, and there will be heavy emphasis on mechanism and regulation of fundamental processes in biological information transfer DNA->RNA->protein. This lecture module will cover genes and genomes, transcription and RNA world, replication, chromosome structure and function and genome instability.

Title: Pathobiology Journal Club  
Course Number: ME.300.803  
Course Director: Lee J. Martin, Ph.D. & Kevan J. Salimian, M.D., Ph.D.  
Dates & Times: SEPTEMBER – MAY; TUES; 12:30-1:30PM  
Location: PCTB G18-19 (Held remotely via Zoom Fall Semester 2020)

The objective of this course is to train graduate students in the fundamentals and art of understanding and determining the quality and structure of scientific publications. Students will select publications for presentation. The paper selection process will be a joint effort with a faculty member. Papers will be carefully read and scrutinized for detail of experimental background and logic, experimental approach and methods, results, figure composition and presentation, and interpretation. Students, with advice from a faculty mentor, will prepare and present to an audience a PowerPoint presentation (approximately 45 minutes) on the selected paper. The student will anticipate and prepare for questions about the paper as part of the presentation. The course is open to all graduate students and postdoctoral fellows.

Title: Principles of Genetics  
Course Number: ME.110.733  
Course Director: Erika Matunis, Ph.D.  
Dates & Time: DECEMBER – JANUARY; M,T,Th,F; 9-10:30AM  
Location: Held remotely via Zoom/Blackboard (2020-21)

This short lecture course will cover fundamental principles of genetics, focusing primarily on principles of genetics, focusing primarily on model eukaryotes. Problem sets will be an integral learning tool in this course.
### Cell Structure and Dynamics

**Title:** Cell Structure and Dynamics  
**Course Number:** ME.110.728  
**Course Director:** Andrew Ewald, Ph.D.  
**Dates & Time:** JANUARY - FEBRUARY; M,T,Th,F; 9-10:30AM  
**Location:** Held remotely via Zoom/Blackboard (2021)

The objective of this course is to provide the basics of cell biology, including the structure, function and biogenesis of cellular organelles. Also covered are essential concepts on the cytoskeleton, cell-cell and cell-extracellular matrix interactions, cell motility, chaperones, and protein turnover.

### Pathways and Regulation

**Title:** Pathways and Regulation  
**Course Number:** ME.360.728  
**Course Director:** Guang William Wong, Ph.D. & Steve Claypool, Ph.D.  
**Dates & Time:** FEBRUARY – MARCH; M,T,Th,F; 9-10:30AM  
**Location:** Wood Basic Science Auditorium/PCTB 115 (Zoom/Blackboard if nec.)

This course will cover the principles of membrane transport, bioenergetics, metabolic pathways, cell cycle and cell death with particular emphasis on regulatory mechanisms including receptor-mediated

### Graduate Immunology

**Title:** Graduate Immunology  
**Course Number:** ME.250.703  
**Course Director:** Mark Soloski, Ph.D.  
**Dates & Time:** FEBRUARY – MAY; T & Th; 10:30AM-12:30PM  
**Location:** Wood Basic Science Auditorium/PCTB 115 (Zoom/Blackboard if nec.)

This is an introductory course designed to provide graduate students with a comprehensive survey of modern cellular and molecular immunology. The course consists predominately of lectures but also includes discussion sessions focusing on important recent research papers. This course is open to all graduate students and postdoctoral fellows.
COURSE DESCRIPTION
Year 1, Semester 2 (Required)

Title: Pathology for Graduate Students: Cancer
Course Number: ME.300.714
Course Director: Angelo DeMarzo, M.D., Ph.D.
Dates & Time: MARCH – APRIL; MWF; 9AM-12:00PM (March times vary for 2021)
Location: Carnegie 489 (Zoom if necessary)

Pathology for Graduate Students: Cancer will concentrate on the biology of cancer at the molecular, cellular, and tissue levels. While the course is largely organized to study cancer in the context of specific organs, general principles of neoplasia will be continuously discussed as a basis for understanding the disease process. The format will include lectures, discussion of research papers, and review of histological slides.

