



## **BIOL 428 (Microscopic Anatomy) Syllabus**

**Monday, August 24, 2020 – Friday, December 18, 2020**

**Instructor:**               **Onesmo B Obalembo, BVM, MVM, Ph.D.**  
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### Time and Venue

The **lectures** will take place in the afternoon (**01:30 pm - 02:20 pm**) on **MWF** in **room 163 in Life Science South (LIFE)**. **Labs** will take place in the afternoon (**3:30 PM - 6:20 PM**) on **Tuesdays in room 341 in Life Science South**.

### In person vs. virtual class meetings

The current plan is to hold Biol. 428 lectures and Labs in person following all safety protocols and regulations to keep ourselves safe from corona virus. As you may already know, you will be required to wear face masks and social distance from each other during lectures. For labs, you will be required to wear labs coats, face masks, gloves and protective eyeglasses. With the exception of lab coats, other items will be provided.

Given the current COVID-19 pandemic, we will deliver classes via Zoom when it becomes necessary to do so. If this happens, lectures and labs will be delivered virtually via Zoom. The Zoom URL link is: <https://uidaho.zoom.us/j/9372126594>

We will conduct lab excises using the virtual histology website at the University of Minnesota using the URL link <http://www.histologyguide.com/index.html>. Dr. Clark Brelje has kindly granted us the permission to use their website.

Course Prerequisites: Biology 212 or 213. The override may be granted based on justifications for the request.

### Required Materials - Histology Textbook, Atlas and Lab Manual:

1. *Histology Laboratory Manual* (will be provided)
2. DiFiore's Atlas of Histology with Functional Correlations, 13<sup>th</sup> Edition; ISBN-13: 978-1496316769 and ISBN-10: 1496316762; Author: Victor P Eroschenko

### Recommended textbook

1. Junqueira's Basic Histology: Text and Atlas, 15<sup>th</sup> Edition (ISBN-13: 978- 1260026177)

and ISBN-10: 1260026175 by Anthony L. Mescher. This is an optional textbook. However, it would benefit those planning to go to medical school.

Reading Assignments:

You will be provided with well-illustrated and PowerPoint slides with notes in the footnotes. In addition, I will get syllabus chapters that match and PowerPoint slides for harder topics. In addition, I have given you textbook reading assignments (listed in Table 1 the course syllabus) to complement the provided materials. You are responsible for all assigned text chapters. Reading the assigned chapters will fill in some of the material that is not covered in lectures. I recommend that you should pay particular attention to all illustrations in your textbook because many of these illustrations will be used in lectures to demonstrate structural features of cells/tissues and organs. Most images in DiFiore's Atlas of Histology with Functional Correlations were taken from our slides.

Course Objectives:

The overall objective of this course is to introduce you to microscopy anatomy of mammals with the main focus on human histology. In this course, you will learn the histology (microanatomy) of cells, tissues, and major organs that constitute the mammalian organism. The information gained from this course will add to the information that you previously learned in other courses, help you to better understand how subcellular structures and cells themselves are organized in different kinds of tissues and organs to efficiently perform the specific functions of cells, tissue and organs. Also, in most cases, your will be introduced to microscopic morphologic changes that occur in disease states as well as new structures that were identified through modern research.

Table 1

<b>Course Objective</b>	<b>Sub Competency</b>	<b>Competency</b>
The student understands the essential processes in collecting, preserving, and processing samples for histologic examination.	Knowledge of practices in preparing examining histological samples. Sampling, fixation, embedding, sectioning, and staining with dyes and fluorochromes.	Knowledgeable
The student understands the basic imaging techniques (bright light, fluorescent and electron microscopy).	Basic understanding of each technique. Be able to recognize and differentiate microscopic images acquired by each approach.	Knowledgeable
The student will be able to identify the basic structure of cells	To recognize, describe, and differentiate cellular organelles their functions, subcellular organization, and effect on specialization of tissues.	Knowledgeable

