BMED 3310 Syllabus

Biotransport, R/R01, 3 Credits
Summer 2026

Instructor Information

Instructor	Email
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General Course Information

Description

The course introduces students to the fundamentals of momentum, heat, and mass transport and their application to biomedical engineering problems. Students will build upon and apply a breadth of knowledge in all three domains of Biotransport.

Topics include, but are not limited to: hydrostatics, Reynolds transport theorem, Bernoulli's equation, the Navier-Stokes equation, conduction and diffusion, heat and mass convection, heat and mass differential balances.

Course Learning Outcomes

1. Identify, formulate, and solve biomedical problems involving mass, momentum and/or heat transfer (Student Outcome 1)
   a. Formulate differential and/or integral equations that represent the physical situation of biomedical problems involving mass, momentum and/or heat transfer (or combinations thereof) and determine appropriate boundary conditions.
   b. Apply conservation laws of fluid flow to describe the system (pressure drops, velocities, velocity profiles, shear stresses, shear rates) for various geometries, particularly for flow through conduits.
   c. Apply differential and/or integral equations to determine concentrations or temperatures at a particular point or concentration/temperature profiles with and without biochemical reactions, and to determine mass/heat fluxes, respectively.

2. Explain analogies between heat and mass transfer, and employ them to solve biomedical engineering problems (Student Outcomes 1)
   a. Distinguish between modes of heat or mass transfer, explain analogies between heat and mass transfer, and apply the correct equations to describe each mode.
   b. Determine convective mass/heat transfer coefficients using appropriate analogies for the geometric situation.

Required Course Materials

There are no required textbooks or outside resources. All necessary course materials will be available to download from Canvas.

Grading Policy:

Assessment Type	Category Weight
Prerequisite Assessment	5%
Quizzes	35% (7 x 5%)
Exams	50% (2 x 25%)
Attendance and Participation	10% (32 x 0.3125%)
TOTAL	**100%**

The preliminary grading scale to be used when assigning final grades:

>=90% - 100%	A
>=80% - 90%	B
>=70% - 80%	C
>=60% - 70%	D
<60%	F

Based on instructor discretion, this scale may be adjusted. Any adjustment to this scale will be solely for students' benefit. Note that students' final grades will be based only on the components outlined above. Requests from students to be allowed to submit supplemental material before or after the end of term to increase their grades will not be considered.

Description of Graded Components

Diagnostic Prerequisite Assessment: There will be a diagnostic quiz given early in the semester. This assessment will cover knowledge from prerequisite classes that is critical to success in Biotransport.

Quizzes: There will be seven course content quizzes throughout the semester. These will be concept-focused and consume less than half of a class period. Quizzes will be given on Thursdays at the end of PSS.

Exams: There will be two exams — one covering each of the two course segments (Fluid Mechanics and Heat/Mass Transport). Students will have an entire class period to complete each exam. Exams will include more complex and in-depth questions than quizzes. Exams will be given on Thursdays and consume the entire duration of the PSS session. Note that the second exam will be given during our designated final exam period, which will be either the last Thursday or Friday of the course.

Attendance and Participation: see Attendance and Participation below

USG Required Course Policies

Attendance and Participation

Active, routine participation in Lecture and PSS will be expected. You must *attend and engage for the entirety* of 32 class periods (this includes the exam days) to receive full credit. This gives you 8 free absences. Arrival more than 10 minutes after the start of class and departure more than 10 minutes before the end of class will be considered an absence. Excused absences will still count as a free absence. Requests for additional excused absences will be granted at the discretion of the instructors and only if all free absences were excused. Please plan accordingly and reach out to your instructor if necessary. Participation credit is at the discretion of your instructors and TAs — if you are present but not clearly engaged, you may not receive credit for that day.

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.

Additional Georgia Tech Required Policies

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.