



**COURSE and TITLE:** *Fundamentals of Human Anatomy & Physiology 1 (BIO 220)*

**Instructor:** Dr. Jessica Adams

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This course is being offered online asynchronously; however, I will be available via zoom for online “student” hours, help sessions, and individual appointments as needed (Please see Brightspace for more information). Email is the best way to communicate with me and I will respond within 24 hours (unless it’s the weekend – but even then, I’m usually quick to respond). I am here to help you – so please do not hesitate to reach out. Welcome aboard!

### **COURSE DESCRIPTION**

BIO 220 is the first of a two-course series on the fundamentals of human anatomy and physiology (A&P I and II). The overall goal of A&P I and II is to promote the knowledge and the understanding of the structures, organization, function, and coordination of the human body from the chemical level, through cells, tissues, organs, body systems, to the overall organism. Together these courses provide the fundamentals necessary for the understanding of human anatomy and physiology.

### **PREREQUISITES**

Earned credit or concurrent enrollment in BIO 221 (Fundamentals of Human Anatomy & Physiology I Laboratory).

### **ESSENTIAL EQUIPMENT**

To successfully complete this course, you will need access to a computer with a camera and reliable, high-speed Internet access and appropriate system and software to support the Brightspace learning platform. URI supports various applications, including Microsoft tool suite (Word, Excel, etc.). You can find more information and access here: <https://its.uri.edu/services/945d3e053d288718a2a58e4f6ea7aa62f16ca4cc45/>

### **COURSE LEARNING OBJECTIVES (CLO)**

By the end of this course, participants will be able to:

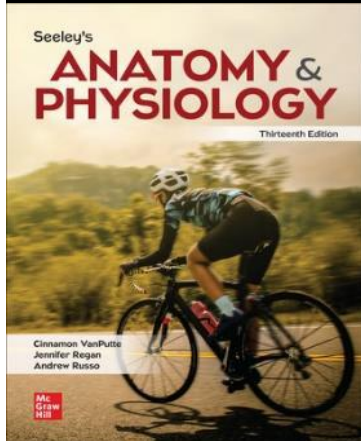
- CLO1: Use standard terminology to describe anatomical structures & physiological processes.
- CLO2: Recognize & explain the principle of homeostasis & the use of feedback loops to control physiological systems in the human body.
- CLO3: Predict physiological responses to changes in homeostasis.
- CLO4: Recognize & explain the interrelationships between the structures of the human body and their functions.
- CLO5: Integrate & apply knowledge of human A&P to interpret real world scenarios.
- CLO6: Use both reflection and self-assessment to grow as a learner.
- Student Learning Objectives (SLO) for chapter specific learning outcomes are listed at the end of the syllabus and are available on Brightspace and within chapter lectures/PowerPoint.

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## **MAJOR STUDY UNITS**

- Unit 1 “Intro”
  - Chapter 1: An Introduction to Anatomy & Physiology
  - Chapter 3: The Cellular Level of Organization
  - Chapter 4: The Tissue Level of Organization
  - Chapter 5: The Integumentary System
- Unit 2 “Skeletal System”
  - Chapter 6: Bones and Bone Structure
  - Chapter 7: The Skeletal System: Gross Anatomy
  - Chapter 8: Joints and Movement
- Unit 3 “Muscular System”
  - Chapter 9: Muscle Tissue: Histology and Physiology
  - Chapter 10: The Muscular System: Gross Anatomy
- Unit 4 “Nervous System”
  - Chapter 11: Nervous Tissue: Histology and Physiology
  - Chapter 12: The Spinal Cord and Spinal Nerves
  - Chapter 13: The Brain and Cranial Nerves
  - Chapter 16: The Autonomic Nervous System

## **REQUIRED ACCESS to McGraw Hill CONNECT® (A&P 1 and A&P 2)**



McGraw Hill's Connect® Online Access for *Seeley's Anatomy & Physiology* (13e) by VanPutte/Regan/Russo — ISBN 9781265186012. Connect access includes access to the eBook.

You also have the OPTION to purchase a printed, loose-leaf copy of the textbook directly from your Connect account and have it shipped to you. The purchase price is \$20 when using the promo code and the shipping is free. Copies of the textbook are placed on reserve in the library for your use.

Please find more information on Brightspace along with McGraw Hill's customer service information should you have any technical difficulties.

## **INSTRUCTIONAL STRATEGIES – FULLY ONLINE**

Much of the instruction for this course will be pre-recorded lectures. Chapter Power Points have been thoughtfully made to provide an effective framework to assist you in the lecture as well as with your studies. These Power Points, which include a list of student learning outcomes, made for each lecture, are available to you on Brightspace. For this online course, Brightspace is our “classroom.” Please refer to the [Brightspace YouTube video tutorials](#) before you get started and refer back to them as a resource as needed while you complete this course.

## **TECHNOLOGY REQUIREMENTS & RESOURCES**

Computer access to the internet with a webcam is required to successfully navigate this course. The course is delivered through the Brightspace Learning Management System (LMS), McGraw Hill's Connect Platform, and Zoom, which are a set of web applications designed to work with modern web browsers.

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Recommended browsers (those with the most QA testing effort against them) are Google Chrome, Safari, and Mozilla Firefox. The mobile versions of these browsers also work well with most operations in Brightspace. Internet Explorer is not recommended. To successfully complete this course, you will also need a working knowledge of Brightspace, McGraw Hill, Connect, Zoom, and Google Drive. For help attaining these skills please refer to the tutorial links below.

- **Brightspace**
  - Account Access <https://brightspace.uri.edu>
  - Resource page <https://web.uri.edu/brightspace/>
  - Tutorials  
[https://www.youtube.com/playlist?list=PLZz77ffBC33ltZ\\_XzSgohYHpzlo6T2xiE](https://www.youtube.com/playlist?list=PLZz77ffBC33ltZ_XzSgohYHpzlo6T2xiE)
  - Accessibility Information <https://www.d2l.com/accessibility/standards>
- **Connect**
  - Account Access will occur through Brightspace.
  - Tutorials are available on various topics and are available online with a google search.
  - Accessibility information:  
<https://www.mheducation.com/highered/explore/accessibility.html>
- **Google Chrome (required for Proctorio)**
  - Log into Google Chrome with a non-uri.edu account (URI blocks Chrome Extensions) to download Proctorio at <https://getproctorio.com/>
  - Accessibility information: <https://about.google/belonging/disability-inclusion/product-accessibility/>
- **Zoom (as needed)**
  - Account Access <https://uri-edu.zoom.us/>
  - Tutorials  
[https://youtube.com/playlist?list=PLZz77ffBC33kRvShf\\_m2hdmoelShm-Ewf](https://youtube.com/playlist?list=PLZz77ffBC33kRvShf_m2hdmoelShm-Ewf)
  - Accessibility Information <https://zoom.us/accessibility>
- **Google Drive (as needed)**
  - Account Access <https://drive.google.com/>
  - Tutorials <https://support.google.com/>
  - Accessibility Information  
[https://support.google.com/drive/topic/2650510?hl=en&ref\\_topic=14940](https://support.google.com/drive/topic/2650510?hl=en&ref_topic=14940)

#### GRADE POINT SYSTEM

A = 93%-100%	B = 83%-86%	C = 73%-76%	D = 60%-66%
A- = 90%-92%	B- = 80%-82%	C- = 70%-72%	F=59% and below
B+ = 87%-89%	C+ = 77%-79%	D+ = 67%-69%	

Performance accounts for 100% of your grade. Every member of the class can earn an "A" under this system. Percentage scores are not rounded up. **You must earn your grade.** There is no exception to this policy.