The student will be able to identify the basic structure of tissues and describe their distribution and contribution to normal function.	To recognize, describe the structure and function of the basic types of tissues, and differentiate basic tissue types	Knowledgeable
The student will be able to identify the basic structure of organs and describe their contribution to normal function.	Be able to recognize and describe the microscopic structure and function of the major organ systems.	Knowledgeable

The overall goal of this class is to understand and explain the basic concepts and principles that govern the basic structure and function of each tissue/organ. Microscopic Anatomy uses lectures and laboratory sessions, with the lectures designed to provide background knowledge about each tissue and to serve as introductions or previews for the labs. In the labs, each student will be able to learn at his/her own pace and develop skills at solving structural problems by examining histological sections with light microscopy and where necessary Transmission and Scanning Electron microscopy. **By the end of this course each student should be able to:**

1. Describe the principles of key histological methods
2. Identify and describe major cell organelles, types of cells and tissues.
3. Describe important histologic features of various organs in the mammalian organism.
4. Understand and describe the ultrastructural features of important cells that characterize tissues and organs.
5. Describe the main functions of the major cell types, tissues, and organs.
6. Begin to understand how morphological changes in cells, tissues, and organs lead to pathobiology of diseases.

Methods of Student Evaluation:

Each student will be evaluated for the overall performance through lecture and laboratory exams (two exams each) and comprehensive lecture and laboratory final examinations. In addition, the instructor will assess everyone for participation and contribution to class activities.

All lecture exams will consist of multiple choice questions. The final laboratory and lecture exams will be comprehensive. That is, the exams will cover all of the material covered in all lectures and laboratories. You will be asked to identify cells, tissue, organs by examining tissue sections using a light microscope.

All students will be required to take the comprehensive laboratory and lecture final exams.

The final grades will be assigned on the basis of the average of the total accumulated points on all examinations. Grading for the course will be based on the University of Idaho scale:

- 90-100% = A,
- 80-89% = B,
- 70-79% = C,

60-69% = D,  
Below 60% = F.

Approximately 50% of the total points will be assigned to lecture exams, 40% will be assigned to laboratory exams, and 10% will be assigned to participation in class activities, particularly the lab. Lab and lecture exams will be given as indicated in the schedule.

#### Lab Fee Reimbursement Policy:

Lab fees may be reimbursed only if the course is dropped within the first two weeks of the semester. Reimbursement requires that a form be filled out by the office staff of the Department of Biological Sciences (Rm. 252, Life Sciences Building) at the time the course is dropped. Lab fees will not be reimbursed for courses dropped after the first two-week period of the semester.

#### Disability Support Services and Accommodations

Reasonable accommodations are available for students who have documented temporary or permanent disabilities. All accommodations must be approved through Center for Disability Access and Resources (CDAR), located in the Bruce M. Pitman Center, Suite 127, in order to notify your instructor(s) as soon as possible regarding accommodation(s) needed for the course. Contact (CDAR at 208-885-6307, email [cdar@uidaho.edu](mailto:cdar@uidaho.edu) or go to [www.uidaho.edu/dss](http://www.uidaho.edu/dss).

## **HISTOLOGY LABORATORY REGULATIONS**

#### The Histology Laboratory

The course will begin with an examination of the characteristic features of cells, using images obtained by using light microscopes as well as transmission and scanning electron microscopes. Following the introduction to the cells, you will study the characteristic features of the four different tissue types. Finally, you will learn the histologic features of the major mammalian organs.

#### Histology Texts and Histology Atlases

Histology is a fascinating, colorful, visual science. The assigned textbook contains information that covers both structure and function of cells, tissues, organs and organ systems. These books give examples of changes seen in major illnesses. As a result, histology relies heavily on illustrations in the form of line drawings and pictures that you need to study carefully in order to understand the lecture materials and textbooks. In fact, many of these illustrations in your textbooks will be used and shown during lectures in PowerPoint presentations.

