

PCB3713C Cellular & Systems Physiology Spring 2020

Syllabus Policy

You are solely responsible for reading and following the instructions, guidelines and schedules in this syllabus, and for checking the e-Learning site at least weekly for announcements regarding any changes. Not having read the information in this syllabus or the announcements will not constitute an excuse for missing an assignment or deadline.

Course Description

How cells, organs, and higher level systems are integrated and coordinated in the functions of humans and other animals. Emphasis will be placed on the use of model organisms, mathematical models and the physical sciences to understand the mechanistic basis of normal physiology and dysfunction. 4 credits.

Prerequisites

One semester of general biology (BSC 2010), and two semesters of general chemistry (CHM 2046 or CHM 2047 or CHM 2051 or CHM 2096) and two semesters of general physics with calculus (PHY 2049 or PHY 2061), all with a minimum grade of C.

Corequisite

None

Course Schedule

Section 004D (BME) and 25HD (non-BME)

Tuesdays and Thursdays, periods 5-6 (11:45 – 1:40 pm) in CSE E235 (CSE Active Learning Center)

Instructors

Course Instructor

David Julian, Ph.D. (Physiology)
Associate Professor, Department of Biology

Pronouns: he/him

Student hour: Wednesdays and Fridays, period 5 (11:45 am -12:35 pm) in Bartram Hall 123

Course Graduate TA

David Anderson

Ph.D. student, Department of Biology

Pronouns: he/him

Student hour: TBA

Course Fee

There is no course fee, but you will need to purchase subscriptions for Osmosis (\$40), Peerceptiv (\$12.95), Learning Catalytics (\$12), and JustPhysiology (\$10). Instructions for purchasing these subscriptions are below.

Course Objectives

At the end of the course, students should be able to:

- Explain physiological mechanisms of humans and representative model organisms by applying basic principles of physics, chemistry, and engineering.
- Describe the fundamental mechanisms underlying normal function of cells, tissues, organs, and organ systems in humans and other animals.
- Explain the basic mechanisms of homeostasis by integrating the functions of cells, tissues, organs, and organ systems.
- Effectively solve basic problems in physiology, working independently and in groups.
- Apply knowledge of functional mechanisms and their regulation to explain the pathophysiology underlying common diseases.
- Generate hypotheses about physiological processes, design experiments to test these hypotheses using dynamic models of physiological systems, and then analyze, interpret, and report experimental results.

Required Course Materials, Software, and Licenses

Primary Course Content

Instead of using a standard textbook to provide the primary resources for course content, we will use the Osmosis medical education platform. This web and mobile-based resource provides high quality instructional videos and annotatable high-yield notes to supplement the videos, plus content review questions, and flashcards that allow adaptive learning. Videos and

associated high-yield notes are listed for each course meeting. You are expected to view the assigned videos and familiarize yourself with the content prior to each class meeting.

The subscription cost is \$40, which will provide you one year of access. You will receive an email from Osmosis to your UFL account with instructions to pay the subscription fee and activate your account. Do not register for Osmosis until you receive the invitation email (otherwise your subscription cost will be much higher).

Osmosis has comprehensive content on medical basic sciences, physiology, pathology, and pharmacology that is primarily targeted to medical students and other health professions, but for this course we will focus only on the subset of content for basic science and physiology. However, your subscription will provide you unrestricted access to all Osmosis content, should you choose to explore it.

Optional Textbook

An additional, optional course content resource is *Ganong's Review of Medical Physiology, 26th Edition*, by Barrett, Barman, Brooks, and Yuan. McGraw-Hill Education, 2019. The electronic version of this book is available online at no cost to all UF students through UF's *Access Medicine* subscription here: <https://accessmedicine.mhmedical.com/book.aspx?bookid=2525>

Note that this is a review textbook, not a primary textbook. An advantage of a review book is that the explanations of concepts and phenomena are concise, but the disadvantage is that you may find some of these explanations to be insufficient. In some cases, this could be because an explanation skips over foundational knowledge that it's assumed the reader already knows, but which you do not. In other cases, this could be because an explanation fails to present details that might help you make connections with your prior knowledge from other courses.