## METHODS OF EVALUATION

Student Deliverables	Module	Points	CLO
4 Proctored Exams (4 Units, 100 points each)	1 for each unit	400	CLO 1-5, SLOs for each chapter
Chapter Homework “quizzes” (8.3 points each, lowest 1 dropped)	1 for each chapter	100	CLO 1-5, SLOs for each chapter
Discussion Forums (1 point each)	1 for each chapter + Introduction	15	CLO 5
Cultural Competency (1.5 extra credit points each)	1 per unit	6(EC)	CLO6
<b>Total</b>		<b>515</b>	

## STUDENT DELIVERABLES

- Please see course schedule

## DESCRIPTION OF ASSESSMENTS

**Proctored Exams:** Four, unit exams will be administered on Brightspace and proctored with Proctorio which requires an internet enabled computer with a webcam and microphone. Exams are scheduled to be available according to the class schedule from 0800-2359. Please see the Brightspace calendar for exact dates. The exams will be timed (50 minutes) and consist of multiple choice and short answer questions based on the lecture material. Questions are completed one at a time without the option to return to previous questions. This course will use Proctorio, a browser-locking and remote proctoring solution designed to protect the integrity of this course’s assessments (more information is on Brightspace). Please review the [Proctorio system requirements](#) before exam 1. Please watch the [Student Orientation Video on Proctorio](#), and then make sure to follow the instructions in [Proctorio’s Quick Start Test Taker Guide](#). To verify your computer system meets the requirements, take the practice quiz. This will ensure that everything will run smoothly on the day of the proctored exam. If you have any trouble while using Connect & Proctorio, you can access quick help guides or reach out to Connect or Proctorio support for troubleshooting Monday – Friday 8am-8pm EST 1(800)388-3987.

**Homework Assignments:** Homework “quizzes” will be assigned on Brightspace for each chapter to ensure you are adequately meeting the course learning objectives.

**Discussion Forums:** will be available weekly on Brightspace. To create dialog with your classmates, I suggest completing your initial post by Wednesday and then respond to two of your group mates later in the week. These are graded on completion, not accuracy. The first discussion post “Introduce Yourself” will be your first interaction with the class. This will allow you to connect with me as well as your fellow classmates.

**Cultural Competency:** 4 extra credit opportunities, 1 per unit to gain knowledge, awareness, and skills related to cultural humility. There are several core competencies endorsed by the Association of American Medical Colleges (AAMC), Group on Student Affairs (GSA), and the Committee on Admission (COA) that are in demand

for students applying to graduate programs within the health care field or seeking employment. Cultural competence is one of them and the overall learning objectives desired by health care fields are:

- demonstrate knowledge of socio-cultural factors that affect interactions and behaviors.
- shows an appreciation and respect for multiple dimensions of diversity.
- recognized and acts on the obligation to inform one's own judgement.
- engages diverse and competing perspectives as a resource for learning, citizenship, and work.
- recognizes and appropriately address bias in themselves and others.
- interacts effectively with people from diverse backgrounds.

**Anatomy and Physiology Revealed (APR)** from McGraw Hill ®: is an interactive dissection tool that includes 3D models, histology, animations, and more to enhance learning. These are OPTIONAL UNGRADED activities, but you will see APR questions in your homework assessments. More information on Brightspace.

**SmartBook** from McGraw Hill ®: is an adaptive learning and reading tool that highlights key topics for students to focus on and provides links to additional material such as videos and slideshows, so they can deepen their understanding of the learning objectives. These are OPTIONAL UNGRADED activities. More information on Brightspace.

### **ATTENDANCE AND OTHER CLASS POLICIES**

- Monday of the first week is considered the first day of class for online instruction.
- In an online learning environment, “attendance” is measured by regular online participation and engagement—important components expected for student success. Online participation is evident through posting to a discussion board, completing quizzes, and other course-related assessments.
- This course is offered online asynchronously and therefore does not have set class meeting times. However, we will meet from time to time via zoom.
- Required first week meeting: Be on the lookout for a Brightspace announcement and sign-up sheet. This 15-minute meeting will be informal and allow us to connect so I may better support you on your educational journal.
- Any student who earns less than a 73% on an exam must meet with me. This will give us a chance to review the exam and discuss effective study strategies.
- Assessment due dates are Sunday by 2359 (11:59 pm for non-military time folks 😊), Eastern Standard Time zone. Please refer to the Brightspace calendar for specific due dates.
- Late work is not accepted.

### **COURSE NAVIGATION**

The “Start here” module under the “content” tab in Brightspace will introduce you to the course and how it will operate. Within this module you will also make a discussion post in the Introduce Yourself to the Class where you will get your first opportunity to interact with your professor and fellow classmates. The course is then broken down by chapter. Within each chapter module you will find the chapter learning objectives, reading materials, video lectures, chapter assessments, and additional resources.

### **SELF DIRECTED LEARNING**

I am an educator and I love my job. I believe in the power of education and desire to foster a love of learning in my students. To meet that end, I have designed this course (and its assignments) to teach you how to learn and provide you with the skills to become a self-regulated learner. (Ha – doesn’t that sound like I am advocating a practice that will lead to my job becoming obsolete – Yikes! But it would be worth it :).)

Self-regulated learners are able to set goals for their learning (what do you want to learn?), use strategies to be successful in meeting those goals (we will cover many strategies this semester), and monitor and reflect on their learning progress in order to adjust their strategies as needed.

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The bottom line is you are in the driver's seat, you control your learning – I am here to help you navigate. ROAD TRIP!

### **MY COMMITMENT TO YOU**

I am committed to quality teaching. The course is well organized, interactive, relevant, and challenging. The course objectives will be met. I need you to commit to the course as well. If there is anything I can do to make this course more relevant to you and your professional goals, please let me know. I encourage you to take advantage of my student "office" hours via zoom. I will help you in any way that I can. Thank you in advance for what I know is going to be a fantastic semester. I am glad you are a student in my class, and I am so excited to be on this anatomical exploration with you!

Additionally, I am committed to reducing course material costs for my students as I strongly feel this is a social justice issue and I take it personally. As a student I worked year-round in order to pay for textbooks (booo!) and I do not want my students to have that burden. It's a bit of a challenge to provide high quality education without (or low) course material costs to students but I believe I have met that challenge (and rocked it if I do say so myself 😊). Thank you in advance for what I know is going to be a fantastic semester. I am glad you are a student in my class, and I am so excited to be on this biological exploration with you!

My advice: Learning is social! One of the best ways to become an active learner is to TALK about what you are learning. In all Adams-style classes, you are expected to communicate with your classmates. The more you engage with each other, the more you engage with the content. In an online class like this, the more people you are connect to, the more opportunities you will have to really cement the material into your new neural networks! So please don't be shy! Form study groups and find people to work with. You'll be happy you did!

