HISTOLOGY
GEORGE MASON UNIVERSITY
Fall Semester 2020
4 Credit Hours

BIOL 465-001 (CRN 70540)/EVPP 490-003 (CRN 77986)
Lecture: 3:00–4:15 p.m. Mondays and Wednesdays
West, Room 1004

BIOL 465-201 (CRN 70543)/EVPP 491-201 (CRN 81604)
Laboratory 201: 1:30–4:15 p.m. Thursdays
Exploratory Hall 2602

Instructor: Dr. Esther Peters
Office: David J. King Hall 3050, Fairfax
Office Hours: 4:30–5:30 p.m. Tuesdays and Thursdays (please let Dr. Peters know by e-mail if you are coming) or schedule other times BY APPOINTMENT (send email request to Dr. Peters)
Phone: 703-993-3462
Cell: 703-624-0143
Email: epeters2@gmu.edu

Prerequisite(s):

Sign up for Mason Alert (e.g., weather closings, emergencies) at **https://alert.gmu.edu**
See Emergency Preparedness Guides at (http://ehs.gmu.edu/guides_EP.html)

Syllabus

Course Description

This course will examine the microscopic structure of animal tissues and organs. Emphasis will be on understanding the cells and tissues of humans and other vertebrates; however, the application of these concepts to other organisms will also be introduced (comparative histology). This syllabus covers both lecture and laboratory sessions. Please note that lecture and laboratory are closely linked and require similar levels of understanding; the laboratory exercises reinforce material that is presented during the lectures; exams given during either session will cover material from both.

Course Objectives and Student Learning Outcomes

The goals of this course are for students to be able to:

Understand the microscopic structure of animal cells and tissues, identify the four basic tissues and specific cell types, recognize their key features, and correctly use new terms,

Explain how their structure and composition relate to metabolic function and organismal processes, and

Evaluate the role of histology in various areas of scientific investigation.

Course Expectations

The course is targeted toward upper-level (senior) undergraduate students who have successfully completed other courses in biology and chemistry. The class is limited to 24 students due to laboratory space. The lecture section will highlight each week's reading and study assignments; the laboratory section will include student examination of histoslides by light microscopy.

As with any 400-level or graduate offering, ***this will not be an easy course***. The successful student **must spend several hours each week reading the textbook, studying supporting materials, and preparing assignments outside of class**. Self-directed study skills are important in learning to read and interpret histoslides. A solid background in biology and basic chemistry is essential. The ability to organize material logically; to visualize the structure and composition of cells, tissues, and organs (i.e., develop a "search image" or "mental organization pattern"); and to integrate structure with an understanding of function (why a group of cells is a tube vs. a sac vs. a sheet) will be most helpful. Interim exams, based on images from the histoslides, reading assignments, and other materials, will be given regularly, along with a final examination based on the textbook, other assignments, and histoslide reading.

Class Preparation

"He who hesitates is lost...."

Reading, research, and assignments are detailed on the following class outlines. Any concerns about keeping up with assignments should be discussed with Dr. Peters.

More students are juggling work, research, internships, shadowing, and families. Please note "employment must not take priority over academic responsibilities. Students employed more than 20 hours a week are strongly urged not to attempt a full-time academic load. Students employed more than 40 hours a week should attempt no more than 6 credits per semester. Students who fail to observe these guidelines may expect no special consideration for academic problems arising from the pressures of employment." (University catalog, section AP.1.2. Academic Load, see: http://catalog.gmu.edu/content.php?catoid=27&navoid=5365#attendance). Please consider your responsibilities and interests and plan accordingly to protect your health and GPA!

Class Participation

Students should come to either the lecture or laboratory ready to participate in all activities (assignments completed prior to class). They should behave in a mature and professional manner and abide by the GMU honor code. **Please turn off cell phones or pagers before class begins.**

Because this class will cover material that needs to be personally examined under a microscope, **absenteeism should be limited to illness or emergencies, or discuss concerns with Dr. Peters.**

Students should notify Dr. Peters before class if they must miss a class. **Multiple missed classes in either the lecture or laboratory sessions can affect student grades.** PowerPoints are not posted so you need to make every effort you can to attend. Students will need to work with Dr. Peters to determine whether class activities can be made up later, although this is likely to be difficult due to schedule conflicts. Students should contact classmates to obtain lecture or laboratory notes and assignments.

Students may record the lectures (sound) and may take pictures of selected PowerPoint slides. However, they should also take notes and make sketches of what is presented, which will help them study for the interim and final exams. If using electronic devices (such as laptops, notebooks, tablets), please be respectful of your peers and your instructor and do not engage in activities that are unrelated to class. Such disruptions show a lack of professionalism and can affect your grade.