The laboratory exercises, on the other hand, will require you to examine thin sections cut from tissues/organs, mounted on objective glasses and stained with dyes to show the particular features of cells, tissues, and organs. To see these characteristic features, you will view sections on the objective glass slides with a light microscope. To better understand what is viewed, you will need to have a histology atlas that illustrates these characteristic features in

color so that you can better orient yourself. During laboratory exercises, you will continually refer to your lab manual and the atlas to guide you to examine the sections from various tissues and organs on the objective glass slides. For these reasons, the recommended textbook, which is itself an atlas, is essential in the laboratory portion of the class. It is a very recent edition and contains the latest information concerning the organizations and functions of different cells, tissues, and organs. Laptops, iPads, and references to the electronic sources that may be obtained online for the lab are allowed.

### Histology Slides

You will be working with very fragile and expensive glass slides. Take extra care not to drop these slides on the floor; the floor in the laboratory is hard and the slides break very easy.

If you break a slide, please report such breakage to the instructor. Students will be assessed the current replacement cost for each broken slide in excess of \$25.00. THEREFORE, HANDLE SLIDES WITH SPECIAL CARE. CLEAN THEM USING KIM WIPES AFTER USE.

No slides are ever to be removed from the laboratory. If I find that microscope slides are disappearing, I will be forced to lock the laboratory and only allow students to view the slides during class hours. However, with a little bit of care and responsible action on everyone's part, we can all enjoy a pleasant and fascinating semester.

### Microscopes

Microscopes are also very fragile and expensive. You will be shown how to use microscopes at the beginning of the first lab. As with the slides, use extra care when working the microscopes. Microscopes are NEVER to be taken from the histology laboratory; at the end of the laboratory session, you should put back the microscopes into the cabinets and secure them. CLEAN MISCOSCOPE LENSES WITH LENS PAPERS. NEVER USE KIM WIPES!

### The Histology Laboratory

The histology laboratory and cabinets will be locked at all times, when not in use. However, if you need to review slides during periods other than the scheduled laboratory times, the laboratory will be unlocked for your use. You can request this service from our Laboratory Supervisor, Jean Norris, in Room 358 of the Life Science Building or me.

In addition to the glass slides, a series of 35 mm projection slides for student review will also be available in the laboratory. All slides that are used in the lecture and laboratory demonstrations will be left in the lab for your later use and study. Keep in mind that these slides can and will be used for laboratory exams. Laboratory examinations will include a portion of questions taken directly from these 35mm slides.

### Class and Laboratory Safety.

All students are required to follow the University of Idaho Coronavirus Disease 2019 (COVID-19) safety guidelines/regulations <https://www.uidaho.edu/vandal-health-clinic/coronavirus>

All students are required to follow the University of Idaho Laboratory Safety Guidelines (<https://www.uidaho.edu/infrastructure/pss/ehs/safety-programs/laboratory-safety>).

You are required to wear pants and closed-toed shoes.

We will use laser pointers during lectures and labs as part of interactive learning. **Laser pointers as are to be used purely for learning purposes and as directed by the instructor.** You will be dismissed from the lab if you are not properly dressed or misuse laser pointers by shining them to others.

## Lecture and Laboratory Schedules

The class/lab schedule highlights the topics, and the estimated time for coverage. In addition, it shows *Textbook Reading Assignments in DiFiore's Atlas of Histology with Functional Correlations, 13<sup>th</sup> Edition*. You are required to read the assigned chapters and look at the complementary PowerPoints slide decks before coming to class. PowerPoints and additional reading materials will be posted on the University of Idaho Blackboard Learn Website.

<u>Date</u>	<u>Day</u>	<u>Session</u>	<u>Subject Matter (Lecture and Lab)</u>	<u>Reading Chapters</u>	<u>Pages</u>
Aug 24, 2020	M	1	Course Introduction + Histological Methods: Sampling, Processing & Microscopy	1	
25	T	2	Histologic Techniques (Lecture; 1 <sup>st</sup> hour) + Introduction to Cell & cell cycle Tissues (hours 2-3)	2; 3	
26	W	3	Epithelial Tissue	LAB-1 4	
28	F	4	Glands	4	
Sept 31, 2020	M	5	Connective Tissue Proper	5	
1	T	6	Epithelial Tissue + Connective Tissue Proper	LAB-2	
2	W	7	Adipose Tissue and Cartilage	5; 7	
4	F	8	Cartilage and Bone	7	
7	M		LABOR DAY- UNIVERSITY	CLOSED	
8	T	9	Cartilage and Bone	LAB-3	
9	W	10	Bone	7	
11	F	11	Hemopoietic Tissue Blood +	6	
14	M	12	Bone Marrow	6	
15	T	13	Bone + Blood	LAB-4	
16	W	14	Muscle Tissue- Skeletal Muscle	8	