### **ADAMS DIVERSITY & INCLUSION STATEMENT**

My goal as an educator is to support learning in a way that is welcoming to all students and that acknowledges and respects a diversity of perspectives, values, voices, and bodies. Within the broader community, science has a history of being generated by "a small subset of privileged voices", sometimes in a subjective manner through a biased lens. Science also has an ugly history of discrimination and abuse of marginalized "participants". While I deliberately incorporate diverse material providing greater perspective and a more accurate view of the topic, I acknowledge it is a work in progress.

You might hear some folks who teach courses like Human Anatomy & Physiology say that their positionality is irrelevant because the subject matter is factual, scientific, and objective. Like a growing number of others in my field, I do not agree. Yes, the mechanisms by which skeletal muscle contracts are probably independent of sociocultural influence. However, we cannot disregard that our concepts of the body and our understanding of what it means to be "normal" or "healthy" are all socially constructed, even when they are backed by scientific evidence and discussed at the cellular level. My positionality (as a white, neurotypical, biomedically-educated, non-disabled, straight, cis-gendered, women, military spouse, and mother) DOES influence my own understanding of the body. No doubt this influences which concepts I prioritize in my teaching as well as the language and framings I use to communicate with students. As an A&P educator, I recognize my power to influence the way students think about their own bodies and the bodies of others. As such, I aim to think and teach about the human body in ways that are body positive, that include every(body), and that help to foster empathy and cultural humility.

This course is not about the ways that power and privilege have influenced our understanding of how bodies work. It is not about how the way we talk about the body (even in the medical literature) can be hurtful. It is not about the ways we value some bodies more than other bodies. But these things will come up... I hope. Although we have a lot of content to work through this semester, I encourage you to take a moment here and there to think



and talk about some of these ideas. I hope to foster a learning environment where we can flag each other's problematic language or thinking and work together towards solutions.

The classroom learning environment, our little ecosystem, is rich in experience, foundational knowledge, and perspectives - I strive to create a classroom community where everyone feels welcomed, valued, and eager to learn - whose voices will be heard and respected.

I continue to work to enhance my cultural competency, knowing this is a lifelong process. If at any time you feel uncomfortable, excluded, or mistreated – please let me know. I always welcome and encourage feedback to improve this course and your experience. I am still figuring out how to achieve these goals, aims and hopes. I invite you to support these efforts by understanding that I will sometimes get it wrong and by holding me accountable when I do. Welcome to class – I am so happy you are here!

### **NETIQUETTE FOR ONLINE COURSE**

- Be polite and respectful of one another.
- Avoid personal attacks. Keep dialogue friendly and supportive, even when you disagree or wish to present a controversial idea or response.
- Be careful with the use of humor and sarcasm. Emotion is difficult to sense through text.
- Be helpful and share your expertise. Foster community communication and collaboration.
- Contribute constructively and completely to each discussion. Avoid short repetitive "I agree" responses and don't make everyone else do the work.
- Consider carefully what you write. Re-read all e-mail and discussion before sending or posting.
- Remember that e-mail is considered a permanent record that may be forwarded to others.
- Be brief and succinct. Don't use up other people's time or bandwidth.
- Use descriptive subject headings for each e-mail message.
- Respect privacy. Don't forward a personal message without permission.
- Cite references. Include web addresses, authors, names of articles, date of publication, etc.
- Keep responses professional and educational. Do not advertise or send chain letters.
- Do not send large attachments unless you have been requested to do so or have permission from all parties.
- 2-word postings (e.g.: I agree, Oh yeah, No way, Me too) do not "count" as postings.

### **DOCUMENTATION**

Any material not original to the student must be cited in APA documentation format. Deliberate use of information or material from outside sources without proper citation is considered plagiarism and can be grounds for disciplinary action. See the explanation of Academic Integrity below.

### **ACADEMIC INTEGRITY**

As a learning community of scholars, URI emphasizes the ethical responsibility of all its members to seek knowledge honestly and in good faith. Students are responsible for doing their own work, and academic dishonesty of any kind will not be tolerated. "Violations of academic integrity include, but are not limited to, cheating, plagiarism, or misrepresentation of information in oral or written form. Such violations will be dealt with severely by the instructor, the dean/center director, and the standards committee. Plagiarism means presenting someone else's idea or writing as if it were your own. If you use someone else's idea or writing, be sure the source is clearly documented." Other guidelines for acceptable student behavior are specified in the university catalog.

1. Plagiarism: Plagiarism consists of using another author's words without proper identification and documentation of that author. Plagiarism takes the form of direct quotation without the use of quotation marks and/or documentation or paraphrasing without proper identification and documentation. The

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fabrication of sources, or the act, deliberately or unconsciously, of passing another author's work off as your own are also considered to be plagiarism. This includes work generated by artificial intelligence (AI).

2. Falsification: Falsification consists of deliberately changing results, statistics, or any other kind of factual information to make it suit your needs. It also consists of deliberately changing a source's intent by misquoting or taking out of context.
3. Multiple submission: If you wish to turn in the same work or use the same research, in whole or in part, for more than one course, you must obtain permission to do so from all professors involved. Failure to obtain this permission constitutes academic dishonesty. "Recycled work" must contain significant work as related to the current course topic, meeting the standards for the current assignment.

All submitted work must be your own. If you consult other sources (class readings, articles or books from the library, articles available through internet databases, or websites) these MUST be properly documented, or you will be charged with plagiarism and will receive an F for the submitted work. In some cases, this may result in a failure of the course as well. In addition, the charge of academic dishonesty will go on your record in the Office of Student Life.

**Cheating will not be tolerated. URI's regulations regarding cheating will be upheld.**

Students are expected to be honest in all academic work. A student's name on any written work, quiz or exam shall be regarded as assurance that the work is the result of the student's own independent thought and study. Work should be stated in the student's own words, properly attributed to its source. Students have an obligation to know how to quote, paraphrase, summarize, cite, and reference the work of others with integrity. The following are some examples of academic dishonesty:

- Using material, directly or paraphrasing, from published sources (print or electronic) without appropriate citation
- Claiming disproportionate credit for work not done independently
- Unauthorized possession or access to exams
- Unauthorized communication during exams
- Taking an exam for another student
- The use of notes, electronic devices, artificial intelligence, or other means to gain an unauthorized advantage
- Unauthorized use of another's work or preparing work for another student
- Facilitating or aiding another's academic dishonesty
- Altering or attempting to alter grades
- Fabricating or falsifying facts, data or references
- Submitting the same paper for more than one course without prior approval from the instructors.

### **URI ACADEMIC WRITING STANDARDS**

Specific writing standards differ from discipline to discipline and learning to write persuasively in any genre is a complex process, both individual and social, that takes place over time with continued practice and guidance. Nonetheless, URI has identified some common assumptions and practices that apply to most academic writing done at the university level. These generally understood elements are articulated here to help students see how they can best express their ideas effectively, regardless of their discipline or any writing assignment.