If you are a student with a disability and you need academic accommodations, please see Dr. Peters and contact the Office of Disability Services (ODS) at 993-2474. All academic accommodations must be arranged through the ODS.

E-mail Communications

Dr. Peters will send e-mail messages only to your GMU e-mail account. Students must use their Mason email accounts—"MASONLIVE" account—to receive important University information, including messages related to this class. See http://masonlive.gmu.edu for more information. Please be sure you check it often and respond to queries from Dr. Peters! If you are not getting messages (e.g., MasonLive issues), please send Dr. Peters an alternate e-mail address.

Course Textbooks and Materials

Students need to have access to a recently published (within the last 10 years) atlas of histology, or they may use online resources (see below). Many have been published on human histology and you may wish to borrow or buy one from a former student in the class, rent, or check one out of the library, particularly if you have a limited textbook budget or plan to attend medical, dental, or veterinary professional school, where you will have to take this course and you might need to buy a different book (although it can't hurt to have more than one histology book!). Several copies are available in Fenwick or can be purchased through Amazon (search Books: Histology). Dr. Peters will have examples of other atlases and textbooks and some will be available in the lab for further study.

Example of Recommended Textbooks

Atlas of Histology with Functional and Clinical Correlations
Paperback, July 2010
By Dongmei Cui, William Daley, Jonathan Fratkin, and Duane Haines, et al.
ISBN-10: 0781797594
ISBN-13: 978-0781797597

This book is also helpful in the lab:

> *The Art Of Examining And Interpreting Histologic Preparations: Study Guide For Histology*
> Paperback, 2004
> By William J. Krause
> ISBN-10: 1581125283
> ISBN-13: 978-1581125283

This book is available at amazon.com, or order through the Mason bookstore.

You may also wish to get an anatomy learning app. Many are available, but *Essential Anatomy 3* 3D4Medical costs $9.99 and is highly recommended.

Peters' Pointers

These notes are provided on Blackboard to help you. They emphasize the **basics** you need to know for the exams. Let Dr. Peters know if you need help accessing Blackboard.

Online Study Aids

The field of histology has also benefitted from the development of Internet resources using digitized images (virtual microscopy) that can help students learn the material from different perspectives and tissue sections (not all kidney sections look the same!). See Blackboard for helpful links. Some students have found that just using Google Images can also be helpful, particularly during the lab sessions. The point is, there are lots of resources and what works for one person may not work for another. Spend some time finding your best way to learn!

Course Assignments

Research and other assignments and their <u>due dates</u> are detailed on the following class schedule. If you cannot meet a due date, please notify Dr. Peters. Assignments should be prepared neatly (either hand- or computer-generated). Be sure to <u>proofread</u> your work to double-check facts, grammar, and spelling; use a spelling- and grammar-checking program if possible, but note that you cannot rely solely on it, proofreading is essential! Sloppily prepared assignments can adversely affect your grade, especially if improvement is not noted during the course.

Reading and studying the atlas, Peters' Pointers, and other materials

Performing an **Internet Search**: "histology," histopathology," and "histotechniques"

Completing **Slide Reading Worksheets** (10 will count towards your grade)

These are due on the day of the interim exam. Dr. Peters can review them before this day if you have completed them. Bring them to lectures to work on and correct them, too. They are to help you learn the material! Sketches will be based on reading and studying histoslides during the laboratory session (Note: the lab is shared with Immunology, but Dr. Peters will submit your name to have your ID card activated to be able to use the microscopes at other times.)

Lab Slide Reading Worksheets need to be turned in before the Interim Exam so they can be graded and returned to help you study for the final exams.

Each student is expected to prepare a **5-Page Research Paper on histology as it relates to one of the following fields of study:** physiology, biochemistry, pathology, toxicology, systematics, molecular biology/genetics, immunology, microbiology, embryology, ecology, etc. (human, nonhuman perspectives). The objective of this project is to learn more about how this field works and supports other sciences, as well as to provide practice in scientific writing and following directions. The paper should basically provide information on who, what, when, where, why, and how. The Research Paper Guide and Reference Formats, as well as the evaluation criteria (Research Paper Grading Form) are available on Blackboard. Dr. Peters will work with you to develop topics and find appropriate resources.

Each paper should be neatly prepared and proofread, especially checking for consistency, completeness, and correctness (Help: The Writing Center, OWL/On-line Writing Lab; many links on grammar questions are online).

