

Systems Physiology - BMED-6042-A

Lecture Room & Format: Emory HSRB2 , In-person only

All lectures for this class will be entirely given at Emory, and in-person attendance is required as there will be no Zoom or hybrid option.

Lecture times : Tue/ Thur 3:55 to 5:10 PM (To accommodate shuttle schedule)

GT/Emory Shuttle: Students are strongly recommended to use the shuttle to attend the class.

[Stinger Bus Routes | Parking & Transportation Services | Georgia Institute of Technology | Atlanta, GA \(gatech.edu\) \(Links to an external site.\) \(Links to an external site.\)Links to an external site.](#)

- The shuttle leaves GT Nanotech Bldg at 3:04PM and arrives at HSRB by 3:45PM.
- Following the class, the shuttle leaves at HSRB2 for GT at 5:15PM.

Co-Course Directors: Sung Jin Park, PhD and Hanjoong Jo, Ph.D.

Presentation Instructor: Kyung In Baek, PhD

Office: Emory Health Sciences Research Bldg E170

Sung.Jin.Park@emory.edu; hjo@emory.edu

Course Description:

This is a course in systems physiology for graduate students in biomedical engineering and bioengineering. The goals of the course is to provide an overview of physiological systems in major organs to illustrate (1) the principles of homeostasis, (2) how physical principles govern physiological function in the intact organism, and (3) the cellular and molecular bases of these physiological processes. The focus of the course is on human physiology, but we will also take a comparative approach to show how different organisms solve the same physical problems in nature. The physiological principles developed in this course will be illustrated by examples drawn from pathophysiology, from engineering models and engineering solutions for medicine. By the end of the course, students are expected to be able to explain the basic mechanisms of homeostasis, apply these principles to physiological systems not explicitly covered in the course, read the relevant current literature, and learn how physiological problems are (creatively) solved using biomedical engineering approaches.

The course consists of lectures, exams, and student presentations.

Grading

Attendance and Participation	5%
Hot paper presentation	10%
Final Team Presentation	15%
Exam 1	35%
Exam 2	35%

Absolute grading scale will be used: A: 91-100, B:81-90; C:71-80

1. Hot paper presentation: 10%

1 oral presentation per student (10 min presentation + 3 min Q&A) on a hot paper*

*Hot paper: Use one recently published paper that was published within the past two years (2019-present) with an impact factor >10 (Please Google “impact factor of (Journal name)”).

*It should be a physiology and disease-related paper and may not be a clinical-only or engineering-only paper without any components of basic physiology/pathology mechanisms.

*Avoid review papers unless specifically pre-approved by Dr. Jo.

* All hot papers should be approved at least two days before the presentation by Dr. Jo.

(Please email hot papers (pdf file or link) along with the Impact factor to Dr. Jo for approval)

2. Final Team Presentation: 15%

An in-depth report involving more than three related papers (at least two should be hot papers) by a team of two students will be presented at the end of the semester.

Topics could be chosen from subjects broadly related the lecture topics but must incorporate quantitative and bioengineering approaches.

Papers used in Hot Paper Presentations in the class may not be used as a Team Project.

Select your partner and submit the team member by Sep 25th.

* All team papers should be approved at least 7 days before the presentation.

(Please email hot papers (pdf file or link) and Impact factors to Dr. Jo for approval)

Presentation time: 22 min (11 min per student) group + 3 min Q&A.

3. Exam 1: 35%

4. Exam 2: 35%

Prerequisites: at least one undergraduate level biology class.

Suggested Textbook choices:

1. [Guyton & Hall Physiology - Medical Physiology - 13th Edition](#) [Links to an external site.](#)
2. F. Boron and E.L. Boulpaep, Medical Physiology, 3rd edition

