I. Vertebrate Histology: Vertebrate tissue preparation, tissue composition, and tissue identification. Two lectures and one two-hour lab. (3)

II. Prerequisite(s): BI153, BI154

III. Purposes or Objectives of the Course: This course focuses on the study of tissues. Students will learn the theory and utility of histology, preparation and staining of tissues for general histological examination, tissue identification, and the cellular composition of tissues.

IV. Student Learning Outcomes
   A. Student will be able to compare and contrast the structure/function of the three types of muscle tissue.
   B. Student will be able to compare and contrast the structure/function of the epithelium of the digestive tract with the epithelium of the integument.
   C. Student will be able to correctly identify different types of connective tissue.

V. Expectations of Students:
   A. Students are expected to attend lecture, complete homework assignments, and complete laboratory activities.
   B. Graduate Student Expectations: Along with the expectations above, graduate students are expected to complete an independent histology project and present their finding to the class.

VI. Course Content or Outline (include number of periods on each topic):

   A. Lecture (1 hr, 50 min)
      Week 1: What is histology?
      Week 2: Tissue preparation and staining
      Week 3: General cell form and components
      Week 4: Epithelia, connective tissue, and the integument
      Week 5: Digestive system
      Week 6: Nervous tissues
      Week 7: Sensory system
      Week 8: Muscle tissues
      Week 9: Circulatory system
      Week 10: Urogenital system
      Week 11: Endocrine system
      Week 12: Immune system
      Week 13: Histology in research – evolutionary biology
      Week 14: Histology in research – biomedical research
      Week 15: Histology in medicine – pathology
B. Laboratory (1 hr, 50 min)
   Week 1: Lab safety – chemicals and sharps
   Week 2: Demonstration of histological techniques
   Week 3: How to use a microscope and different types of microscopes
   Week 4: Examination of epithelial tissues, connective tissue, and the integument
   Week 5: Examination of the digestive tract
   Week 6: Examination of nervous tissue
   Week 7: Examination of sensory organs
   Week 8: Examination of muscle tissue
   Week 9: Examination of blood vessels and cardiovascular tissues
   Week 10: Examination of urogenital tissues
   Week 11: Examination of endocrine organs
   Week 12: Examination of immunological cells and tissues
   Week 13: Preparing your own tissues for histology
   Week 14: Cutting and staining tissues
   Week 15: Student presentations

Signature: ___________________________________________ Date: ______________
           Chair

Signature: ___________________________________________ Date: ______________
           Dean
Vertebrate Histology
Spring 2015
(ZO-451/651)

Professor: Dr. Dustin S. Siegel
Office: 227, Rhodes
Phone: 573-651-2262
Email: dsiegel@semo.edu (please only email me from your SEMO address)
Lecture: Tuesday, 1:00pm – 2:50pm, MG131
Lab: Thursday, 1:00pm – 2:50pm, MG131
Office Hours: MWF, 8:00am – 9:00am

Text(s):

Course Description:
This course focuses on the study of tissues; i.e., histology. Throughout the semester students will learn the theory and utility of histology, preparation and staining of tissues for general histological examination, tissue identification, and the cellular composition of tissues. The first two weeks of the course will focus on introductory material and tissues preparation, while the remainder of the semester will be dedicated to tissues identification and the cellular composition of tissues.

Student Learning Outcomes:
– Student will be able to compare and contrast the structure/function of the three types of muscle tissue.
– Student will be able to compare and contrast the structure/function of the epithelium of the digestive tract with the epithelium of the integument.
– Student will be able to correctly identify different types of connective tissue.

Prerequisites:
BI151, BI152, BI153, BI154

During this course we will cover the following general topics:

◆ What is histology?
◆ Tissues preparation and staining
◆ General cell form and components
◆ Epithelia
◆ The integument
◆ Connective tissues
◆ Nervous tissues
◆ Muscle tissues
◆ Circulatory system
◆ Respiratory system
Urinary system
Immune system
Digestive system
Sensory system
Endocrine system
Reproductive system (both male and female)

Attendance:
I ASSUME each and every student is a responsible adult who cares about his or her own education. If you have to miss a class it is your responsibility to obtain the lecture notes, assignments, and other pertinent class materials. Attendance at exams and classroom assignments is MANDITORY. Any legitimate conflict (athletic events, religious holiday, travel mishaps, illness) must be brought to my attention, preferably the week before excluding illness, in writing or via email. As far as illness goes, you better be on your deathbed or very close in order to miss an exam! Illness will require written verification!! It is your responsibility to communicate with me personally in advance for missed exams and classroom assignments. Leaving a message on my phone or for me through someone else is not sufficient; you must receive confirmation from me in order for an absence to count as excused.

***BE ON TIME*** I will close the door at the beginning of lecture. If you are not in your seat, you miss class, and YOU will be responsible for seeking out notes from another student.

