

**Class: 1:00 – 2:20 pm on Tuesday / Thursday, Frey Hall, Room 100**

LECTURE	MONTH	DAY	WEEKDAY	TITLE	PROFESSOR
1	JAN	23	Tues	Homeostasis	McKinnon
2		25	Thurs	Membrane Potential: Pumps / Transporters	McKinnon
3		30	Tues	Membrane Potential: Ion Channels	McKinnon
4	FEB	1	Thurs	Neuronal Action Potential	McKinnon
5		6	Tues	Synaptic Transmission 1	McKinnon
6		8	Thurs	Synaptic Transmission 2	McKinnon
7		13	Tues	Electrophysiological Properties of Neurons	McKinnon
8		15	Thurs	Sympathetic neurons	McKinnon
Exam 1		20	Tues	Exam 1: Lectures 1-8	McKinnon
9		22	Thurs	Muscle	McKinnon
10		27	Tues	Heart	McKinnon
11	MAR	1	Thurs	Cardiovascular System	McKinnon
12		6	Tues	Cardiac Pathophysiology 1	Watson
13		8	Thurs	Cardiac Pathophysiology 2	Watson
Spring Recess		13	Tues	Spring Recess	
		15	Thurs	Spring Recess	
14		20	Tues	Pulmonary Physiology I	Solomon
15		22	Thurs	Pulmonary Physiology II	Solomon
16		27	Tues	Pulmonary Physiology III	Solomon
Exam 2		29	Thurs	Exam 2: Lectures 9-16	McKinnon
17	APR	3	Tues	Intermediary Metabolism	El-Maghrabi
18		5	Thurs	Islet Hormones Metabolism and Diabetes	El-Maghrabi
19		10	Tues	Adrenal, Growth and Thyroid Hormones	El-Maghrabi
20		12	Thurs	Renal Function	Rosati
21		17	Tues	Integrated Kidney Physiology I	Rosati
22		19	Thurs	Integrated Kidney Physiology II	Rosati
23		24	Tues	Renal Pathophysiology	Rosati
Exam 3		26	Thurs	Exam 3: Lectures 17-23	McKinnon
24	MAY	1	Tues	Human Reproductive Physiology	Rosati
25		3	Thurs	Human Reproductive Pathophysiology	Rosati
Final Exam		15	Tues	Final Exam: 1:00 pm	McKinnon

### Course Description

The course expands on the the fundamental principles of cellular and organ physiology that were introduced in BIO 203. The subject matter includes advanced topics covering the origins of cellular electrical excitability, properties of synaptic transmission, the genetics of channelopathies in neuronal and cardiac physiology, and an advanced treatment of selected topics in cardiac, respiratory, endocrine, renal and nervous system physiology. The focus is on mammals in general and humans in particular. May not be taken for credit in addition to HBY 350.

Prerequisite: C or higher in BIO 203

Advisory Prerequisite: CHE 132 or CHE 142

3 credits

### Learning Goals

Upon completion of BI0328, students will be able to:

1. Describe the roles of membrane pumps, transporters and voltage-gated channels in establishing membrane potentials and electrical excitability.
2. Describe the major types of synaptic transmission in the nervous system: excitatory, inhibitory and neuromodulatory
3. Describe the electrical function of the heart and its regulation by neuromodulators.
4. Describe the regulation of the cardiovascular system.
5. Describe the origins and consequences of endocrine autoimmune diseases
6. Predict the effects of alterations in structure, function and neural/hormonal regulation of digestive system on digestion, metabolism, and body growth and maintenance.
7. Explain the development of bone, blood and the immune system, and relate patient symptoms and laboratory results to underlying pathologies in these tissues.
8. Describe the anatomy and function of the urinary system and how this integrates with other systems to maintain body homeostasis.
9. Understand the anatomy, function and regulation of the human male and female reproductive systems.
10. Synthesize and critique information from primary physiological data sources in a written assignment (optional).

### Faculty

This course is taught jointly by David McKinnon and Robert Watson from the Department of Neurobiology and Behavior, and by Barbara Rosati, Irene Solomon and Raafat El-Maghrabi from the Department of Physiology and Biophysics. Dr. McKinnon is the course director together with Dr Watson. Please contact Dr. Watson for all administrative matters related to the course. Please contact the appropriate faculty member for content-related questions. Faculty office hours will be posted on Blackboard.

Diane Pauciullo is the Course Administrator. You MUST contact Ms. Pauciullo to receive an excused absence from an exam, for makeup exam information, or to present IDs for exams (see EXAMS below). Ms. Pauciullo's office is located at Undergraduate Biology Office in CMM/BLL.

The teaching assistant for the course is Maxwell Moore. Information on Maxwell's office hours and review sessions will be posted on Blackboard.

