

BMED 3100 Syllabus

Systems Physiology, A, 3.0

Fall 2026

Instructor Information

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General Course Information

Description

An introduction to human physiology emphasizing biomedical engineering approaches to the understanding of basic organ function, disease states, and medical intervention.

Course Learning Outcomes

1. **Describe** the anatomical structures and **explain** the physiological functions of major human organ systems.
2. **Analyze** homeostatic mechanisms and **evaluate** how different organ systems integrate to maintain physiological balance.
3. **Apply** physiological principles and **use** quantitative reasoning to **explain** organ function in both normal and pathophysiological states.
4. **Describe and interpret** physiological mechanisms at the molecular, cellular, tissue, and systems levels.
5. **Interpret and analyze** data from clinical case studies using physiological principles and **synthesize** insights to explain system-level function.
6. **Communicate** physiological concepts and findings effectively in both written and oral formats with peers, scientists, clinicians, and biomedical engineers.
7. **Identify and evaluate** engineering and clinical issues associated with biomedical engineering applications in human physiology.
8. **Collaborate** with peers by providing constructive feedback and engaging in scientific dialogue to enhance team-based problem-solving.

Required Course Materials

Widmaier, Eric P., Raff, Hershel, Strang, Kevin T. (2023) *Vander's Human Physiology 16th Edition*, Boston:McGraw-Hill Higher Education. ISBN: 9781264125739. If you choose to use a different edition, you are responsible for locating the appropriate sections and identifying any content difference.

Grading Policy:

Grades will be posted on Canvas throughout the semester so you can monitor your progress. The course is based on **1000 total points**, and your final grade will be determined by the total number of points earned across all assignments.

Course Grading Breakdown (1000 points total)

Problem Solving Studio (PSS)

13 PSS sessions @ 20 points each = **240 points**

Weekly Pre-PSS Assessments

13 assessments @ 5 points each = **60 points**

Homework

4 assignments @ 45 points each = **180 points**

PSS Group Peer Evaluations

4 evaluations @ 5 points each = **20 points**

Exams

3 unit exams @ 100 points each = **300 points**

Final Exam

Unit 4 Exam = 100 points

Cumulative Final = 100 points

Total Final Exam Points = **200 points**

Total = 1000 points

This grading structure is designed to value **consistent engagement, preparation, collaboration, and conceptual understanding** throughout the semester—not just performance on exams.

Grading Scale

Final letter grades are assigned based on total points earned:

- **A:** 900–1000 points
- **B:** 800–899 points
- **C:** 700–799 points
- **D:** 600–699 points
- **F:** 0–599 points

Because the course uses a **point-based system**, you can estimate your standing at any time by checking your total points in Canvas.

Assignments

- PSS: 240 points
- Pre-PSS Assessments: 60 points
- Homework: 180 points
- Peer Evaluations: 20 points
- Exams (3): 300 points
- Final Exam: 200 points

Total = 1000 points

Description of Graded Components

Problem Solving Studio (PSS) — 240 points

Problem Solving Studios are collaborative, in-person sessions where you will apply current and previously learned physiological concepts to real-world scenarios. These activities emphasize making connections across systems and practicing physiological reasoning. You will work in assigned groups and submit one group response at the end of each session. PSS assignments are designed to be completed without outside resources, so preparation through Pre-PSS activities is essential. The lowest PSS grade will be dropped if all sessions are attempted.

Weekly Pre-PSS Assessments — 60 points

Weekly Pre-PSS assessments are short, asynchronous video-based quizzes designed to help you prepare for PSS sessions. These assessments focus on foundational concepts needed for in-class problem solving and may include cumulative material. You will have two attempts, and the highest score will be recorded. The lowest Pre-PSS assessment grade will be dropped if all assignments are attempted.

Homework — 180 points

Homework assignments provide individual practice applying and synthesizing course material in preparation for exams. Each assignment includes exam-style questions and is completed in two parts: an initial submission prior to discussion and a follow-up reflection after discussion. Homework is completed individually and is designed to strengthen conceptual understanding and problem-solving skills.