Attendance in class is MANDITORY. Class exercises are meant to enhance your learning experience. I expect you to arrive on time and stay the entire class period. Also, all materials covered in class are fair game on exams, so missing class will hurt your grade. If you miss more than two classes during the semester you will fail this course!!

Late Assignments:
Since this is an upper level biology class I expect all assignments to be in on time. Assignments are due at the beginning of class on the day that they are due (not in my mail box later). I will only accept late papers with a deduction of a letter for each day they are late up to 3 days. I will not accept a paper 3 days after the due date. The 1st day late: B is the best possible grade, 2nd day late: C is the best possible grade, 3rd day late: D is the best possible grade. Deductions will not be taken in cases of family emergency or illness with a doctor’s note. This may seem rough on you but it is only fair to your peers who turn their assignments in on time. It also prepares you for the future. Every profession has due dates on assignments and if you are late there are always consequences that can lead to loss of your job, so hopefully this will prepare you for such endeavors. Turning assignments in on time also allows me to grade them and get them back to everyone on time. I will not give assignments back until I have graded everyone’s.

Grading:
3 Lecture exams → 100pts each
Final lecture exam → 200pts
3 Lab exams → 100pts each
Journal write-up → 25pts
Histology project → 25pts
Points and Grade:
Undergraduates
A = 90-100%
B = 80-89%
C = 70-79%
D = 69-60%
F = below 60%

Graduates
A = 90-100%
B = 80-89%
C = 70-79%
F = below 70%

Exams:
Three exams are given during the semester and there is a comprehensive final during final exam week. Each exam counts equally toward your grade and is worth 100 points. The exams will be combinations of fill in the blank, definitions, labeling diagrams, short answer, and essay. Because the final exam is comprehensive, you will be able to drop your lowest test grade. Thus, in total, you will have 400 pts worth of exams in Histology, but only 300 pts will count to your final grade. However, if you miss an exam, you will not be able to drop that exam; thus, if you choose to not take an exam, you will receive a zero for one exam grade.

Journal Write-up:
One journal write-up will be given during the semester. Each student will pick 1 peer-reviewed journal articles (no short communications or review articles will be accepted and nothing on humans!) that deal with topics in the field of vertebrate histology. There are a number of morphology, anatomy, and physiology journals on the Kent library page (http://library.semo.edu/) that include histology in their analyses. You will turn in a 2-3 page summary and critique of each article. The 1st page of the write up should be a summary of what the authors were looking at and what techniques they used to test their hypotheses. The summary should have the following sections: Objective/Question tested, Methods, Results, Strength/Weakness. Also a brief description of the results and how they relate to the major points in the discussion of the paper should be include in the summary section. The 2nd page should be devoted to one or more strengths or weaknesses of the paper. Do not dwell on writing style or presentation. I want you to critique the methods they used. For example: Were the methods appropriate for the goals of the research? Did the experiments actually answer the questions they were asking? How much factual information did they get out of their experiments and are their major points brought up in the discussion answered by their results? Is there enough experimental data to support their conclusions?

Histology Project:
You will dissect their favorite tissue out of an organism (most likely a frog or salamander), prepare the tissue for sectioning, section the tissue, and stain the tissue on a microscope slide. Next, you will examine your tissue under a microscope, take pictures at 40x, 100x, and 400x, and then label the digital images that were photographed. Each image requires at least three
labels. On the last day of lab you will present you tissue to the class via powerpoint. **FOR GRADUATE STUDENTS ONLY:** Graduate students are required to complete a much more detailed histology project to be presented to the class, and potential publication. This project will be agreed upon by myself and the student at the beginning of the semester.

**Ethics***:
While we cannot make you an ethical person, we can tell you that the world, especially the scientific one, demands it. Continued enrollment in this class after the first day shall be viewed as acceptance of the following standards in addition to what is already detailed in your student handbook. These guidelines have been adapted from: J. H. Reed and D. E. Hallock (1996; Encouraging ethical behavior in class. The Teaching Professor 10:1). They adapted these from faculty standards prepared by the American Association of University Professors. We consider ourselves and all other faculty, held to these same high ethical standards.

1) Engage in the free pursuit of learning by:
   - Seeking help and clarification where needed
   - Respecting fellow students', professors', and guests' opinions without disparaging and dismissing them
   - Seeing beyond "personality issues" with others to appreciate their contributions to the learning environment
2) Model ethical scholarly standards by:
   - Avoiding plagiarizing and all other breaches of academic honesty
   - Avoiding any seeming approval, acceptance, or encouragement of fellow students' academic dishonesty and by bringing any such instances to the attention of the professor and/or university officials
   - Engaging in discussions with other students and professors about ethical issues in academics
3) Acknowledge, accept, and expect just assessment of your learning by:
   - Understanding the professor's methods and rationale for your assessment and asking for clarification if you do not understand
   - Engaging in accurate, just, and objective self-assessments of your own work
   - Engaging in constructive, value-neutral discussion with the professor about discrepancies between your self-assessment and the professor's assessment of your work
   - Refraining from comparing assessments and grades with classmates in a manner that might diminish a classmates' self esteem, nor divulging another classmates assessments or grades without permission
4) Avoid harassment, discrimination, and exploitation by:
   - Getting to know classmates and the professor as individuals rather than applying prejudices and stereotypes
   - Contributing your full effort in team and collaborative projects
   - Respectfully voicing your expectations of full participation in team and collaborative projects to fellow students
   - Not discouraging, in any way, a member's full participation in a collaborative project
   - Being careful not to make racist, sexist, and other types of discriminatory remarks during class
- Being careful not to monopolize class discussion time so that others do not have a chance to participate or are intimidated about participating