COURSE DESCRIPTION
Year 1, Semester 2 (Required)

Title: Pathobiology and Disease Mechanisms
Course Number: ME.300.710
Course Director: Richard Roden, Ph.D.
Dates & Time: MARCH – JUNE; W & F; 1-2:30PM (March times vary for 2021)
Location: TBA (Zoom if necessary)

Pathobiology and Disease Mechanisms provides an intensive study of human disease through traditional lectures, and the discussion of the primary scientific literature including classic and current cutting edge papers. The course combines lectures with small group discussions, and will cover topics relevant to infectious, degenerative, neoplastic, and inflammatory disease of the major organ systems. The primary objective of the course is to understand how research findings elucidate the underlying mechanisms leading to clinical manifestations of disease (seen grossly and microscopically in the traditional Pathology component of the course). Active student participation is required in the form of presenting and discussing papers. The course is open to all PhD and MD/PhD students.

COURSE DESCRIPTION
Year 1, Semester 2 (Required)

Title: Pathology for Graduate Students: Immunology & Infectious Disease
Course Number: ME.300.716
Course Director: Petros Karakousis, Ph.D.
Dates & Time: APRIL – MAY; MWF; 9AM-12:00PM
Location: Carnegie 489 (Zoom if necessary)

Pathology for Graduate Students: Immunology and Infectious Disease will concentrate on the basic mechanisms of Immunology and Infection in human diseases. The format will include lectures, discussion of research papers, and review of histological slides.
COURSE DESCRIPTION
Year 1, Semester 2 (Required)

Title: Pathology for Graduate Students: Neuropathology
Course Number: ME.300.715
Course Director: Philip Wong, Ph.D.
Dates & Time: MAY; MWF; 9AM-12:00PM
Location: Carnegie 489 (Zoom if necessary)

Pathology for Graduate Students: Neuropathology will concentrate on the basic mechanisms of Neuropathology both at the molecular level and in human diseases. Normal tissue histology and function will be discussed as a basis for the understanding of Neuropathology. Animal models of neuropathological diseases will be critically considered.

COURSE DESCRIPTION
Year 2 (Required)

Title: *Research Ethics Course – Section I and Section II
Course Director: Office of Graduate Biomedical Education
Time: 2 Half Day Sessions - Fall and Spring
Location: TBA (Zoom if necessary)

Recognize the key concepts in the responsible conduct of research, including data acquisition and management, mentor/trainee responsibilities, publication practices and authorship standards, conflicts of interest and commitment, and scientific misconduct.

*NOTE: Completion of this course is a SOM requirement for graduation. This course is offered in two parts, Section I in the fall and Section II in the spring.

COURSE DESCRIPTION
Year 2, Semester 4 (Required)

Title: Grant Writing 101
Course Numbers: ME.300.717
Course Director: Nicholas Roberts, Vet.M.B., Ph.D.
Dates & Time: MARCH – MAY; MWF; 10:00-11:00AM
Location: TBA (Zoom if necessary)

The course will explore how to pick a scientific area. Students will write mini-grants in the format of an NIH F31 pre-doctoral award.
ELECTIVES:

All students in their second year and beyond are required to take a one-semester elective course for credit in each academic year. Courses may be taken for a grade or pass/fail. Students may choose a course offered in the Johns Hopkins Medical Institutions, or on the Homewood Campus subject to approval by the Program Director. Please note that Grant Writing 101 is a required second year course and does not count as an elective, nor does the optional course, Teaching in Pathobiology (ME.300.802) count as an elective.

SOM ELECTIVE COURSE SEARCH LINK: https://sis.jhu.edu/classes/Default.aspx
SPH ELECTIVE COURSE SEARCH LINK: https://www.jhsph.edu/courses