Venues for writing include the widespread use of e-mail, electronic chat spaces and interactive blackboards. URI is committed to guaranteeing that students can expect all electronic communication to meet Federal and State regulations concerning harassment or other "hate" speech. Individual integrity and social decency require common courtesies and a mutual understanding that writing--in all its educational configurations--is an attempt to share information, knowledge, opinions and insights in fruitful ways.

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Academic writing (as commonly understood in the university) always aims at correct Standard English grammar, punctuation, and spelling.

The following details are meant to give students accurate, useful, and practical assistance for writing across the curriculum of URI.

Students can assume that successful collegiate writing will generally:

- Delineate the relationships among writer, purpose, and audience by means of a clear focus (thesis statements, hypotheses or instructor-posed questions are examples of such focusing methods but are by no means the only ones) and a topic that's managed and developed appropriately for the specific task.
- Display a familiarity with and understanding of the discourse styles of the discipline and/or particular assignment.
- Demonstrate the analytical skills of the writer rather than just repeating what others have said by summarizing or paraphrasing.
- Substantiate abstractions, judgments, and assertions with evidence specifically applicable for the occasion whether illustrations, quotations, or relevant data.
- Draw upon contextualized research whenever necessary, properly acknowledging the explicit work or intellectual property of others.
- Require more than one carefully proofread and documented draft, typed or computer printed unless otherwise specified.

### **STUDENT SUPPORT SERVICES**

The following student support services are provided by the university and available to all URI students:

- Student support services such as counseling center: <https://web.uri.edu/counseling>
- Food assistance: <https://web.uri.edu/rhody-outpost>
- Bias resource team: <https://web.uri.edu/brt>

We are a community of learners, and I am here to support you in any way that I can. Any student who faces challenges securing their food or housing and believes this may affect their performance in the course is urged to contact the Dean of Students for support. As always, if you are comfortable in doing so, please let me know and I'll provide any resources that I can.

### **URI ANTI-BIAS SYLLABUS STATEMENT**

We respect the rights and dignity of each individual and group. We reject prejudice and intolerance, and we work to understand differences. We believe that equity and inclusion are critical components for campus community members to thrive. If you are a target or a witness of a bias incident, you are encouraged to submit a report to the URI Bias Response Team at [www.uri.edu/brt](http://www.uri.edu/brt). There you will also find people and resources to help.

### **ACADEMIC SUPPORT SERVICES (Summer availability varies)**

#### **DISABILITY ACCOMMODATIONS AND INCLUSION**

Your access in this course is important. Please send me your Disability, Access, and Inclusion (DAI) accommodation letter early in the semester so that we have adequate time to discuss and arrange your approved academic accommodations. If you have not yet established services through DAI, please contact them to engage in a confidential conversation about the process for requesting reasonable accommodations in the classroom. DAI can be reached by calling: 401-874-2098, visiting: [web.uri.edu/disability](http://web.uri.edu/disability), or emailing: [dai@etal.uri.edu](mailto:dai@etal.uri.edu). They are available to meet with students enrolled in Kingston as well as Providence courses.

#### **Office of Disability Services**

#### **Americans With Disabilities Act Statement**

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Any personal learning accommodations that may be needed by a student covered by the “Americans with Disabilities Act” must be made known to the university as soon as possible. This is the student's responsibility. Information about services, academic modifications and documentation requirements can be obtained from The Office of Affirmative Action, Equal Opportunity, and Diversity (AAEOD). <https://web.uri.edu/affirmativeaction/>

Any student with a documented disability is welcome to contact me early in the semester so that we may work out reasonable accommodations to support your success in this course. Students should also contact Disability Access, and Inclusion Office, Office of Student Life, 302 Memorial Union, 401-874-2098. They offer online drop-in hours for student support: <https://web.uri.edu/disability/>

From the University Manual: 6.40.10 and 6.40.11 Accommodations for Qualified Students with Disabilities. Students are expected to notify faculty at the onset of the semester if any special considerations are required in the classroom. If any special considerations are required for examinations, it is expected the student will notify the faculty a week before the examination with the appropriate paperwork.

### **Academic Enhancement Center (Might not be available during the summer ☹️)**

Please note we cover a large amount of material in this course, and as such, a significant amount of work will be expected. This is a challenging course. Success requires that you keep pace with the work, understand course concepts, and study effectively. The Academic Enhancement Center (<http://www.uri.edu/aec/>) is a great place to do this and they offer online services.

The Academic Enhancement Center helps URI students succeed through three services: Academic Coaching, Subject-Based Tutoring, and The Writing Center. To learn more about any of the services below, please visit [uri.edu/aec](http://uri.edu/aec) or call 401-874-2367 to speak with reception staff. AEC is located 4th floor of Roosevelt Hall.

**Subject Tutoring** To view more information about our offerings and schedules, please visit [uri.edu/aec/tutoring](http://uri.edu/aec/tutoring).

**Academic Skills Development** resources helps students plan work, manage time, and study more effectively. All Academic Skills and Strategies programming are offered both online and in-person. **UCS160: Success in Higher Education** is a one-credit course on developing a more effective approach to studying. **Academic Consultations** are 30-minute, 1 to 1 appointment that students can schedule on Starfish with Dr. David Hayes to address individual academic issues. **Study Your Way to Success** is a self-guided web portal connecting students to tips and strategies on studying and time management related topics. For more information on these programs, visit [uri.edu/aec/academic-skills](http://uri.edu/aec/academic-skills) or contact Dr. Hayes directly at [davidhayes@uri.edu](mailto:davidhayes@uri.edu).

**The Writing Center**, located in Roosevelt Hall 009, provides free writing support to students in any class, at any stage of the writing process: from understanding an assignment and brainstorming ideas, to developing, organizing, and revising a draft. Fall 2020 services are offered through two online options: 1) real-time **synchronous appointments** with a peer consultant (25- and 50-minute slots, available Sunday - Friday), and 2) written **asynchronous consultations** with a 24-hour turn-around response time (available Monday - Friday). Synchronous appointments are video-based, with audio, chat, document-sharing, and live captioning capabilities, to meet a range of accessibility needs. View the synchronous and asynchronous schedules and book online, visit [uri.mywconline.com](http://uri.mywconline.com).

Like AEC on Facebook (Seriously? Who uses FB anymore?) <https://www.facebook.com/URIAEC>

### **BRIGHTSPACE SUPPORT SERVICES**

The ITS Service Desk, located in the URI Library, is prepared to help students should they encounter problems with Brightspace. Please read through the following information:

1. For login problems, call the Service Desk at 874-4357.

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2. The Service Desk Website, <https://web.uri.edu/itservicedesk/> opens in new window, posts the semester operating schedule as well as a link on the right index to the self- help technical wiki. That site contains Brightspace help and instructions for both students and faculty.
3. Recommended browsers (those with the most QA testing effort against them) are Google Chrome, Safari, and Mozilla Firefox. The mobile versions of these browsers also work well with the majority of operations in Brightspace. Internet Explorer is not recommended.

#### **URI ONLINE LIBRARY RESOURCES**

<https://web.uri.edu/library/>

#### **BIOLOGICAL SCIENCES BEREAVEMENT STATEMENT**

If you are grieving or have experienced the death of a loved one, the Biological Sciences Faculty, Staff, and Teaching Assistants understand and want to support you during this difficult time.