*Prepared by T. Lewis, Wittenberg University

Consequences of Cheating:
First, resist the temptation to cheat on any assignment or in life for that matter. In this class, the consequences of cheating are at minimum a zero on that assignment and in many cases failure of the entire course. Please refer to your student handbook for further details on academic integrity at Southeast Missouri State University.

Miscellaneous Ground Rules:
I tend to be very laid back and do my best to entertain and educate my students so that their learning experience is enriching and enjoyable. Therefore, I have very few ground rules for my classes. Treat each other as colleagues and respect each other’s questions and opinions about topics that we discuss in and outside of class. Listen to questions asked by your fellow students and of course by me. That entails that each of you listen and not talk during lecture time and discussion time unless you are the one presenting material. I will say this only once...leave your cell phones at home or in the OFF position during my class. Use your fellow students and me to ask questions and to discuss difficult material that is covered in lecture. I want all of you to have fun and enjoy your learning experience but I will make each of you work very hard!!!

Plagiarism:
By this time in your academic career, you all know what plagiarism is (I hope) and we have a strict honor code here at Southeast Missouri State University. Our honor council defines plagiarism as “the act of taking words, ideas, strategies, formulas, compositions, research or creative ideas of another an presenting them as if they were your own.” It is every student’s responsibility to understand what is expected particularly in science with paraphrasing and citation. All pertinent information can be found on the university website at: http://www2.semo.edu/philosophy/courses/plagiarism.htm I have also found another website, which belongs to Georgetown University. The website explains nicely what plagiarism is and how to avoid it. Check it out, it is a very nice site: http://www.georgetown.edu/honor/plagiarism.html

Student Disability Statement:
Any student with a documented disability who needs to arrange reasonable accommodations must contact each professor at the beginning of the semester. Early notification is highly preferable. Contact may be made by private consultation during my office hour or by contacting me at dsiegel@semo.edu. Please complete a Request for Services form (http://www.semo.edu/ds/program_info.htm) if accommodations are required. Staff at Disability Services will work with you to coordinate accommodations and provide you self-identification letters for each professor.

Class Schedule and Reading Assignments:
Fine Print*: The following schedule is tentative and is an approximation of what we will cover this semester. My ambition tends to override my intelligence when it comes to cramming
information into a semester course. The schedule is subject to change based on my inability to predict the length of time needed to cover some material and the fun we may have with discussing various subjects. Therefore, exam dates may change to accommodate any deviation we may take from the dates listed below.

- Questions, comments or requests regarding this course or program should be taken to ME! Unanswered questions or unresolved issues involving this class may be taken to Dr. Jim Champine.
- For other information from the university on classroom conduct and civility, visit: http://www.semo.edu/pdf/stuconduct-code-conduct.pdf
Histology Lecture Schedule:

Jan 20: History of histology and the practice of histology
Jan 27: No class!!!
Feb 3: Tissue preparation and staining
Feb 10: General cell form and components
Feb 17: Exam 1
Feb 24: Epithelia, connective tissue, and the integument
Mar 3: Digestive system
Mar 10: Sensory system – Journal review due
Mar 17: No class!!!
Mar 24: Exam 2
Mar 31: Muscle tissue
April 7: Circulatory system
April 14: Urogenital system
April 21: Exam 3
April 28: Endocrine system
May 5: Immune system
May 14: Final exam, 12:00pm, MG131
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<tr>
<th>Date</th>
<th>Topic</th>
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<tbody>
<tr>
<td>Jan 22</td>
<td>Lab safety – chemicals and sharps</td>
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<td>Jan 29</td>
<td>Demonstration of histological techniques</td>
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<tr>
<td>Feb 5</td>
<td>How to use a microscope and different types of microscopes</td>
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<td>Feb 12</td>
<td>Examination of epithelial tissue, connective tissue, and the integument</td>
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<td>Feb 19</td>
<td>Examination of the digestive tract</td>
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<td>Feb 26</td>
<td>Examination of nervous tissue</td>
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<td>Mar 5</td>
<td>Examination of sensory organs</td>
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<td>Mar 12</td>
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<td>April 2</td>
<td>Examination urogenital tissues</td>
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<td>April 9</td>
<td>Examination of endocrine organs</td>
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<td>May 7</td>
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