Dr McKinnon	david.mckinnon@stonybrook.edu	BST 6-124, HSC, (631) 444-7334
Dr Watson	robert.watson@stonybrook.edu	
Dr Rosati	barbara.rosati.1@stonybrook.edu	BST 6-124, HSC, (631) 444-7350
Dr Solomon	irene.solomon@stonybrook.edu	
Dr Maghrabi	raafat.el-maghrabi@stonybrook.edu	
Ms Pauciullo	diane.pauciullo@stonybrook.edu	CMM/BLL Room 108, (631) 632-8171
Mr Moore	maxwell.moore@stonybrook.edu	

### Student Responsibilities and Requirements

You are responsible for all of the material presented in class, along with any material specifically assigned to you by an instructor. You are not responsible for knowing or applying textbook material not covered in class or mentioned by an instructor outside of class. In addition to remembering facts and terms presented in class, you should also be able to apply what you know to new situations, synthesize information from multiple lectures and understand the consequences of dysregulation of the physiological systems presented. Since expectations are high for this course, you need to prepare appropriately.

Prepare for each lecture by reviewing the material presented (in the slides, notes or text) BEFORE class. Use your time in lecture wisely to take notes and fill in any gaps in your preparatory knowledge. Use your own preparation and the lectures as your main sources of information rather than relying on the Echo recordings. Use them to review material you already know. While every effort will be made to post the course material in a timely manner, Echo system failures can and do happen. Spend most of your time outside of class in practice applying your knowledge to new situations rather than just reviewing it. Draw concept maps tying the various facts learned in class together to help you synthesize the information. Read the assigned primary literature, and use it to help you review the concepts covered in lecture. Don't just take the practice exams; use them as study tools. Try writing 3-4 sentence explanations of why each statement is incorrect or correct, try to change correct statements into incorrect statements and vice versa, try to challenge your study partners by writing practice exam questions for them to take and then review together. Visit the TA's office hours and review sessions to ask specific questions about the course material. This course is worth 3 credits. You should expect to spend an average of 6 hours of time outside of class per week on course materials in addition to the 3 hours of time you spend in lecture in order to pass the class, and more time to excel in the class.

You are also responsible for your own learning, and that of your classmates. Please make every effort to ensure you are not preventing others from learning to the fullest extent through your actions. Pay attention in class, and participate in any group activities during lecture. Talk with your neighbors about the material only when asked to in class. Avoid all conversations not related to the class material. Please refrain from using your cell phones in class. Silence your devices before class.

### Course Communication

The main method of disseminating course material is through the course Blackboard site. Students are responsible for checking the information and policies contained in Blackboard announcements and documents. Please check the Blackboard site frequently.

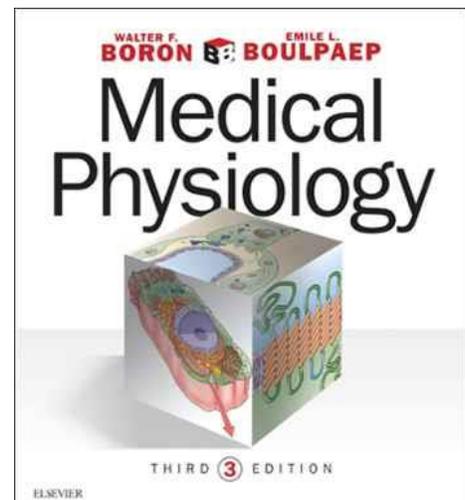
The primary method of communication is via Stony Brook University email; you are responsible for being informed about any content in emails sent by instructors and staff to your Stony Brook University email address. In the rare event that a class or exam is cancelled or postponed, you will be notified through your Stony Brook University email account.

When emailing instructors, include your full name and SBU ID number in the body of the email and BIO328 in subject line of the email. Use professional language in all email communication. Faculty are inundated with junk mail and these emails can get lost otherwise.

### Course Resources

Each instructor in the course utilizes a different teaching style and makes different resources available to students. Additional readings and materials will also be posted by each instructor on Blackboard.

The recommended textbook for BIO 328 is Medical Physiology (3rd edition) (Boron and Boulpaep, 2016).



### Exams, Assignments and Grades

Grades in BIO328 will be based on your performance on three non-cumulative in-class examinations (60%, 20% each) and a comprehensive final examination (40%).

An exception to this is if you choose to do the written assignment. In this case the four exams will contribute 90% of the final grade and the written assignment will contribute 10%.

The three Midterm Exams contribute will be held in Frey 100 during normal class hours, as noted in the syllabus. The final examination will be at a place yet to be announced. The location and time for the final exam will be posted on Blackboard when it is announced. Note that the time and day for the final exam is DIFFERENT from the regular class time.