Assignments will not be accepted at all after the last day of regular classes, as noted by Dr. Peters. Grades on all assignments will be counted as part of the final grade. (A score of "0" will be given to assignments not turned in by the last day of regular classes.)

Exams

Several interim exams and a final exam will be given during this course. If a student is seriously ill or must miss the test for another reason, notify Dr. Peters to discuss options for completing the test earlier or later. The lowest interim exam grade (not final exam) will be dropped. A student can count one missed interim exam as the lowest grade to be dropped; however, no other grades can be dropped. A **cumulative final exam** will also be given in both the lecture and the laboratory (combining those two grades). Material to be covered on the exams is indicated on the schedule and will include interpretation of histoslides and material from the Peters' Pointers.

Grading Criteria

The total grade received for this course will be based on the following assignments and assessments on an individual basis as noted above:

Activity	Percent Contribution to Total Grade
Internet Search	5
10 Slide Reading Worksheets	10
5-page Research Paper	20
4 Interim Exams (10 % each) [5 will be given, lowest score dropped]	40
Final Exam (combined Lab and Lecture final exams)	25
TOTAL	100

The final grade will be based on this scale: A+ ≥ 100–98, A = 97–90, A- = 89–88, B+ = 87-86, B = 85–80, B- = 79–78, C+ = 78-77, C = 76–70, C- = 69-68, D = 67–60, F < 59. **A CURVE WILL NOT BE APPLIED.**

Academic Integrity

GMU is an Honor Code university; please see the University Catalog for a full description of the code and the honor committee process. The principle of academic integrity is taken very seriously and violations are treated gravely. What does academic integrity mean in this course? Essentially this: when you are responsible for a task, you will perform that task. When you rely on someone else's work in an aspect of the performance of that task, you will give full credit in the proper, accepted form. Another aspect of academic integrity is the free play of ideas. Vigorous discussion and debate are encouraged in this course, with the firm expectation that all aspects of the class will be conducted with civility and respect for differing ideas, perspectives, and traditions. When in doubt (of any kind) please ask for guidance and clarification. Students in this course should be aware of the following policies for completing work and taking examinations.

For assignments: Students are expected to complete the work on their own, usually using the textbook and other materials, although they may discuss issues and seek guidance on questions from other students or the instructor. These assignments are designed to help you learn the material in preparation for tests.

All exams will be completed by individuals in the classroom (those registered for the course).

Unless otherwise noted by the instructor prior to the exam, these assessments will be taken without the use of study aids, memoranda, textbooks, other books, data, or other information available. The purpose of these assessments is to evaluate the student's progress in understanding the material.

It is important to note that materials produced for this course, particularly for the research paper, require creativity in organization and presentation, but that the information presented within the paper or other product must be properly acknowledged as to its source. For example, discussing how histology is used in physiology might include historical information, case studies, detailed methodologies, quotations, and/or data. Statements of a general nature or that synthesize information from several sources need not be attributed to a specific source; however, statements of specific details or direct quotations ("between quotation marks") from books, journals, newspaper or other media articles, Internet web pages, or other authorities must be identified with the name of the author and year in the text and the full citation provided in the Literature Cited section at the end of the paper.

Other Useful Campus Resources

WRITING CENTER: A114 Robinson Hall; 703-993-1200; http://writingcenter.gmu.edu

UNIVERSITY LIBRARIES: "Ask a Librarian" http://library.gmu.edu/mudge/IM/IMRef.html

COUNSELING AND PSYCHOLOGICAL SERVICES (CAPS): 703-993-2380; http://caps.gmu.edu

LEARNING SERVICES: 703-993-2999; http://caps.gmu.edu/learningservices/; offers many good study skills workshops!

ACADEMIC COUNSELING PROGRAM: 703-993-2380:
http://caps.gmu.edu/learningservices/academiccounseling.php

UNIVERSITY POLICIES
The University Catalog, http://catalog.gmu.edu, is the central resource for university policies affecting student, faculty, and staff conduct in university academic affairs. Other policies are available at http://universitypolicy.gmu.edu/. All members of the university community are responsible for knowing and following established policies.