PSS Group Peer Evaluations — 20 points

Peer evaluations provide an opportunity to reflect on group collaboration and provide constructive feedback to your teammates. These evaluations help support effective teamwork and

accountability during PSS sessions. Responses are confidential and are intended to improve group learning experiences.

Unit Exams — 300 points

Three unit exams assess your understanding of course material and your ability to apply physiological concepts. Exams may include multiple-choice and case-based short-answer questions similar to those used in PSS and homework. Exam content may draw from lectures, videos, PSS, homework, and readings. The lowest Unit 1–3 exam (or an excused exam) may be replaced by the cumulative portion of the final exam.

Final Exam — 200 points

The final exam consists of two parts: a Unit 4 exam and a cumulative portion covering Units 1–3. Both sections include multiple-choice and problem-solving questions. The cumulative portion of the final exam may replace one Unit 1–3 exam grade.

Course Policies

Attendance and Make-Up Policy

Problem Solving Studio (PSS) Policies

PSS sessions are collaborative, in-person activities and attendance in your assigned section is required. PSS sessions cannot be made up in another section. Points may be deducted for late arrival or early departure.

Technology Policy

- Only the designated **Recorder** may have a laptop or tablet open.
- The Recorder is responsible for submitting the group responses.
- The Recorder role rotates among group members.
- If unauthorized windows or applications are open, the **entire group receives a zero** for that PSS.

Missed PSS

- Makeups are only allowed for **excused absences**.
- Students with excused absences must submit an **individual PSS** by **Friday 11:59 pm** of the same week.
- The final PSS of a unit cannot be made up (answer key released same day).
- The **lowest PSS grade is dropped** regardless of reason.

Weekly Pre-PSS Assessments & Homework Policies

Assignments must be submitted by the posted deadlines in Canvas.

Late Policy

- Late submissions receive **50% of earned credit** if submitted the morning after the deadline.
- No submissions are accepted after the posted cutoff time.
- Unexcused missed assignments receive a zero.

Missed Homework (Excused Absence)

- If a homework assignment is missed due to a documented excused absence, the score will be replaced by the **highest homework score** from the semester.

Peer Evaluation Policy

Peer evaluations must be submitted by the posted deadline.

Late or makeup submissions are **not permitted**. Failure to submit results in a zero.

Exam Policies

Unit Exams

- Exams are administered in person during scheduled class times.
- Exams include multiple-choice and short-answer questions.
- One missed exam with an **excused absence** is eligible for:
 - a make-up exam **or**
 - grade replacement using the cumulative final exam.

Only **one exam** may be replaced or made up.

Make-Up Exams

- One make-up exam is offered during the **Georgia Tech Conflict Exam Period**.
- No alternate make-up dates are provided.
- Students who miss the make-up exam forfeit the opportunity.

Grade Replacement Policy

For one excused missed exam:

- The cumulative final exam score may replace the missed exam.
- This option applies to **only one exam**.

Missing an exam without documentation results in a **zero**.

Final Exam Policy

The final exam must be taken during the scheduled final exam period.

- Excused absences may take a make-up during the conflict period.
- Non-excused absences result in a zero.
- Georgia Tech final exam conflict policies will be followed.

Excused Absence Policy

To receive an excused absence:

- Notify instructor within **24 hours**
- Submit documentation within **5 business days**
- Planned absences require **2 weeks advance notice**

Excused Absence Examples

- Critical illness
- Personal emergency
- Institute-sponsored activities
- Scientific conference presentations
- Career fairs (must notify instructor)

Non-Excused Absences

- Travel or vacations
- Oversleeping
- Minor illness
- Routine appointments
- Interviews or meetings
- Traffic delays
- Forgetting deadlines

Academic Integrity

Georgia Tech aims to cultivate a community based on trust, academic integrity, and honor.

Students are expected to act according to the highest ethical standards. Review [Georgia Tech's Honor Code](#) and the student [Code of Conduct](#).

Any student suspected of cheating or plagiarism on a quiz, exam, or assignment will be reported to the Office of Student Integrity, who will investigate the incident and identify the appropriate penalty for violations.