BMED6042 Systems Physiology 2025 Fall Lecture Schedule - TENTATIVE

Lecture times : Tue/ Thur 3:55 to 5:10 PM

EXAMS will be given for 2 hour each 3:55-5:55 PM

TENTATIVE

Date	Class room	Lecturer	
Aug 19	HSRB II N100	Hanjoong Jo	Introduction - Cells and action potentials
Aug 21	HSRB II N100	Hanjoong Jo	Circulation
Aug 26	HSRB II N100	Hanjoong Jo	Blood & coagulation
Aug 28	HSRB II N100	Hanjoong Jo	How to present hot papers
Sep 2	HSRB II N100	Amir Rezvan	Heart
Sep 4	HSRB II N100	Sung Jin Park	Muscle physiology
Sep 9	HSRB II N100	George Beck	Bone Physiology
Sep 11	HSRB II N100	Machelle Pardue	Eye physiology
Sep 16	HSRB II N100	Hanjoong Jo	Hot Paper 1 on Cardiovascular

Sep 18	HSRB II N100	Nick Varvel	Immune system
Sep 23	HSRB II N100	Hanjoong Jo	EXAM 1
Sep 25	HSRB II N100	Cesar Romero	Kidney physiology
Sep 30	HSRB II N100	Hanjoong Jo	Hot paper 2 – Musculoskeletal, Eye
Oct 2	HSRB II N100	Hanjoong Jo	Hot paper 3 – Blood, Renal and Immune
Oct 7	HSRB II N100	Nikrad Shahnavaz	Digestive system
Oct 9	HSRB II N100	Sung Jin Park	Hot paper 4 on Cells & Neuro
Oct 14	No Class	No Class	Fall Break
Oct 16	HSRB II N100	Robert Taylor	Lung - confirmed
Oct 21	HSRB II N100	Robert Taylor	Gas Exchange - confirmed
Oct 23	No Class	No Class	BMES Mtg (HJ/SJ out from Oct 23-26)
Oct 28	HSRB II N100	Richard Nichols	Central Autonomic
Oct 30	HSRB II N100	Richard Nichols	Autonomic nervous system
Nov 4	HSRB II N100	Sara Markley	Endocrine system 1
Nov 6	HSRB II N100	Sara Markley	Endocrine system 2
Nov 11	HSRB II N100	Sung Jin Park	Hot paper 5 – GI & Endocrine, Lung
Nov 13	HSRB II N100	Sung Jin Park	Final team presentations #1
Nov 18	HSRB II N100	Sung Jin Park	Final team presentations #2
Nov 20	HSRB II N100	Sung Jin Park	Final team presentations #3
Nov 25	HSRB II N100	Sung Jin Park	Final team presentations #4
Nov 27	No Class	No Class	Thanksgiving
Dec 2	HSRB II N100	Sung Jin Park	EXAM 2
Dec 4	HSRB II N100	Sung Jin Park	

***MENTAL HEALTH RESOURCES**

Your instructors, and the BME department as a whole, care about student mental health. While your instructors can be a resource, we also want to make sure you are aware of the formal resources for receiving mental health assistance in BME and at GT. More information about these resources can be found here: <https://mentalhealth.gatech.edu/>

- **Mental Health Care & Resources** – The Center for Mental Health Care and Resources (CMHCR) is the best place to engage with mental health care at GT. They are found in the Smithgall Student Services Building and can also be reached at **404-894-2575**. Their normal hours of operation are 8am to 5pm Monday through Friday. CMHCR can connect

you with services including individual or group counseling, academic or personal support services, assessment and testing for learning disabilities, and other mental health providers. They can help you find the right resources for a crisis, an acute issue, or a longer-term concern.

- **BME Satellite Counselor** – In addition to the Center for Mental Health Care’s centralized services, BME hosts a counselor, Kate Silverio, in Room 1105 of the Whitaker Building (in the back of the academic office). The Satellite Counselor offers 15 min appointments (in-person or virtual) during which students can discuss a brief or specific, non-emergency concern, and/or learn about mental health resources on campus. To schedule with the Satellite Counselor, please email her (kate.silverio@studentlife.gatech.edu).
- **Crisis Services** - If you require immediate support for mental health difficulties you have several options:
During business hours (8 a.m.-5 p.m.). Call **404-894-2575** or go to Suite 238 in the Smithgall Student Services Building.
Outside of business hours, call **404-894-2575** and select the option for the after-hours counselor.
In an emergency, call Georgia Tech Campus Police at **404-894-2500** on campus or **911**.