18	F	15	Muscle Tissue - Cardiac + Smooth Muscle	8
21	M	16	Nervous Tissue - Central Nervous System (CNS)	9
22	T	17	Muscle + Nervous System	LAB-5
23	W	18	Nervous System – Peripheral Nervous System (PNS)	9
25	F	19	Nervous System –PNS	9
28	M	20	First EXAM (Lecture)	
29	T	21	First EXAM (Lab)	LAB-6
30	W	22	Circulatory System- Heart and Arteries	10
Oct 2, 2020	F	23	Circulatory System- Veins and Lymph Vessels	10
5	M	24	Immune System: Lymph Nodes, Thymus	11
6	T	25	Bone Marrow + Vascular System	LAB-7
7	W	26	Immune System: Spleen tonsils, Peyer's Patches	11
9	F	27	Digestive System- Oral cavity + Salivary Glands	13
12	M	28	Digestive System-Esophagus - Stomach	14
13	T	29	Immune System Organs	LAB-8
14	W	30	Digestive System- Intestine	15
16	F	31	Digestive System- Liver + Pancreas	16
19	M	32	Respiratory System- Conducting Portion	17
20	T	33	Digestive System Organs	LAB-9
21	W	34	Respiratory System- Lung	17
23	F	35	Integumentary System- Skin	12
26	M	36	Integumentary System- Sweat glands and Innervation	12
27	T	37	Integument + Respiratory System	LAB-10
28	W	38	Urinary System (Kidney)	18
30	F	39	Urinary System- Nephron	18
Nov. 2, 2020	M	40	Urinary System- Ureter, Urinary Bladder & Urethra	
3	T	41	Urinary System	LAB-11
4	W	42	Male Reproductive System - Testis	20

6	F	43	Review	
9	M	44	<u>Second EXAM (Lecture)</u>	
10	T	45	<u>Second EXAM (Lab)</u>	LAB- 12
11	W	46	Male Reproductive System- Excurrent Ducts	20
13	F	47	Male Reproductive System- Accessory Genital Organs	20
16	M	48	Female Reproductive System - Ovary and Ovarian Activity	21
17	T	49	<u>Male Reproductive System</u>	LAB- 14
18	W	50	Female Reproductive System – Uterus	21
20	F	51	Female Reproductive System – Cervix, Vagina, Placenta + Mammary Glands	21
23	M	52	Endocrine Glands- Hypothalamus -Pituitary Axis & Pineal	19
24	T	53	<u>Female Reproductive System + Endocrine Organs</u>	LAB-15
25	W	54	Endocrine Glands- Thyroid + parathyroid glands	19
27	F		<u>Fall recess/Thanksgiving</u>	UI holiday
30	M	55	Endocrine Glands- Adrenal gland	19
Dec. 1, 2020	T	56	<u>Female Reproductive System + Endocrine Organs</u>	LAB-15
2	W	57	Pancreatic Islets +Diffuse Endocrine System	
4	F	58	Special senses Eye 1	22
5697	M	59	Special senses Eye 2	22
568	T	60	<u>Endocrine Glands + Sense organs</u>	LAB-16
9	W	61	Special senses: Ear	22
11	F	62	<u>REVIEW LECTURE/LAB</u>	
14	M	63	<u>REVIEW LECTUR/LAB</u>	
15	T	64	<u>LAB. FINAL</u>	LAB-17
16	W	65	<u>LECTURE FINAL</u>	
18	F		<u>GRADE SUBMISSION</u>	

Abbreviations: M= Monday, T= Tuesday, W= Wednesday, and F= Friday.  
UI= the University of Idaho