Core IMPACTS

[Core IMPACTS](#) is the University System of Georgia's General Education curriculum. If you are teaching a course that counts towards Core IMPACTS, you should include a syllabus statement about the Core area and associated [career competencies](#). [This resource](#) developed by the Center for Excellence in Teaching and Learning and Online Education at Georgia State University includes template syllabus statements for each of the Core IMPACTS areas that you may adapt for your course.

Accommodations for Students with Disabilities

If you are a student with learning needs that require special accommodation, [contact the Office of Disability Services](#) (404-894-2563) as soon as possible to make an appointment to discuss your special needs and to obtain an accommodations letter. Please also e-mail me as soon as possible in order to set up a time to discuss your learning needs.

Student-Faculty Expectations Agreement

At Georgia Tech, we believe that it is important to strive for an atmosphere of mutual respect, acknowledgement, and responsibility between faculty members and the student body. [The Student-Faculty Expectations](#) articulate some basic expectations that you can have of me and that I have of you. In the end, simple respect for knowledge, hard work, and cordial interactions will help build the environment we seek. Therefore, I encourage you to remain committed to the ideals of Georgia Tech while in this class.

Additional Course Policies

Device Use Policy:

In this course, we ask that students be present and actively engaged to maximize learning and collaboration. To reduce distractions and promote equity in the classroom:

- During lecture and PSS, all non-essential devices must be put away or silenced.
- Cell phones, smartwatches, and other personal devices should be turned off or in silent mode and kept out of view.
- The use of laptops or tablets is permitted only when needed for classwork, such as during PSS by the designated Recorder.
- No recording (audio, video, or pictures) of class sessions is permitted without explicit instructor approval.
- A basic scientific calculator (non-internet enabled) may be used during PSS or exams, if needed.

- Storing notes or accessing materials on any device (phones, watches, calculators, etc.) during PSS or exams is strictly prohibited.
- If you choose to use a laptop or tablet during lecture for note-taking or to follow slides, please do so respectfully and in a way that does not distract peers.

Generative AI Guidance for Privacy and Security:

- What are the restrictions on the types of information I can input into an AI tool?
- What are the security and privacy concerns related to the use of AI tools?
- Security best practices

This guidance is provided to the Georgia Tech community about the use of Artificial Intelligence (AI), a rapidly evolving technology. The guidance will be updated as the Institute reviews the role of AI at Georgia Tech and explores formal contracts and agreements with AI vendors.

The use of AI tools in teaching and learning, research, and business activities presents new opportunities and challenges in information security, data protection, and privacy. This document is a guide for faculty, researchers, staff, and students on how to use AI tools in a secure, responsible, legal, and confidential manner, especially when it involves the sharing of Georgia Tech protected data. The guide outlines the requirements that employees must follow when using AI tools, including the evaluation of security and privacy risks and the protection of sensitive and proprietary data.

The Institute recognizes that the use of AI tools can pose risks to our operations as well as to those who entrust their data to us. Therefore, we are committed to protecting the confidentiality, integrity, and availability of all Institute data and respecting the privacy rights and interests of individuals. Additionally, Georgia Tech is subject to many laws and regulations governing the use of data in the U.S. and other countries. Violating such laws and regulations by irresponsible use and/or improper disclosure could create liability for Georgia Tech and significantly harm our reputation. All faculty, staff, and students must use AI tools in a manner consistent with our security, privacy, data management Policies, guidance, and best practices, and consistent with any contractual and/or confidentiality requirements in place with respect to data.

What are the restrictions on the types of information I can input into an AI tool?

Georgia Tech faculty, staff, and students shall not submit any personally identifiable information (PII), [Protected Data, Regulated Data or Georgia Tech Organizational DataLinks to an external site.](#) into any AI tool.

Personally identifiable information (PII) includes any information about an individual that can be used to distinguish or trace an individual's identity, such as

- Name,
- Social security number,
- Date and place of birth,
- Mother's maiden name,
- Biometric records; and
- Any other information that is linkable to an individual, such as medical, educational, financial and employment information.

The Protected Data categorization is the default data protection categorization for Georgia Tech's Organizational Data. Under this data protection categorization information is not generally available to parties outside of the Georgia Tech community.

Note: A Protected Data categorization does not always mean that the data contained therein is confidential or non-disclosable, and such data may be subject to disclosure under the Georgia Open Records Act or other applicable laws and regulations.