- If you have questions about missing class or your assignments, we encourage you to reach out to your Dean so they can notify all your instructors about your circumstances. If you are in University College, call 401-874-5903 and ask to speak to the UC Dean about a private matter; if you are in CELS, contact Dean Kim Anderson (kand@uri.edu; 401-874-5026) in the CELS Office of Student Affairs.
- Next, please reach out to me and together, we can make a plan that will allow you to be as successful as possible in this class during this tough time. Your mental health is so much more important than your grade in this class.

The University Counseling Center can offer further support 24/7 (call 401-874-2288, <https://web.uri.edu/counseling/crisis/>).

SUMMER SESSION 1 <u>SUGGESTED</u> COURSE SCHEDULE to view content (due dates below)				
Date		CH	BIO 220 Lecture Topic	BIO 221 Lab (check their site)
05/19	M	1	Introduction Cell Biology Tissues	Labs this week: Intro. Histology Integumentary
05/21	W	3		
05/23	F	4		
05/27*	T*	5	Integument (Exam 1)	Labs this week: Skeletal System Organization, Axial & Appendicular Skeleton and Articulations
05/28	W	6	Bone Tissue	
05/30	F	7	Skeletal: Axial Skeleton	
06/02	M	7	Skeletal: Appendicular Skeleton	Labs this week: midterm practical Muscles, Organization, EMG Axial muscles (mid-term practical)
06/04	W	8	Articulations (Exam 2)	
06/06	F	9	Muscle Tissue	
06/09	M	10	Muscle System	Labs this week: Appendicular muscles Nervous system, part I Histology, reflexes, reaction times
06/11	W	10	Muscle System (Exam 3)	
06/13	F	11	Neural Tissue	
06/16	T	12	Spinal Cord, Nerves and Reflexes	Labs this week: Nervous System Part II spinal cord, spinal nerves, ANS Part III: brain, cranial nerves, Final lab practical
06/18	W	13	Brain & Cranial Nerves	
06/20	F	16	Autonomic Nervous System, (Exam 4)	

**DUE DATES** (highlighted above), **Please check Brightspace calendar for all due dates!**

**Unit 1 (red)** = Tuesday 5/27 (all unit 1 course work including exam 1 must be submitted by 11:59pm)

- \*Monday 05/26 is Memorial Day, no classes.
  - 5/30 – Monday classes meet but this doesn't impact our class.

**Unit 2 (orange)** = Wednesday 06/04 (all unit 2 course work including exam 2 must be submitted by 11:59pm)

**Unit 3 (green)** = Wednesday 06/13 (all unit 3 course work including exam 3 must be submitted by 11:59pm)

- \*Monday 06/19 is Juneteenth, no classes.

**Unit 4 (blue)** = Friday 06/20 (all unit 4 course work including exam 4 must be submitted by 11:59pm)

\*May 26<sup>th</sup> is Memorial Day – no classes but since we are online and asynchronous, please adjust your studying accordingly.

SUMMER SESSION 2 <u>SUGGESTED</u> COURSE SCHEDULE to view content (due dates below)				
Date		CH	BIO 220 Lecture Topic	BIO 221 Lab (check their site)
06/23	M	1	Introduction Cell Biology Tissues	Labs this week: Intro. Histology Integumentary
06/25	W	3		
06/27	F	4		
06/30	M	5	Integument (Exam 1)	Labs this week: Skeletal System Organization, Axial & Appendicular Skeleton and Articulations
07/02	W	6	Bone Tissue	
07/05	S	7	Axial Skeleton	
07/07	M	7	Appendicular Skeleton	Labs this week: midterm practical Muscles, Organization, EMG Axial muscles (mid-term practical)
07/09	W	8	Articulations (Exam 2)	
07/11	F	9	Muscle Tissue	
07/14	M	10	Muscle System	Labs this week: Appendicular muscles Nervous system, part I Histology, reflexes, reaction times
07/16	W	10	Muscle System (Exam 3)	
07/18	F	11	Neural Tissue	
07/21	M	12	Spinal Cord, Nerves and Reflexes	Labs this week: Nervous System Part II spinal cord, spinal nerves, ANS Part III: brain, cranial nerves, Final lab practical
07/23	W	13	Brain & Cranial Nerves	
07/25	F	16	Autonomic Nervous System, (Exam 4)	

**DUE DATES** (highlighted above), **Please check Brightspace calendar for all due dates!**

**Unit 1 (red)** = 06/30(all unit 1 course work including exam 1 must be submitted by 11:59pm)

- 07/04 is Independence Day, no classes.

**Unit 2 (orange)** = Wednesday 07/09 (all unit 2 course work including exam 2 must be submitted by 11:59pm)

**Unit 3 (green)** = Wednesday 07/18 (all unit 3 course work including exam 3 must be submitted by 11:59pm)

**Unit 4 (blue)** = Friday 07/25 (all unit 4 course work including exam 4 must be submitted by 11:59pm)

**CHAPTER LEARNING OBJECTIVES** (These make EXCELLENT study guides)

**Ch. 1 THE HUMAN ORGANISM Learning Outcomes**

- 1.1A Define *anatomy*.
- 1.1B Describe the levels at which anatomy can be studied.
- 1.1C Define *physiology*.
- 1.1D Describe the levels at which physiology can be studied.
- 1.1E Explain the importance of the relationship between structure and function.
- ~~1.2A Explain why it is important to study other organisms along with humans.~~
- 1.3A Name the six levels of organization of the body.
- 1.3B Describe the major characteristics of the six levels of organization.
- 1.3C List the 11 organ systems and identify their components.
- 1.3D Describe the major functions of each system.
- ~~1.4A List and define the six characteristics of life.~~
- 1.5A Define *homeostasis*.
- 1.5B Explain why homeostasis is important for proper body function.
- 1.5C Describe a negative-feedback mechanism and give an example.
- 1.5D Describe a positive-feedback mechanism and give an example.
- 1.6A Describe a person in the anatomical position.
- 1.6B Define the directional terms for the human body and use them to locate specific body structures.
- 1.6C Know the terms for the parts and regions of the body.
- 1.6D Name and describe the three major planes of the body.
- 1.6E Name and describe the three major ways to cut an organ.
- 1.6F Describe the major trunk cavities and their divisions.
- 1.6G Locate organs in their specific cavity, abdominal quadrant, or region.
- 1.6H Describe the serous membranes, their locations, and their functions.

**Ch. 3 CELL BIOLOGY Learning Outcomes**

- 3.1A List the general parts of a cell.
- 3.1B Relate and explain the four main functions of cells.
- 3.2A Relate the kinds of microscopes used to study cells.
- 3.3A Describe the functions of the plasma membrane.
- 3.3B List the main chemical components of the plasma membrane.
- 3.3C Relate why a membrane potential is formed.
- 3.4A List and describe the functions of membrane lipids.
- 3.4B Explain the nature of the fluid-mosaic model of membrane structure.
- 3.5A Describe the difference between integral and peripheral membrane proteins.
- 3.5B List and explain the functions of membrane proteins.
- 3.5C Describe the characteristics of specificity, competition, and saturation of transport proteins.
- 3.6A Describe the nature of the plasma membrane in reference to the passage of materials through it.
- 3.6B List and explain the three ways that molecules and ions can pass through the plasma membrane.
- 3.6C Discuss the process of diffusion and relate it to a concentration gradient.
- 3.6D Explain the role of osmosis and osmotic pressure in controlling the movement of water across the plasma membrane.
- 3.6E Illustrate the differences among hypotonic, isotonic, and hypertonic solutions in terms of water movement.
- 3.6F Describe mediated transport.
- 3.6G Compare and contrast facilitated diffusion, active transport, and secondary active transport.

