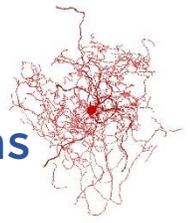


BIO 553 Syllabus, Fall 2021

Advanced Systemic Physiology: Control Systems



Time
MWF 9:05-9:55

Place
Ross Hall 2260

Professor
Dr. Nick Pullen ([email](#))
[research lab](#)

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 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.

Materials

- [Medical Physiology, 3rd ed.](#) by Boron & Boulpaep is strongly encouraged for this course. It is also used in BIO 552. Except the glaring dearth of immunology, this book is an excellent physician/scientist reference.
- [Janeway's Immunobiology, 9th 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 to always be thinking “how does this affect health?” Think about potential treatments, mechanisms, 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.

<i>Assignments</i>		<i>Course Letter Grade</i>	
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 (on Monday, December 6, 10:45am-1:15pm; [link](#)). 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 during class.

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.

Date	Topic	Canvas Module	Reading (Boron)	Assessments
M Aug 23	Introductions and Homeostasis Review	1	1, 3, 5	
W Aug 25	Review Principles of Cell Physiology (esp. membranes); primary literature	1	1, 3, 5, Hallmarks of Health	Primary Literature Exercise (due by 5pm, Thursday)
F Aug 27	Nervous System Organization	2	10	
M Aug 30	Neurons & Glia	2	11, 12	
W Sep 1	Neurons & Glia	2	11, 12	
F Sep 3	Neuronal Synapses	2	7, 13	
M Sep 6	NO CLASS - LABOR DAY			Quiz 1 due
W Sep 8	Sensing	3	15, 16	
F Sep 10	Sensing	3	15, 16	Paper Discussion
M Sep 13	Autonomic Nervous Control	4	14	
W Sep 15	Autonomic Nervous Control	4	14	
F Sep 17	Master Endocrine Control: Hypothalamus & Pituitary	5	47, 48	
M Sep 20	Master Endocrine Control: Hypothalamus & Pituitary	5	47, 48	Quiz 2 due
W Sep 22	Master Endocrine Control: Hypothalamus & Pituitary	5	47, 48	
F Sep 24	Buffer Time			Paper discussion
M Sep 27	EXAM 1 - Nervous System and HP Axes			EXAM 1
W Sep 29	Thyroid Physiology	6	49	
F Oct 1	Parathyroid Physiology	6	52	
M Oct 4	Adrenal Physiology	6	50	Quiz 3 due
W Oct 6	Endocrine Pancreas	6	51 (43)	
F Oct 8	Endocrine Wrap-up	4-6		Paper discussion
M Oct 11	The Neuromuscular Junction	7	8	
W Oct 13	Skeletal Muscle	7	9	
F Oct 15	Skeletal Muscle	7	9	
M Oct 18	Smooth & Cardiac Muscle			Quiz 4 due
W Oct 20	Sources of Energy and Muscle Fatigue	7	60	
F Oct 22	Sources of Energy and Muscle Fatigue	7	60	
M Oct 25	Buffer Time			Paper discussion
W Oct 27	EXAM 2 - Endocrine and Muscle			EXAM 2
F Oct 29	Male Reproductive System	8	54	
M Nov 1	Female Reproductive System	8	55	
W Nov 3	Pregnancy	9	56, 57	
F Nov 5	Early Life	9	56, 57	
M Nov 8	Intro to Immunology			Quiz 5 due
W Nov 10	Cells & Organs of Immunity	10	18	
F Nov 12	Cells & Organs of Immunity	10	18	
M Nov 15	Innate Immunity	10	supp.	
W Nov 17	Innate Immunity	10	supp.	
F Nov 19	Adaptive Immunity	11	supp.	Paper discussion
M Nov 22	Adaptive Immunity	11	supp.	Quiz 6 due
W Nov 24	NO CLASS - THANKSGIVING			
F Nov 26	NO CLASS - THANKSGIVING			
M Nov 29	Immune Crosstalk	11	supp.	Immune System Concept Map
W Dec 1	Influences of the Immune System on the Organism	11	supp.	
F Dec 3	Wrap-up.			Quiz 7 due before final
M Dec 6	FINAL EXAM	10:45am-1:15pm	Comprehensive	