Regulated Data refers to information that is bound by requirements of applicable federal, state, local, or international laws and regulations, and/or contractual obligations. This data must be guarded from disclosure. Disclosure of this information may contribute to financial fraud and/or violate applicable federal, state, local, or international laws and regulations, and/or contractual obligations. Examples of regulated data includes:

- [FERPALinks to an external site.](#) (Family Educational Rights and Privacy Act) data, e.g., all student information, both directory and non-directory
- HIPAA (Health Insurance Portability and Accountability Act) data
- GLBA (Gramm-Leach-Bliley Act) data: student financial information
- European Union/United Kingdom GDPR (General Data Protection Regulation): personal data of individuals located in the EU/EEA and UK
- [Controlled Unclassified InformationLinks to an external site.](#)
- [Export Controlled dataLinks to an external site.](#)
- Data subject to Non-Disclosure Agreements (NDA), Proprietary Information Agreements, or other confidentiality agreements.

Once such information is input into an AI tool, in most cases there is little control over how the tool will use and share such data with other parties. Additionally, if the tool generates information that relates to an identifiable individual it, too, becomes PII and must be handled in the same manner as all other PII even if such AI-generated information is spurious or factually incorrect. Read the [Georgia Tech Data Privacy PolicyLinks to an external site.](#), the [Georgia Tech Personal Information Privacy PolicyLinks to an external site.](#), and the [Georgia Tech Data Governance and Management PolicyLinks to an external site.](#) for more context on data considerations.

What are the security and privacy concerns related to the use of AI tools?

There are several concerns related to the use of AI tools including, but not limited to:

- Confidentiality. AI tools may be able to access sensitive or confidential information about an individual if they share it in "conversation" with an AI tool. This information could be used for malicious purposes or shared with third parties without the individual's knowledge or consent.
- Data collection. AI tools collect data about the "conversations" it has with users. This data may include personal information, such as names and locations, as well as sensitive data or information, such as PII, or the opinions and beliefs of the person interacting with the AI tool. This data could potentially be accessed by the developers of the AI tool or by third parties or used unlawfully.
- Data security. There is always a risk that data collected by an AI tool could be lost or stolen, either through a data breach or through cyber-attacks. This could expose personal or sensitive information to unauthorized parties.
- Lack of control. When using an AI tool, individuals have little control over what information is collected and how it is used and shared. This is concerning for those who value their privacy and want to have more control over their personal information.
- Misuse of data. There is a risk that the data collected by the AI tool could be used for purposes other than those for which it was intended. For example, it could be used for targeted advertising or to influence individuals in ways that they may not be aware of.

- Unlawful decision-making about individuals. Some AI tools can be used to make impactful decisions about individuals – for example, whether they may be eligible for a potential employment opportunity or promotion or qualify for public housing or other public services. In an increasing number of jurisdictions, such practices may be prohibited or heavily regulated, particularly if there is no meaningful human oversight of the decisions made and an inbuilt right to contest them.
- Unforeseen consequences. There is always the possibility that AI tools could be used in ways that have unintended consequences for individuals' privacy. For example, it could be used to create fake news or to spread misinformation.

Security best practices

All faculty, staff, and students are expected to adhere to the following security best practices

when using AI tools:

- a. Risk Assessment of AI services: Any AI services provided by a 3rd party need to go through the [Third-Party Security AssessmentLinks to an external site.](#) (TPSA) before being used with Protected or Regulated Data, or integrated with existing Georgia Tech services or systems. Faculty, staff, and students must engage first their unit-level IT before purchasing/licensing AI services. Faculty, staff, and students should also exercise caution when using AI services for personal use: it is important to evaluate the security of any AI tool before using it and check the reputation of the tool developer and any third-party services used by the tool.
- b. Protection of sensitive data: When any information is uploaded into an AI tool, it should be assumed that the information will be viewed by an outside third party. Faculty, staff, and students must not upload or share any data that is personally identifying, confidential, proprietary, or governed by regulation without prior written approval from the Institute Data Steward ([Data Domain contactLinks to an external site.](#)).
- c. Access control: To meet security compliance requirements, faculty, staff, and students must not give Institute access to AI tools (e.g., through API access or other automated integration mechanism) without prior approval from the system/service owner(s) as well as the respective data stewards responsible for the data domain being used ([Data Domain contactLinks to an external site.](#)).
- d. Use of approved and reputable AI tools: Faculty, researchers, staff, and students must only use AI tools and services that have been reviewed and approved by Georgia Tech (See [Regulated Data by ServiceLinks to an external site.](#)) when using PII or Protected or Regulated Data.
- e. Compliance with Institute Policies: Faculty, staff, and students must follow all applicable Institute Policies, guidelines, and best practices, including, without limitation:
 - i. [Georgia Tech Data Privacy PolicyLinks to an external site.](#)
 - ii. [Georgia Tech Personal Information Privacy PolicyLinks to an external site.](#)
 - iii. [Georgia Tech Data Governance and Management PolicyLinks to an external site.](#)
 - iv. [Protected Data practicesLinks to an external site.](#)
- f. Secure transmission: Faculty, staff, and students must use secure networks (such as the Georgia Tech VPN) to encrypt data during transmission to protect against interception or unauthorized access.

Pre- &/or Co-Requisites

Prerequisite: A grade of 'D' or higher in BMED 3600, CHEM 1315 or CHEM 2311, or junior standing.

Collaboration, Group Work, and Use of Generative AI

All work you submit must be your own. Submitting work that is not written by you without proper citation is a violation of the Georgia Tech Academic Honor Code. Suspected violations will be reported to the Dean of Students and may result in grade penalties or additional disciplinary action. You will be asked to acknowledge adherence to the Honor Code on exams and are expected to follow it in all course activities.

Collaboration and cheating are not the same. Collaboration means working together when permitted, while submitting another person's ideas or words as your own—whether from classmates, online sources, or AI tools—constitutes plagiarism. Always cite sources other than the course textbook, lecture slides, and your own notes.

Expectations for Coursework

- **PSS:** completed collaboratively without outside resources
- **Homework:** completed individually (resources allowed unless otherwise stated)
- **Exams:** completed individually without resources

The following are considered violations of academic integrity:

- Using false excuses to delay assessments
- Obtaining assessment information from others
- Copying from another student or allowing others to copy
- Using unauthorized notes, devices, or resources
- Working with others on individual assessments
- Submitting work created by another person or AI tool as your own
- Paraphrasing or copying from sources (including AI) without citation

When in doubt, cite your sources and ask for clarification.

Campus Resources for Students

Help with Academics: In addition to office hours with the instructor and TAs, see <https://bme.gatech.edu/bme/tutoring> for up-to-date information about FOCUS tutoring, PLUS program, and more.

Should you encounter challenges attending class, watching videos, or keeping up with your studies and assignments, please don't hesitate to contact an instructor or TA. The sooner you inform us of any issues or potential challenges, the more effectively we can assist you in finding solutions that enable you to make the most of the semester and enhance your learning experience.

Undergraduate Student Academic Success Resources:

- Academic Support: Academic Success and Advising (a unit in the Office of Undergraduate Education & Student Success) provides free support for your courses. Students can attend scheduled supplemental review (PLUS) sessions, stop by Drop-In Tutoring, or schedule a one-on-one appointment through Knack. To explore what options work best for you, please visit us online at success.gatech.edu/tutoring, email us at tutoring@gatech.edu, or come see us at Clough Undergraduate Learning Commons, Suite 283.
- Academic Resources such as the Communications Center, Language Institute, Library, Catalog, Registrar, resources for conducting research, Advocacy and Conflict Resolution resources, and how to manage unexpected situations that may impact your academic performance;
- Student Resources such as Campus Services, Child Care/Family programs, Health & Wellness, Career Services, and the Student Resource Guide; and
- Professional Development such as the programming from the Career Center and other professional development resources and events”

Student Well-Being:

At Georgia Tech, we are concerned about your overall physical, social, and mental well-being. A comprehensive list of wellness related resources has been compiled and maintained by the Office of the Vice President for Student Engagement and Well-being ([student-resource-guide \(gatech.edu\)](https://student-resource-guide.gatech.edu))