**If you miss more than 1 exam, FOR ANY REASON(S), you fail the entire course.** It is, therefore, very important not to miss exams for trivial reasons. The results from each exam are normalized so that every exam will have exactly the same mean for final grading. As a consequence, there is no advantage to missing an exam and the potential for a significant disadvantage if you genuinely fall ill.

### Exam Policy

1. The three midterm exams will each cover about 1/3 of the course content. The final exam will cover all of the course content, including Lectures 24 and 25. In general, multiple-choice format questions will include the selection of an INCORRECT statement from a group of correct statements.
2. All students must present a valid SBU photo ID upon completion of each exam. Failure to present a valid SBU photo ID either at the exam or to Ms. Pauciullo within 48 hours after the exam will result in a score of zero for the exam.
3. Notes, books, electronic devices (such as cellular phones, calculators, translators or computers), hats or any other items (apart from pencils and erasers) are not allowed on your person or desks during the exam. Do not bring valuables to the exam, as you may be required to place all personal belongings at the front or sides of the room.
4. After 50 minutes of time have elapsed, you may leave if you have completed your exam. No student may begin the exam after this time. No student may leave the exam room and reenter for any reason (not even restroom breaks). There are no restroom breaks.
5. Exam keys will be posted on Blackboard as soon as possible after each exam. For 48 hours after each exam, the professors will receive written inquiries from students who feel there may be an error in a question. Faculty will read all inquiries, but will not be able to respond to each inquiry individually. If any error is identified, the answer key will be changed to reflect corrections. After 48 hours, the answer key will be considered finalized and published again in its final form on Blackboard, along with student scores. No further change to the exam key will be made, without exception. Students seeking clarification about specific exam questions for the midterm exams should meet with the appropriate instructor during published office hours after the final key has been published.
6. Contact Ms. Pauciullo or if you suspect any errors in the grading of your exam scantron.
7. Any suspected cases of academic dishonesty involving exams will be referred to the Academic Judiciary and may result in the maximum action allowed by University Guidelines for each incident (see ACADEMIC INTEGRITY below).

### Excused Absences from Exams

Excused absences from one exam per student per semester are permitted only in rare circumstances. **Students missing two or more exams for any reason will receive a grade of "F" in the course.** For this reason, it is very important not to miss exams for trivial reasons.

If you are absent from any exam, you must notify the Course Administrator, Ms. Pauciullo, within 24 hours of the exam and then provide appropriate documentation (e.g., note from a medical provider, death certificate, documentation for approved university activities, etc.) before an excused absence from the exam will be approved. If possible, please notify Ms. Pauciullo or Dr. Malmquist in advance. Failure to provide documentation, or having a submitted excuse refused, will result in the score of zero for the missed exam.

The final exam will be given during the final exam period which will be announced when the information is available. **Unavoidable excused absences from the final exam are permitted only if a student has not missed any of the midterm exams.** Makeup exams for the final will be given at a later date and time arranged by Ms. Pauciullo. It is the responsibility of the student to plan a class schedule that avoids exam conflicts and too many exams on the same day during final exam week. The final exam will not be given at any other time during final exam week, and requests to take a makeup final exam due to conflicts with other exams during final exam week will not be approved.

All medical excuses for missing an exam must be accompanied by a medical information act waiver (which can be obtained from the Undergraduate Biology office or the course Blackboard site) stating that the medical provider will verify that the student in question visited the provider's office and was treated as stated in the excuse (see the Course information section of the Blackboard site for instructions and a copy of the waiver form). Without a medical information act waiver, the excuse will not be accepted.

### **Written Assignment (optional)**

Research Article Summary – **Due Monday April 16th before 5pm**, 10% of course grade

Scientists present their experimental findings to their peers and colleagues in formal written journal articles, as well in scientific seminars and talks. Interpreting and critiquing data presented to specialists is a crucial skill for scientists and clinicians, which may be important to many of you who continue to pursue science in your careers or further education. The written assignment in BIO328 is designed to give you exposure and practice with understanding physiological data presentation. Detailed instruction for the assignment will be posted on Blackboard. You will be graded based on posted rubrics; make sure that you include each of the items listed in the rubric in your reports. Your grade will be based on understanding some basic physiology facts from each source, your ability to relate them to the material presented in the course, your ability to critique the presentation of the data, and your writing ability.

**Research Article Summary** (about 3-4 pages, 1250-1750 words, worth 10% of course grade (optional)).

You will read, analyze and thoroughly critique a peer-reviewed article from a scientific journal that relates to several of the topics discussed in BIO328. Copies of the article and an optional reading guide/worksheet will also be posted on Blackboard. This assignment may be submitted to fulfill the upper division writing requirement (UDWR) for Biology majors. If you wish to submit this assignment in fulfillment of the UDWR you must co-register for BIO459. Please contact Dr. Malmquist or a Biology Advisor for further instructions.