Classroom Response System

We will use the Learning Catalytics classroom response system to both aid and assess your understanding of the course material. A six-month subscription is \$12 (if you do not already have an active subscription from another course).

To register and subscribe, do the following:

1. Go to <http://www.learningcatalytics.com>
2. Click on the REGISTER icon near the top of the screen
3. Under the "Student" tab, select "No" for the question "Are you using Learning Catalytics with a MyLab or Mastering product?"
4. In the Register window, select "No, I would like to buy access"
5. Purchase a 6 month subscription (unless you believe you will need it for another course in the next year, in which case the 12-month subscription is a better deal).
6. Follow the remaining instructions to purchase the subscription. If you do not already have a Pearson Education account, use your UF email address as your Login Name.

Peer-Review System

We will use the [Peerceptiv](https://go.peerceptiv.com/) peer-review system for the research report. The subscription is \$12.95. Sign up and create an account at <https://go.peerceptiv.com/>. Our class code is "like37".

If you attempt to self-register without using the instructions in the activation email, you will receive an on-screen message indicating that an account already exists with your email address. In that case, or if you no longer have access to the activation email, use the Forgot Password link to access your account.

Physiology Simulation System

We will use JustPhysiology to conduct physiology experiments. The subscription is \$10. JustPhysiology is a web application based on the HumMod simulation engine, which has a mathematical model of human physiology that utilizes over 14,000 physiological variables. The model was initially developed at the University of Mississippi Medical Center.

You will receive an email from JustPhysiology to your UFL account with instructions to pay the subscription fee and activate your account. Note that the subscription can currently only be paid using PayPal. Do not register for JustPhysiology until you receive the invitation email (otherwise your subscription cost will be higher).

If you lose the original email from JustPhysiology, go to <https://justphysiology.com/users/login> and click on "Reset Password." You will then be asked for your email address. Enter your UF email address and select Reset Password. Enter the new password and then continue to pay the subscription fee as noted above.

Note that UF subscriptions are discounted. Dr. Julian is associated with HC Simulation LLC (the company that produces JustPhysiology) but will receive no financial benefit from subscriptions associated with this course.

Other Content

All other digital content will be accessible from the Canvas website (<https://elearning.ufl.edu>).

Activities and Assessments

The class content will include textbook reading, in-class lessons, in-class problem-based learning ("active learning" questions), experiments using physiological simulations, and writing and peer-review of research reports.

Problem-based Learning

During most “lecture” sessions you will be asked to work with your classmates to answer questions and solve problems. You will use the classroom response system to provide your answers.

Research Report

You will individually complete a research report during the term. For this report, you will be provided with a research problem about a physiological phenomenon. You will be expected to do the following:

1. Develop a hypothesis for the assigned problem.
2. Design an experiment to test your hypothesis using the physiology simulation software.
3. Submit a short proposal to conduct your experiment. This will be evaluated by the graduate teaching assistant.
4. After the proposal is approved, conduct your experiment, collect and analyze the data, and draw conclusions from the results.
5. Craft a clear, well-supported first-draft report.
6. Submit your draft report. This will be scored through peer review and by the graduate teaching assistant.
7. Participate in peer reviews of other students' draft reports.
8. Back-evaluate your reviewer feedback.
9. Revise your draft report based on reviewer feedback (this may involve designing and running new experiments).
10. Submit your final report for peer review. This will be scored through peer review and by the graduate teaching assistant.
11. Participate in peer reviews of other students' final reports.
12. Back-evaluate the reviewer feedback you received on your final report.

Your proposal and research report must each be formatted according to the detailed instructions provided for each, which will be posted on the course home page. Proposals and reports that are not formatted correctly will receive a score of zero. You are welcome to work on proposal and report with other students in the course, but the final product must represent your own work.

All research reports, evaluations, and other associated activities are due at 21:00:00 Eastern time on the date indicated in the syllabus schedule. The timestamp for every submission is based on the clock of the Peerceptiv server (which is synchronized with the NIST Internet time service), not the clock of the computer you are using. Problems with your computer or your internet access will not be grounds for extending the deadline, so don't wait until the last few minutes to complete any submission.