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- 3.6H Describe the processes of endocytosis and exocytosis.
- 3.7A Describe the composition and functions of the cytoplasm.
- 3.7B Describe the composition and functions of the cytoskeleton.
- 3.8A Define *organelle*.
- 3.8B Describe the structure and function of the nucleus.
- 3.9C Describe the structure and function of the nucleoli.
- 3.8D Explain the structure and function of ribosomes.
- 3.8E Compare the structures and functions of rough and smooth endoplasmic reticula.
- 3.8F Discuss the structure and function of the Golgi apparatus.
- 3.8G Describe the role of secretory vesicles in the cell.
- 3.8H Compare the structures and roles of lysosomes and peroxisomes in digesting material within the cell.
- 3.8I Relate the structure and function of proteosomes.
- 3.8J Describe the structure and function of mitochondria.
- 3.8K Explain the structure and function of the centrosome.
- 3.8L Compare the structures and functions of cilia, flagella, and microvilli.

#### Ch. 4 TISSUES Learning Outcomes

- 4.1A Describe the general makeup of a tissue.
- 4.1B List the four primary tissue types.
- ~~4.1C Explain how histology relates to biopsies and autopsies.~~
- ~~4.2A Identify the three embryonic germ layers.~~
- ~~4.2B Name the adult structures that are derived from each of the three germ layers.~~
- 4.3A List and explain the general characteristics of epithelial tissue.
- 4.3B Describe the major functions of epithelial tissue.
- 4.3C Classify epithelial tissues based on the number of cell layers and the shape of the cells.
- 4.3D Name and describe the various types of epithelial tissue, including their chief functions and locations.
- 4.3E Relate the structural specializations of epithelial tissue with the functions they perform.
- 4.3F Differentiate between exocrine and endocrine glands, and unicellular and multicellular glands.
- 4.3G Categorize glands based on their structure and function.
- 4.4A List and describe the major functions of connective tissue.
- 4.4B Identify the specialized cells found in connective tissue.
- 4.4C Describe the three main components of the extracellular matrix of connective tissue.
- 4.4D Discuss the types and functions of embryonic connective tissue.
- 4.4E Explain how adult connective tissue is classified.
- 4.4F Give an example of each type of connective tissue.
- 4.4G Describe the characteristic functions of each type of connective tissue.
- 4.4H State the location of each type of connective tissue in the body.
- 4.5A Describe the general structures of each of the three types of muscle tissue.
- 4.5B Give the locations in the body of each type of muscle tissue.
- 4.5C Describe the functions of each type of muscle tissue.
- 4.6A Describe the structural and functional roles of neurons and glia in the nervous tissue.
- 4.7A List the structural and functional characteristics of mucous membranes.
- 4.7B List the structural and functional characteristics of serous membranes.
- 4.7C List the structural and functional characteristics of synovial membranes.
- 4.8A Describe the process of inflammation in response to tissue damage.
- 4.8B Explain how inflammation protects the body.
- 4.8C Relate the five major signs of inflammation.
- 4.8D Explain how each of the five major signs of inflammation is produced.
- 4.9A Describe the three groups of cells based on their ability to regenerate.

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4.9B Explain the major events involved in tissue repair.

#### Ch. 5 THE INTEGUMENTARY SYSTEM Learning Outcomes

- 5.1A Describe the general functions of the integumentary system.
- 5.2A Describe the structure of the epidermis.
- 5.2B Describe the function of the epidermis.
- 5.2C Discuss the epidermal strata and relate them to the process of keratinization.
- 5.2D Differentiate between thick and thin skin as to the layers present and their locations.
- 5.2E Explain the major factors affecting skin color.
- 5.2F Describe the structure of the dermis.
- 5.2G Describe the functions of the dermis.
- 5.3A Describe the structure of the subcutaneous tissue underlying the skin.
- 5.3B Describe the functions of the subcutaneous tissue.
- 5.4A Describe the structure of a hair.
- 5.4B Discuss the phases of hair growth.
- 5.4C Explain the function of the arrector pili muscle.
- 5.4D List the glands of the skin and describe the secretions they produce.
- 5.4E Describe the parts of a nail.
- 5.4F Explain how nails grow.
- 5.5A Relate the protective functions of the skin, hair, glands, and nails.
- 5.5B Explain how the skin acts as a sense organ.
- 5.5C Discuss the importance of the skin in temperature regulation.
- 5.5D Describe the involvement of the skin in vitamin D production and in excretion.

#### Ch. 6 SKELETAL SYSTEM: BONES AND BONE TISSUE Learning Outcomes

- 6.1A List the components of the skeletal system.
- 6.1B Explain the functions of the skeletal system.
- 6.2A Relate the importance of cartilage to the structure of the skeletal system.
- 6.2B Describe the structure of hyaline cartilage.
- 6.2C Explain the types of cartilage growth.
- 6.3A Describe the components of the extracellular bone matrix and state the function of each.
- 6.3B List each type of bone cell.
- 6.3C Give the function of each type of bone cell.
- 6.3D Give the origin of each type of bone cell.
- ~~6.3E Describe the structure of woven and lamellar bone.~~
- 6.3F Explain the structural differences between compact and spongy bone.
- 6.4A Classify bones according to their shape.
- 6.4B Label the parts of a typical long bone.
- 6.4C Explain the differences in structure between long bones and flat, short, and irregular bones.
- 6.5A Outline the process of intramembranous ossification.
- 6.5B Describe the steps of endochondral ossification.
- 6.5C List the bones, or parts of bones, that develop from each type of ossification.
- 6.6A Demonstrate an understanding of bone growth in length and width, as well as at the articular cartilage.
- 6.6B Describe the factors that affect bone growth.
- 6.7A Explain the need for bone remodeling, particularly in long bones.
- ~~6.7B Describe the role of a basic multicellular unit (BMU) in the remodeling process.~~
- 6.7C Discuss how mechanical stress affects bone remodeling and bone strength.
- 6.8A List the main bone fracture types.

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- 6.8B List the characteristics of bone fracture types.
- 6.8C Outline and explain the steps in bone repair.
- 6.9A Explain the role of bone in calcium homeostasis.
- 6.9B Describe how parathyroid hormone and calcitonin influence bone health and calcium homeostasis.

## Ch. 7 SKELETAL SYSTEM: GROSS ANATOMY Learning Outcomes

- 7.1A Define the anatomical terms for bone features.
- 7.1B List the two anatomical portions of the skeleton.
- 7.1C List the bone shapes.
- 7.2A Describe the general functions of the axial skeleton and list its parts.
- 7.2B List the major sutures of the skull and the bones they connect.
- 7.2C Name the bones of the skull and describe their features as seen from the superior, posterior, lateral, anterior, and inferior views.
- 7.2D Name the bones that compose the orbit of the eye.
- 7.2E List the bones and cartilage that form the nasal septum.
- 7.2F Describe the locations and functions of the paranasal sinuses.
- 7.2G List the bones of the cranium and face.
- 7.2H Explain the unique structure of the hyoid bone.
- 7.2I Describe the shape of the vertebral column, list its divisions, and state its functions.
- 7.2J Discuss the common features of the vertebrae and contrast the structure of vertebrae from each region.
- 7.2K List the bones and cartilage of the thoracic cage, including the three types of ribs.
- 7.3A Describe the girdles that make up the appendicular skeleton.
- 7.3B Identify the bones that make up the pectoral girdle and relate their structure and arrangement to the function of the girdle.
- 7.3C Name and describe the major bones of the upper limb.
- 7.3D List the bones that make up the pelvic girdle and explain why the pelvic girdle is more stable than the pectoral girdle.
- 7.3E Name the bones that make up the hip bone. Distinguish between the male and the female pelvis.
- 7.3F Identify and describe the bones of the lower limb.

## Ch. 8 JOINTS AND MOVEMENT Learning Outcomes

- 8.1A Describe the two systems for classifying joints.
- 8.1B Explain the structure of a fibrous joint.
- 8.1C List the three types of fibrous joints and give an example of each type.
- 8.1D Contrast the two types of cartilaginous joints and give examples of each type.
- 8.1E Illustrate the structure of a synovial joint.
- 8.1F Explain the roles of the components of a synovial joint.
- 8.1G Classify synovial joints based on the shape of the bones in the joint and give an example of each type.
- 8.1H Distinguish among uniaxial, biaxial, and multiaxial synovial joints.
- 8.2A Categorize movements as gliding, angular, circular, special, or combination of types.
- 8.2B Demonstrate the difference between the following pairs of movements: flexion and extension; plantar flexion and dorsiflexion; abduction and adduction; supination and pronation; elevation and depression; protraction and retraction; opposition and reposition; inversion and eversion.
- 8.2C Distinguish between rotation and circumduction. What is excursion?
- 8.3A Explain the difference between active and passive range of motion.
- 8.3B Describe the consequences of movement beyond the normal range.
- 8.3C List the factors that affect normal range of motion.
- 8.4A Describe the structure and movements of the TMJ.

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- 8.4B Compare and contrast the ball-and-socket joints of the shoulder and hip.
- 8.4C Compare and contrast the hinge joints of the elbow, knee, and ankle.
- 8.4D Describe the ligaments that support the complex ellipsoid joint of the knee.
- 8.4E Explain the structure and functions of the arches of the foot.
- 8.4F Discuss the common disorders that affect these major joints.

## Ch. 9 MUSCULAR SYSTEM: HISTOLOGY AND PHYSIOLOGY Learning Outcomes

- 9.1A Summarize the major characteristics of skeletal, smooth, and cardiac muscle.
- 9.1B Summarize the functions of the muscular system.
- 9.2A Explain the four functional properties of muscle tissue.
- 9.3A Describe the connective tissue components of skeletal muscle.
- 9.3B Explain the blood supply and innervation of skeletal muscle.
- 9.3C Discuss the origin of muscle fibers and explain how muscle hypertrophy occurs.
- 9.3D Describe the components of a muscle fiber.
- 9.3E Relate the types of myofilaments and describe their structures.
- 9.3F Produce diagrams that illustrate the arrangement of myofilaments in a sarcomere.
- 9.3G Describe how the sliding filament model explains the contraction of muscle fibers.
- 9.3H Explain what happens to the length of the A band, I band, and H zone during contraction.
- 9.4A Describe the resting membrane potential and how it is generated and maintained.
- 9.4B Explain the role of ion channels in the production of an action potential.
- 9.4C Discuss the production of an action potential, including depolarization and repolarization.
- 9.4D State the all-or-none principle as it pertains to action potentials.
- 9.4E Describe the structure of a neuromuscular junction.
- 9.4F Explain how an action potential is transmitted across the junction.
- 9.4G Explain the events of excitation-contraction coupling.
- 9.4H Summarize the events of cross-bridge movement.
- 9.4I Relate the events of cross-bridge movement to muscle contraction.
- 9.4J State the conditions needed for muscle relaxation.
- 9.5A Describe a muscle twitch and the events that occur in each phase of a twitch.
- 9.5B Describe a motor unit.
- 9.5C Describe how motor unit number affects muscle control.
- 9.5D Explain how whole muscles respond in a graded fashion.
- 9.5E Explain how the force of contraction can be increased.
- 9.5F Summarize what occurs in tripe.
- 9.5G Explain multiple-motor-unit recruitment.
- 9.5H Describe wave summation in terms of incomplete tetanus and complete tetanus.
- 9.5I Explain the connection between the initial length of a muscle and the amount of tension produced.
- 9.5J Distinguish between isometric and isotonic contractions.
- 9.5K Relate how muscle tone is maintained.
- 9.6A Distinguish between fast-twitch and slow-twitch muscle fibers.
- 9.6B Explain the functions for which each type is best adapted.
- 9.6C Describe how training can increase the size and efficiency of both types of muscle fibers.
- 9.6D Explain how muscle metabolism causes normal body temperature.
- 9.6E Describe how muscles respond to changes from normal body temperature.
- 9.7A Describe four sources of energy for ATP production in muscles.
- 9.7B Distinguish between oxygen deficit and excess postexercise oxygen consumption.
- 9.7C Compare the mechanisms involved in the major types of muscle fatigue.
- 9.7D Contrast physiological contracture and rigor mortis.

## Ch. 10 MUSCULAR SYSTEM: GROSS ANATOMY Learning Outcomes

- 10.1A Define the following and give an example of each: *origin, insertion, agonist, antagonist, synergist, fixator, and prime mover*.
- 10.1B Explain how fasciculus orientation determines muscle shape and list examples of muscles that demonstrate each shape.
- 10.1C Recognize muscle names based on specific nomenclature rules.
- ~~10.1D Explain each of the three classes of levers in the body and give a specific example of each class.~~
- 10.2A Name the muscles found in the neck and list the origin, insertion, and action of each.
- 10.2B Describe movements of the head and give the muscles responsible for each movement.
- 10.2C List the muscles used to create various facial expressions.
- 10.2D Describe mastication, ~~tongue movement, and swallowing~~ and list the muscles or groups of muscles involved in each.
- 10.2E List the hyoid muscles and define the action of each.
- 10.2F Name the muscles responsible for movement of the eyeball and describe each movement.
- ~~10.3A Describe the muscles of the vertebral column and the actions they accomplish.~~
- 10.3B List the muscles of the thorax and give each of their actions.
- 10.3C Describe the muscles of the abdominal wall and explain their actions.
- ~~10.3D List and describe the muscles of the pelvic diaphragm and perineum.~~
- 10.4A Describe the movements of the scapula and list the muscles associated with it.
- 10.4B Name and locate the muscles acting on the shoulder and arm and explain their movements.
- 10.4C List and describe the muscles and movements of the forearm, wrist, hand, and fingers.
- 10.4D Distinguish between extrinsic and intrinsic hand muscles.
- 10.5A Summarize the muscles of the hip and thigh and explain their actions.
- 10.5B List and describe the muscles and movements of the ankle, foot, and toes.

## Ch. 11 NERVOUS SYSTEM: FUNCTIONAL ORGANIZATION OF NERVOUS TISSUE Learning Outcomes

- 11.1A Explain the functions of the nervous system.
- 11.2A List the divisions of the nervous system and describe the characteristics of each.
- 11.2B Differentiate between the somatic and the autonomic nervous systems.
- 11.2C Contrast the general functions of the CNS and the PNS.
- 11.3A Describe the structure of neurons.
- 11.3B Describe the functions of the components of a neuron.
- 11.3C Classify neurons based on structure.
- 11.3D Classify neurons based on function.
- 11.3E Describe the location, structure, and functions of CNS glial cells.
- 11.3F Describe the location, structure, and functions of PNS glial cells.
- 11.3G Discuss the function of the myelin sheath.
- 11.3H Describe the formation of myelin sheaths in the CNS and PNS.
- 11.4A Distinguish between gray matter and white matter.
- 11.4B Describe the components of gray matter in the CNS and PNS.
- 11.4C Describe the components of white matter in the CNS and PNS.
- 11.5A Define resting membrane potential.
- 11.5B Explain how resting membrane potential is created and maintained.
- 11.5C Explain the processes that can change the resting membrane potential.
- 11.5D List the three phases of neuron communication.
- 11.5E Describe the characteristics of a graded potential.
- 11.5F Describe the creation of an action potential.
- 11.5G Explain how an action potential is propagated.

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- 11.5H Discuss the all-or-none principle as it applies to action potentials.
- 11.5I Explain the characteristics and purpose of the refractory period.
- 11.5J Explain the factors that determine action potential frequency.
- 11.5K Explain the five levels of stimulation.
- 11.5L Describe the effect of myelination on the speed of action potential propagation.
- 11.5M Describe other factors that affect the speed of action potential conduction.
- 11.6A Describe the general structure and function of a synapse.
- 11.6B Distinguish between electrical and chemical synapses as to mode of operation and types of tissues where they are found.
- 11.6C Describe the release of a neurotransmitter in a chemical synapse.
- 11.6D Describe the removal of a neurotransmitter in a chemical synapse.
- 11.6E Explain the effects of neurotransmitter binding to receptors in a chemical synapse.
- 11.6F Discuss the effects of neuromodulators in a chemical synapse.
- 11.6G Contrast excitatory and inhibitory postsynaptic potentials.
- 11.6H Explain the roles of presynaptic inhibition.
- 11.6I Define *facilitation*.
- 11.6J Describe the process of spatial summation.
- 11.6K Describe the process of temporal summation.
- 11.7A Contrast convergent and divergent neuron pathways.
- 11.7B Describe a reverberating circuit.
- 11.7C Explain a parallel after-discharge circuit.

## Ch. 12 NERVOUS SYSTEM: SPINAL CORD AND SPINAL NERVES Learning Outcomes

- 12.1A Describe the general structure of the spinal cord.
- 12.1B Name the meninges (sing. meninx) and their related spaces surrounding the spinal cord.
- 12.1C Draw and label a cross section of the spinal cord with its dorsal and ventral nerve roots.
- 12.2A Describe the components of a monosynaptic and a reflex arc.
- 12.2B Explain the four ways reflexes can be classified.
- 12.2C Describe the features of a stretch reflex.
- 12.2D Explain the function of a Golgi tendon reflex.
- 12.2E Describe a withdrawal reflex.
- 12.2F Explain the purpose of a crossed extensor reflex.
- 12.3A Describe the connective tissue components of a nerve.
- 12.3B List the number and locations of the 31 pairs of spinal nerves.
- 12.3C Describe a dermatome and its clinical importance.
- 12.3D Explain the branching of the spinal nerves into rami and plexuses.
- 12.3E List the major nerves that exit each plexus and the body region they innervate.
- 14.1A List the types of somatic and visceral sensory receptors, tell where they are located, and describe how they function in sensation. (We do not cover chapter 14, but receptors will be covered with nervous tissue).

## Ch. 13 NERVOUS SYSTEM: BRAIN AND CRANIAL NERVES Learning Outcomes

- 13.1A Describe the development of the neural tube.
- 13.1B Name the embryonic pouches and the adult brain structures that they become.
- 13.1C Explain the origin of the ventricles of the brain.
- 13.2A List the parts of the brainstem and describe their structural characteristics.
- 13.2B Explain the functions of the parts of the brainstem.
- 13.3A List the major regions of the cerebellum and describe the functions of each.
- 13.4A List the parts of the diencephalon and state their functions.

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13.5A Describe the structure of the cerebrum, including the lobes, fissures, sulci, cerebral cortex, and cerebral medulla.

13.5B Relate the principal function of each lobe of the cerebrum.

13.5C List and describe the three types of tracts found in the cerebrum.

13.5D List the basal nuclei and explain their function.

13.5E State the parts and functions of the limbic system.

13.6A Describe the meninges and the spaces between them.

13.6B Identify the locations of the four ventricles and the structures that connect them.

13.6C Explain how cerebrospinal fluid is formed, circulated, and returned to the blood.

13.6D Describe the function of cerebrospinal fluid.

13.7A Describe how the brain is supplied with blood.

13.7B Explain the role of the blood-brain barrier.

13.8A List the 12 cranial nerves and give the primary sensory, somatic motor, and/or parasympathetic functions of each.

13.8B Describe cranial reflexes.

## Ch. 16 NERVOUS SYSTEM: THE AUTONOMIC NERVOUS SYSTEM Learning Outcomes

16.1A Explain the basic function of the autonomic nervous system (ANS).

16.1B List the divisions of the autonomic nervous system and describe the conditions under which each is more influential.

16.2A Describe the structural and functional differences between the somatic nervous system and the ANS.

16.2B Describe the relationship between preganglionic and postganglionic neurons.

16.2C Contrast somatic and autonomic motor neurons with sensory neurons.

16.3A List the divisions of the ANS.

16.3B Describe the arrangement of sympathetic neurons and ganglia.

16.3C Describe the arrangement of parasympathetic neurons and ganglia.

16.3D Explain what an autonomic nerve plexus is and list the major autonomic nerve plexuses in the body.

16.3E Discuss the organization of the ENS.

16.4A Explain dual innervation of the ANS.

16.4B Describe the role of the sympathetic division during activity or stress and the general effects on the body.

16.4C Describe the role of the parasympathetic division during rest and the general effects on the body.

16.4D Differentiate between cholinergic and adrenergic neurons.

16.4E Contrast the two types of cholinergic receptors.

16.4F Describe the types of adrenergic receptors and their subtypes.

16.4G List effectors and the type(s) of receptors they have.

16.5A Explain the importance of autonomic reflexes to maintaining homeostasis.

16.5B Describe several autonomic reflexes.

16.5C Explain how a local reflex differs from other types of reflexes.

16.6A Explain opposite effects, cooperative effects, and general versus localized effects for the ANS.