All assignments must be submitted in .pdf format to the appropriate **SafeAssign** link on the course Blackboard site.

Assignments submitted after the deadline will not be graded. Assignments may be completed well in advance of the deadline. You are encouraged to submit them early! No extensions to submissions will be granted due to scheduling conflicts with other courses, previously scheduled activities, or technical issues. Since the assignment is optional no late submissions will be considered.

SafeAssign checks each assignment against all others submitted in the class, internet sites, and published works. All written assignments must be completed as your own, independent work. Plagiarism (presenting another's work as your own) is cheating. Detected plagiarism will result in the maximum action allowed by University guidelines for each incident (see Academic Integrity below). You must properly cite any sources used in your written assignments using APA style. Citation resources are available through the Stony Brook University Libraries and will be posted on Blackboard. If you are unsure about what you must cite, please ask your TA or Dr. Watson.

### **Americans with Disabilities Act**

If you have a physical, psychological, medical or learning disability that may impact your course work, please contact Disability Support Services, ECC (Educational Communications Center) Building,

Room 128, (631)632-6748. They will determine with you what accommodations, if any, are necessary and appropriate. All information and documentation is confidential.

<https://web.stonybrook.edu/newfaculty/StudentResources/Pages/DisabilitySupportServices.aspx>.

Students requiring emergency evacuation are encouraged to discuss their needs with their professors and Disability Support Services. For procedures and information, go to the following web site: <http://www.ehs.sunysb.edu/fire/disabilities/asp>

### **Academic Integrity**

Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Faculty is required to report any suspected instances of academic dishonesty to the Academic Judiciary. Faculty in the Health Sciences Center (School of Health Technology & Management, Nursing, Social Welfare, Dental Medicine) and School of Medicine are required to follow their school-specific procedures. For more comprehensive information on academic integrity, including categories of academic dishonesty please refer to the academic judiciary website at :<http://www.stonybrook.edu/uaa/academicjudiciary/>

Academic dishonesty includes any act that is designed to obtain fraudulently, either for oneself or for someone else, academic credit, grades, or other recognition that is not properly earned or that adversely affects another's grade. The following represents examples of this and does not constitute an exhaustive list:

- Cheating on exams or assignments by the use of books, electronic devices, notes, or other aids when these are not permitted, or by copying from another student.
- Collusion: two or more students helping one another on an exam or assignment when it is not permitted.
- Ringers: taking an exam for someone else, or permitting someone else to take one's exam.
- Submitting the same paper in more than one course without permission of the instructors.
- Plagiarizing: copying someone else's writing or paraphrasing it too closely, even if it constitutes only some of your written assignment, without proper citation, even instructor notes & presentation slides.
- Falsifying documents or records related to credit, grades, status (e.g., adds and drops, P/NC grading, transcripts), or other academic matters.
- Altering an exam or paper after it has been graded in order to request a grade change.
- Stealing, concealing, destroying, or inappropriately modifying classroom or other instructional material, such as posted exams, library materials, laboratory supplies, or computer programs.
- Preventing relevant material from being subjected to academic evaluation.
- Presenting fabricated excuses for missed assignments or tests.
- Unauthorized clicker use: using someone else's clicker, falsifying attendance roster, signing in for someone
- Electronic communication devices, including cellular phones, beepers, speakers, calculators and headphones must be secured in a closed container (and not, for example, worn on a belt or around the neck) and must be turned off (and not, for example, simply set on vibration mode) during any examination. This policy shall be announced before each examination. Note: even if a student does not answer a ringing cell phone during an exam, it can be considered academic dishonesty for not having it turned off.

### **SUNY Critical Management Policy**

Stony Brook University expects students to respect the rights, privileges, and property of other people. Faculty are required to report to the Office of University Community Standards any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, or inhibits students' ability to learn. Further information about most academic matters can be found in the Undergraduate Bulletin, the Undergraduate Class Schedule and the Faculty-Employee Handbook.

### **Email Policies**

Email sent via Blackboard (<http://blackboard.stonybrook.edu>) is the principal way we will officially communicate with you for this course. It is your responsibility to make sure that you read your email in your official University email account. For most students that is Google Apps for Education (<http://www.stonybrook.edu/mycloud>) but you may verify your official Electronic Post Office (EPO) address at:

<http://it.stonybrook.edu/help/kb/checking-or-changing-your-mail-forwarding-address-in-the-epo>

If you choose to forward your official University email to another off campus account, we are not responsible for any undeliverable messages to your alternative personal accounts. You can set up email forwarding using these DoIT-provided instructions found at:

<http://it.stonybrook.edu/help/kb/setting-up-mail-forwarding-in-google-mail>

If you need technical assistance, please contact Client Support at (631) 632-9800 or [supportteam@stonybrook.edu](mailto:supportteam@stonybrook.edu)