The total grade for each research report will be determined from the following criteria:

- **Review Grade** - a combination of the Accuracy and Helpfulness grades, which are then curved, after which any Reviewing Late Penalties are subtracted.
- **Accuracy** - correlation of your own ratings to mean ratings by others on same documents.
- **Helpfulness** - how helpful the author thought your comments were via back evaluation.
- **Writing Grade** - average score given by reviewers which is then curved, and then any Writing Late Penalties are subtracted.
- **Task Grade** - accounts for the percentage of assigned reviews and back-evaluations that were done. It represents only your reviewing activities, which is then curved.
- **Weighting** – How each category is weighted. The breakdown is 40% reviewing, 40% writing, and 20% task.
- **Overall** - The sum of all of the weighted grades

Exams

There will be a midterm exam and a final exam. These will consist mostly of problem-based, multiple choice, fill-in-the-blank, ordering, and numeric (calculation) questions. The midterm will cover all course material through week 7, will consist of approximately 40 questions, will be administered during a normal lecture session (115 minutes in duration), and will be worth 100 points. The final exam will cover all course material from the entire term but will focus primarily on the last half of the course. It will also consist of approximately 40 questions and will be worth 100 points, but it will be administered during the final exam period (2 hours duration). Both exams will be closed-book and you will not be allowed to use notes, but you will be expected to utilize the physiology simulation software to answer some of the questions.

Grading

Assessments

Assessment Type	Quantity	Points	Subtotal	Pct of Total
Problem-based Learning	~100	1	100	25%
Research Report	1	100	100	25%
Midterm Exam	1	100	100	25%
Final Exam	1	100	100	25%
<i>Total</i>			400	100%

Grade Distribution

Point Range (%)	Letter Grade
-----------------	--------------

93.33 or higher	A
90-93.32	A-
86.66-89.99	B+
83.33-86.65	B
80-83.32	B-
76.66-79.99	C+
73.33-76.65	C
70-73.32	C-
66.66-69.99	D+
63.33-66.65	D
60-63.32	D-
< 60	E

Grades will not be assigned by a curve, but the grade cutoffs may be adjusted downward. In other words, if your final point accumulation is 93.33%, then you are guaranteed to receive an A. This means there is no upper limit to the number of “A” grades that can be assigned.

A “C-” is not a qualifying grade for critical tracking courses at UF. In order to graduate, students must have an overall GPA and an upper-division GPA of 2.0 or better (C or better). A “C-” average is equivalent to a GPA of 1.67, and therefore, it does not satisfy this graduation requirement. More information on grades and grading policies is here:

<https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

Extra Credit

There will be no opportunities for extra credit.

Time Commitment

The UF College of Liberal Arts and Sciences assumes that you will devote 3-4 hours per week per credit-hour to each course during the regular fall and spring semesters. This course is 4 credits, so you should therefore expect to devote 12-16 hours per week to this course (for a total of 180-240 hours over the semester), of which only 4 hours per week will be spent in class. Therefore, you are responsible for budgeting more than 2/3 of the time you will spend on this course. If you find yourself spending more than 16 hours per week on average, discuss this with your course instructor to see if you can refine your work and study habits. If you find yourself spending less than 12 hours per week on average, you should recognize that you may have difficulty fully learning and comprehending the material in this time, which will probably be reflected in poor performance on the various activities and assessments, causing you to receive a lower overall course grade.

Activity	Minimum Time (Hours)
Lectures/problem-based learning	56
Viewing videos and reviewing notes	80
Research report	40
Midterm exam	2
Final exam	2
<i>Total</i>	<i>180</i>

Communication

Updates and changes to the course schedule, this syllabus, and any other aspects of the class content and structure will be communicated to you via announcements on the course e-Learning site. You are responsible for checking this site regularly for announcements.

Communicating electronically with the Instructor and Graduate Teaching Assistant

There are two primary modes of electronic communication for this class -- the discussion forum and Canvas mail. To ensure that your questions are answered as promptly as possible, please follow the communications guidelines below:

Discussion Forum: This course is participatory. Use the discussion forum on the course website for questions/answers about the course content, structure, assignments and activities. You are strongly encouraged to respond to your peers if you know the answer or can provide guidance. The course Graduate TA will monitor this area, but the TA may not be able to read every posting and therefore this should **not** be used to communicate with the instructors.

Direct Canvas Mail to the Instructors: Direct email to Dr. Julian or to the graduate teaching assistant should be used only for messages that are **private** in nature or that have been posted to the Discussion Forum but were not solved. Use the Mail tool in Canvas for all such direct email. If you use any other email tool, it may be filtered as spam or otherwise not be seen by your instructors.

Course Policies

Academic Honesty

UF students are bound by The Honor Pledge which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the

University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The [Honor Code](#) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

Policy On Absences and Make-up Work

Requirements for class attendance and make-up exams, assignments, and other work are consistent with [university attendance policies](#).

If you must miss an assignment or exam due to an allowable scheduled absence (for example, to participate in a sanctioned university function), you must notify the instructor as soon as the event is scheduled or during the first week of classes. If you miss an assignment or exam due to an allowable but unscheduled and unpredictable absence (e.g., illness), you must contact the instructor as soon as possible. In the case of illness, you must provide a signed note from your primary care provider indicating that you were unable to complete the assignment or take the exam on the day(s) in question.

Late Work

Late work will not be accepted unless it is the direct result of an allowable but unscheduled and unpredictable absence (e.g., illness), as defined above, at the discretion of the instructor.

Using Electronic Devices in Class

The class will meet in a computer classroom and you will have access to the UF computers for all in-class activities, including the classroom response system. Therefore, you are not expected to bring a computer to the lectures to utilize the classroom. You may not use the classroom computers for activities unrelated to the class. If you fail to follow this policy, or if you use a personal computer in the classroom for activities that are a distraction to any other members of the class, you will be warned that you are being disruptive. Multiple disruptions will be considered grounds for the assignment of a failing grade.

Campus Resources:

Health and Wellness

U Matter, We Care: If you or a friend is in distress, please contact umatter@ufl.edu or 352 392-1575 so that a team member can reach out to the student.

Counseling and Wellness Center: <http://www.counseling.ufl.edu/cwc/>, 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

Sexual Assault Recovery Services (SARS): Student Health Care Center, 392-1161.

University Police Department: 392-1111 (or 9-1-1 for emergencies). <http://www.police.ufl.edu/>

Academic Resources

E-learning technical support: 352-392-4357 (select option 2) or e-mail to Learningsupport@ufl.edu. <https://lss.at.ufl.edu/help.shtml>.

Career Resource Center: Reitz Union, 392-1601. Career assistance and counseling. <http://www.crc.ufl.edu/>.

Library Support: <http://cms.uflib.ufl.edu/ask>. Various ways to receive assistance with respect to using the libraries or finding resources.

Accommodations for Students with Disabilities

Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, www.dso.ufl.edu/drc/) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

Course Evaluation Process

Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at <https://evaluations.ufl.edu>. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results/>.

Course Schedule (subject to change)

All research report activities are due at 21:00:00 (09:00 PM) on the dates indicated in the last column below.

Wk	Session	Date	Content Videos and Readings	Viewing Time (mins)	Research Report
1	1	Jan 07	Lab values and concentrations <ul style="list-style-type: none"> What is an equivalent? Molarity, molality, osmolarity, osmolality, and tonicity Tonicity - comparing two solutions Diffusion and osmosis <ul style="list-style-type: none"> Diffusion - Intro. Concentration gradients Osmosis Hypotonic, isotonic, and hypertonic solutions (tonicity) Cellular respiration <ul style="list-style-type: none"> Oxidation and reduction review from biological point-of-view Oxidation and reduction in cellular respiration Overview of cellular respiration ATP and reaction coupling <ul style="list-style-type: none"> Reaction coupling to create glucose-6-phosphate 	100	
	2	Jan 09	Review <ul style="list-style-type: none"> Evolution and natural selection Gene regulation Cellular physiology > Cellular structures and processes <ul style="list-style-type: none"> Cellular Structure and Function Selective permeability of the cell membrane Cell-cell junctions Osmosis (Process) Resting membrane potential Cell signaling pathways 	65	
2	3	Jan 14 ¹	Endocrinology> Anatomy and physiology <ul style="list-style-type: none"> Endocrine anatomy and physiology Endocrinology> Pituitary hormones <ul style="list-style-type: none"> Adrenocorticotrophic hormone Growth hormone and somatostatin Thyroid stimulating hormone <ul style="list-style-type: none"> Thyroid hormone 	50	

			Endocrinology> Adrenal hormones Synthesis of adrenocortical hormones Cortisol		
	4	Jan 16	Endocrinology> Pancreatic hormones Glucagon Insulin (Function) Somatostatin Endocrinology> Calcium and phosphate regulation Calcitonin Parathyroid hormone Vitamin D	34	
3 ¹	5	Jan 21	Neurology > Anatomy and physiology Nervous system anatomy and physiology Neuron action potential Neurology > Autonomic nervous system Sympathetic nervous system Parasympathetic Nervous system Adrenergic receptors Cholinergic receptors	66	
	6	Jan 23	Neurology > Blood brain barrier and CSF Blood brain barrier Cerebrospinal fluid Neurology > Brain functions Sleep , Consciousness , Learning , Attention , Memory , Language , Emotion , Stress Neurology > Motor nervous system Motor cortex Motor neurons and muscle spindles Pyramidal and extrapyramidal tracts Cerebellum Basal ganglia: Direct and indirect pathway of movement Spinal cord reflexes	35	
4	7	Jan 28	Neurology > Sensory nervous system Sensory receptor function Somatosensory pathways Somatosensory receptors Anatomy and physiology of the ear Auditory transduction and pathways Vestibular transduction	57	
	8	Jan 30	Olfactory transduction and pathways Taste and the tongue Anatomy and physiology of the eye Photoreception Optic pathways and visual fields	44	

5	9	Feb 04	Musculoskeletal > Bones, joints, and cartilage Skeletal system anatomy and physiology Musculoskeletal > Muscles Muscular system anatomy and physiology Slow twitch and fast twitch muscle fibers Sliding filament model of muscle contraction Muscle contraction Neuromuscular junction and motor unit	52	
	10	Feb 06	Hematology> Blood components and function Blood components Platelet plug formation (primary hemostasis) Coagulation (secondary hemostasis) Role of Vitamin K in coagulation Clot retraction and fibrinolysis	37	
6	11	Feb 11	Cardiovascular physiology > Anatomy and physiology Cardiovascular system anatomy and physiology Lymphatic anatomy and physiology Normal heart sounds Abnormal heart sounds	48	
	12	Feb 13	Cardiovascular physiology > Cardiac electrophysiology Action potentials in pacemaker cells Action potentials in myocytes Electrical conduction in the heart Cardiac conduction velocity Excitability and refractory periods Cardiac excitation-contraction coupling Cardiac length tension Cardiac contractility Cardiovascular physiology > Electrocardiography ECG basics	44	
7	13	Feb 18	Cardiovascular physiology > Blood pressure regulation Baroreceptors Chemoreceptors Cardiovascular physiology > Cardiac cycle Measuring cardiac output – Fick principle Cardiac and vascular function curves Altering cardiac and vascular function curves Stroke volume, ejection fraction, and cardiac output Pressure volume loops Changes in pressure-volume loops Cardiac work Cardiac preload Cardiac afterload Law of Laplace	70	

	14	Feb 20	Frank-Starling relationship Cardiovascular physiology > Hemodynamics Blood pressure, blood flow, and resistance Pressures in the cardiovascular system Resistance to blood flow Laminar flow and Reynolds number Compliance of blood vessels	52	
8	15	Feb 25	Cardiovascular physiology > Normal variations of the cardiovascular system Cardiovascular changes during exercise Cardiovascular changes during hemorrhage Cardiovascular changes during postural change	0	
	16	Feb 28	Midterm on sessions 1-14. Normal class time and location.		
			Spring Break Feb 29 – Mar 8		
9	17	Mar 10	Cardiovascular physiology > Special circulations Cerebral circulation Coronary circulation Control of blood flow circulation Microcirculation and Starling forces Cardiovascular physiology > Thermoregulation Cardiovascular temperature homeostasis	25	Proposal (03/13)
	18	Mar 12	Respiratory physiology > Anatomy and physiology Respiratory anatomy and physiology Respiratory physiology > Breathing mechanics Lung volumes and capacities Anatomy and physiologic dead space Ventilation Alveolar gas equation Compliance of lungs and chest wall Combined pressure-volume curves for the lung and chest wall Alveolar surface tension and surfactant Air flow, pressure, and resistance Breathing cycle	57	
10	19	Mar 17	Respiratory physiology > Breathing regulation Breathing control Pulmonary receptors and mechanoreceptors Respiratory physiology > Gas exchange Ideal (general) gas law Boyle's law Dalton's law Henry's law Fick's laws of diffusion Graham's law	0	

			Gas exchange in the lungs Diffusion-limited and perfusion-limited gas exchange		
	20	Mar 19	<i>Respiratory physiology > Gas transport</i> Oxygen binding capacity and oxygen content Oxygen-hemoglobin dissociation curve Erythropoietin Carbon dioxide transport in blood	30	
11	21	Mar 24	Regulation of pulmonary blood flow Zones of pulmonary blood flow Pulmonary shunts Ventilation perfusion ratios and V Q mismatch Hypoxemia and hypoxia <i>Respiratory physiology > Normal variations of the respiratory system</i> Pulmonary changes during exercise Pulmonary changes at high altitude and altitude sickness	39	Draft Report (03/27)
	22	Mar 26	<i>Renal physiology > Anatomy and physiology</i> Renal anatomy and physiology <i>Renal physiology > Fluids in the body</i> Body fluid compartments Water shifts between body compartments Renal clearance <i>Renal physiology > Renal blood flow regulation</i> Renal blood flow regulation Measuring renal plasma flow and renal blood flow	60	
12	23	Mar 31	<i>Renal physiology > Renal electrolyte regulation</i> Glomerular filtration Proximal convoluted tubule Loop of Henle Distal convoluted tubule TF/Px ratio and TF/Pinulin Renin-angiotensin aldosterone system Calcium homeostasis Magnesium homeostasis Phosphate homeostasis Potassium homeostasis Sodium homeostasis	55	Draft Reviews (04/03)
	24	Apr 02	<i>Renal physiology > Renal absorption and secretion</i> Tubular reabsorption and secretion Tubular reabsorption of glucose Tubular secretion of PAH Urea recycling Weak acids and bases – non-ionic diffusion <i>Renal physiology > Water regulation</i> Osmoregulation Kidney countercurrent multiplication	53	

			Antidiuretic hormone Free water clearance		
13	25	Apr 07	Renal physiology > Acid-base physiology Acid-base map and compensatory mechanisms Buffering and Henderson-Hasselbalch equation Physiologic pH and buffers Plasma anion gap The role of the kidney in acid-base balance Metabolic acidosis Metabolic alkalosis Respiratory acidosis Respiratory alkalosis	74	Draft Back Evals (04/10)
	26	Apr 09	Gastrointestinal physiology > Anatomy and physiology Gastrointestinal anatomy and physiology Gastrointestinal physiology > Gastrointestinal function Enteric nervous system Gastrointestinal hormones Satiety Gastrointestinal physiology > Upper gastrointestinal tract Chewing and swallowing Salivary secretion Enteric nervous system and slow waves Esophageal motility Gastric motility Gastric secretions	53	
14	27	Apr 14	Gastrointestinal physiology > Digestion and absorption Hydration Digestion of carbohydrates and sugars Digestion of proteins Digestion of fats and lipids Vitamins Intestinal fluid balance Prebiotics and probiotics Gastrointestinal physiology > Liver, gall bladder, and pancreas Bile secretion and enterohepatic circulation Liver anatomy and physiology Pancreatic secretion	75	Final Report (04/17)
	28	Apr 16	Reproductive physiology > Female reproductive system Anatomy and physiology of the female reproductive system Estrogen and progesterone Oxytocin and prolactin Menstrual cycle	74	

			Pregnancy Reproductive physiology > Male reproductive system Anatomy and physiology of the male reproductive system Testosterone		
15	29	Apr 21	Immune System Introduction to the immune system Vaccines	28	Final Report Reviews (04/22)
		May 01	Final Exam: 12:30 PM - 2:30 PM in the normal class location (CSE E235)		Final Back Evals (05/01)

1. January 20 is a holiday (Martin Luther King Jr. Day).
2. Reading Days are April 23-24.