NAMES AND PHONE NUMBERS OF CLASSMATES:

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Histology Assignments and Assessments at a Glance

		Lecture			Laboratory	
Week	**Date**	**Assessment or Assignment Due**	**Topics**	**Date**	**Assessment or Assignment Due**	**Topics**
1	August 24 August 26		Course overview, Cell Structure and Function, Cell Cycle and Replication Epithelium and Glands Internet Search	August 27		Introduction to Histotechniques, How Slides are Made: Video; Microscope Handling; Slide Reading, 2- to 3-Dimensions Worksheet 1: Key Features of Cells Worksheet 2: Epithelium and Glands
2	August 31 September 2	***August 31 - last day to add***	Connective Tissue Cartilage and Bone	September 3		Worksheet 3: Connective Tissue, Cartilage and Bone
3	September 7 NO CLASS Labor Day September 9	***September 8 - last day to drop with no tuition penalty***	Blood	September 10		**Complete worksheets 1-3 (turn in before exam)** **Study for Interim Exam 1: Cell Biology, Epithelium, Connective Tissue, Cartilage and Bone**
4	September 14 September 16	***September 15 – Final drop deadline for 50% tuition refund September 16–28 Final drop deadline no refund*** **INTERNET SEARCH DUE SEPT 16**	Review for Interim Exam 1 and Pretest Study for Interim Exam 1	September 17	**Interim Exam 1: Cell Biology, Epithelium, Connective Tissue, Cartilage and Bone**	**EXAM ONLY**

Week	Date	Lecture		Date	Laboratory	
		Assessment or Assignment Due	**Topics**		**Assessment or Assignment Due**	**Topics**
5	September 21 September 23		Muscle Nervous Circulatory System Lymphoid System	September 24		Worksheet 4: Blood Worksheet 5: Muscle and Nervous Tissue Worksheet 6: Circulatory System and Lymphoid Tissue **Complete worksheets 4-6** **Study for Interim Exam 2: Blood, Muscle, Nervous, Circulatory and Lymphoid Systems**
6	September 28 *Yom Kippur* September 30	***Selective Withdrawal Period – September 29–October 28***	Review for Interim Exam 2 Study for Interim Exam 2	October 1	***Interim Exam 2: Blood, Muscle, Nervous, Circulatory and Lymphoid Systems***	**EXAM ONLY**
7	October 5 October 7 *Yom Kippur*	**PROPOSED TITLE OF RESEARCH PAPER DUE** **October 5**	Endocrine System Integumentary System	October 8		Worksheet 7: Endocrine System Worksheet 8: Integumentary System
8	October 12 Fall Break Holiday **CLASS MEETS OCTOBER 13** October 14		Respiratory System Digestive System I	October 15		Worksheet 9: Respiratory System ***Complete worksheets 7-9*** **Study for Interim Exam 3: Endocrine, Integumentary, and Respiratory Systems**
9	October 19 October 21		Review for Interim Exam 3 Study for Interim Exam 3	October 22	**Interim Exam 3: Endocrine, Integument, and Respiratory Systems**	**EXAM ONLY**

Week	Date	Lecture		Date	Laboratory	
		Assessment or Assignment Due	**Topics**		**Assessment or Assignment Due**	**Topics**
10	October 26 October 28		Digestive System II Digestive System III	October 29		Worksheet 10: Digestive System I, II, III **Complete Worksheet 10** **Study for Interim Exam 4: Digestive System**
11	November 2 November 4		Review for Interim Exam 4 Study for Interim Exam 4	November 5	**Interim Exam 4: Digestive System**	**EXAM ONLY**
12	November 9 November 11		Urinary System Female Reproductive System Male Reproductive System Special Senses	November 12 *Birth of Bahá'u'lláh*		Worksheet 11: Urinary System Worksheet 12: Reproductive Systems Worksheet 13: Special Senses **Complete Worksheets 11-13 (If Required for Grades)** **Study for Interim Exam 5**
13	November 16 November 18	**RESEARCH PAPER DUE November 18**	Review for Interim Exam 5 Study for Interim Exam 5	November 19	**Interim Exam 5**	**EXAM ONLY**
14	November 23 November 25 NO CLASS Thanks-giving Holiday			November 26 NO LAB Thanks-giving Holiday *Day of the Covenant*		**Finish Research Paper if needed** **Review All Slides and Worksheets for Final Lab Exam**

Week	Date	Lecture		Date	Laboratory	
		Assessment or Assignment Due	**Topics**		**Assessment or Assignment Due**	**Topics**
15	November 30 December 2	**ALL RESEARCH PAPERS DUE BY DECEMBER 2**	Interim Exam 5 returned Study for Final Lab Exam	December 3	**Final Lab Exam (Slide Reading Only)**	**FINAL LAB EXAM ONLY** **Study for FINAL Lecture EXAM**
	Hanukkah December 11–18	**Monday, December 14** **FINAL LECTURE EXAM (No Slides): All Chapters Time: 1:30–4:15 p.m**.				

NOTES: