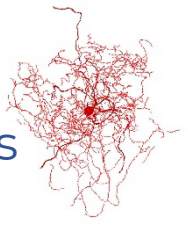


BIO 553 Syllabus (section 015), Spring 2024

Advanced Systemic Physiology: Control Systems



Time
MW 3:35PM-4:50PM

Place
Ross Hall 0280

Professor
[Dr. Nick Pullen \(email\)](#)
Open Office Hours:
MW 2pm-3:30pm, Ross Hall 2536

Course Description & Purpose

The current UNC catalog entry is found [here](#). This course introduces, at the graduate level, the physiological systems governing homeostasis in humans. We will address content in excitable tissues (nervous and muscle), endocrine systems (including reproductive), and immunology. You will also develop and hone your ability to find, read, and discuss primary basic science and clinical literature. Prerequisites include cell biology and upper-level undergraduate biochemistry, so you are expected to have familiarity with that content and/or the resources to independently review it. This is a companion course to BIO 552 ([Homeostats](#)), so I suggest taking that too (it doesn't matter what order). This course is foundational for developing biomedical scientists, healthcare practitioners, and science teachers seeking graduate-level content expertise.

Contact Outside Class

The best way to reach me is [email](#). If you call my phone (970) 351-1843, be sure to leave a message. My office is Ross Hall 2536, and I can also be found in my research lab, Ross Hall 1631. I strive to answer emails the same day, and I expect the same courtesy from you. If you want to meet, come to open hours, or let me know and we can schedule another time.

Materials

- [Concise Medical Physiology](#) by Boron & Boulpaep (2021) is the assigned textbook for this class. It is a much shorter and more recent version of [Medical Physiology, 3rd ed.](#) by the same authors. If you already have the latter and don't want to get the "concise" book, that is fine. The topic schedule has suggested readings in both (you do NOT need both, however). Except for the glaring dearth of immunology, these are excellent physician/scientist references.
- [Janeway's Immunobiology, 10th ed.](#) is the preeminent text in its field, and you will likely use it if you ever take an immunology course. However, it is NOT required for BIO 553 since immunology takes up only about 3-weeks of our schedule. My slides and supplementary literature provided to you will be sufficient.
- I provide all my lecture slides ahead of time in Canvas. These are drafts until the day of because I update them with contemporary scientific literature.
- Supplementary literature, videos, and other media are posted in relevant modules in Canvas.
 - You are not expected to read anything with "FYI:" in its page title. These are value-added materials.

Course Objectives

With successful completion of this course, you will have experience:

- identifying anatomical and physiological components of the following: central and peripheral nervous systems, endocrine system, muscle tissues, immune system, and reproductive system.
- interpreting physiological data.
- constructing models of control systems and homeostasis from the context of each of the systems and tissues addressed in this course.
- critiquing primary literature in basic biomedical science.
- developing logical and cogent hypotheses and experimental plans.
- connecting symptoms of various diseases to the dysfunction of specific physiological systems.

There are content-specific learning objectives on the "Overview" page of each module in Canvas, and these are a great starting point if you make study guides.

Course Conduct

As a graduate level physiology course my main personal goal is to have you participating in dynamic and relevant discussions about **translational science**. I want you always to be thinking “how does this affect health?” Think about potential treatments, mechanisms, and expected outcomes. As developing authorities in the field, my expectation is that you will read what is assigned, research what intrigues you most, be prepared to discuss it, and ask questions. The Boron chapters and my presentation slides will be the foundation for most assessments – topics are listed in the schedule on page 3. Read and review these before class. **I will not lecture you on every detail. The point of class is for us to discuss challenges and highlights.** You will also be contributing to and leading more formal discussions on selected literature.

Everyone needs to work hard, ask questions, and discuss relevant information. Everyone should be respectful of others’ civil and sincere participation.

Assessments & Grades

Your grade for this class is based on earned points from assignments totaling 400 points. Letter grade is based on the % of total available points and follows a typical 10% scale. There are no +/- grades for this class.

Assignments		Course Letter Grade	
Midterm Exams (2)	160 points (80 each)	A	≥90%
Final Exam	100 points	B	≥80% to <90%
Quizzes (7)	70 points (10 each)	C	≥70% to <80%
Analyses/Activities	70 points	D	≥60% to <70%
Total	400 points	F	<60%

Exams consist of multiple choice, matching, fill-in, and written and drawn questions. There are two midterm exams and a longer final. Each exam mostly covers content since the last, but the second midterm and final will have cumulative parts due to the nature of the material. Exams will be taken online with proctoring software. The final exam for this course is scheduled for May 1, 2024. In the unlikely event the university is closed on that date, the exam will still be taken as scheduled since it is done online.

Quizzes will be made available through Canvas and will cover content since the last quiz or exam. You will generally have several days to complete these. Quizzes are not timed, but there is only one attempt for each.

Analyses/Activities will be graded periodically. These will mostly cover finding literature, interpreting and critiquing research, developing experimental next steps, or demonstration of knowledge of a complex topic (e.g., concept map of the immune system). Detailed rubrics are provided for each of these assignments in Canvas. You will be expected to present on and discuss literature in class.

Academic Integrity

UNC policies and recommendations for academic misconduct will be followed. You are responsible to the Bear Code ([link](#)). You are expected to complete online quizzes independently. Any public posting of exam or quiz questions, lecture materials, and recordings is considered cheating and will be investigated.

University-Wide Support and Policies

[CLICK HERE](#) to read important statements applying to the UNC community including disability resources, professional counseling, Title IX, equity, and inclusion.

https://www.unco.edu/center-enhancement-teaching-learning/teaching-resources/syllabus_statements.aspx

Course Schedule on the Next Page

This is a tentative schedule of topics covered. If the schedule changes you will receive an announcement indicating any changes. The course calendar and announcements in Canvas will indicate specific due dates and changes.

Readings are aligned to chapters of both Boron & Boulpaep texts, but you only need one of them. The topic of each chapter is the same in both, except that [Concise Medical Physiology](#) is the more recent, much shorter version of [Medical Physiology, 3rd ed.](#)

<i>Day</i>	<i>Topic</i>	<i>Reading (Boron)</i>	<i>Module</i>	<i>Assignments</i>
M Jan 8	Intro., Review, Homeostasis Principles	1, 2, 3, 5	1	
W Jan 10	Nervous system Organization & Development	10	2	Primary Literature and Intro.
M Jan 15	MLK DAY - NO CLASSES			
W Jan 17	Neurons, Glia, and Their Functions	11, 12		
M Jan 22	Neurons, Glia, and Their Functions			Quiz 1
W Jan 24	Synapses	7,13		
M Jan 29	General properties of sensory systems (tentative)	15, 16	3	Paper Analysis
W Jan 31	Autonomic Nervous Control	14	4	
M Feb 5	Master Endocrine: Hypothalamus & Pituitary	47, 48	5	Quiz 2
W Feb 7	Master Endocrine: Hypothalamus & Pituitary			Paper Analysis
M Feb 12	EXAM 1 -Nervous System and HP Axes			
W Feb 14	Thyroid & Parathyroid Physiology	49, 52	6	
M Feb 19	Adrenal Physiology	50		Quiz 3
W Feb 21	Endocrine Pancreas	51 (43)		
M Feb 26	Endocrine wrap-up and discussion			Paper Analysis
W Feb 28	The Neuromuscular Junction	8	7	
M March 4	Skeletal Muscle	9		
W March 6	Smooth & Cardiac Muscle			Quiz 4
M March 11	SPRING BREAK	SPRING BREAK		SPRING BREAK
W March 13	SPRING BREAK	SPRING BREAK		SPRING BREAK
M March 18	Muscle & Exercise wrap-up (energy & fatigue)	60		Paper Analysis
W March 20	EXAM 2 -Endocrine and Muscle			
M March 25	Male Reproductive System	54	8	
W March 27	Female Reproductive System	55		
M April 1	Pregnancy	56	9	
W April 3	Pregnancy & Neonate	57		Quiz 5
M April 8	Reproductive Physiology wrap-up and discussion			
W April 10	Cells and Organs of Immunity	18	10	Paper Analysis
M April 15	Innate Immunity	supp.		
W April 17	Adaptive Immunity	supp.	11	Quiz 6
M April 22	Influences of the Immune System on the Organism			Concept Map
W April 24	Wrap-up			Quiz 7 due before final
W May 1	FINAL EXAM	COMPREHENSIVE		

