



BME 306A: Intro to BME
School of Engineering and Science
Spring 2022

Instructor: Dr. Becky Tucci

Contact Info: Becky.Tucci@stevens.edu

Meeting Times: Tuesdays 5 p.m. – 6:15 p.m.
Thursdays 9:30 a.m. – 10:45 a.m.

Office Hours: Tuesdays 3-4
By appointment

COURSE DESCRIPTION

Biomedical Engineering (BME) is a field in which engineering principles are used to design, test, and produce devices, procedures, and analysis that will aid in improving and delivering healthcare to people. Biomedical Engineers are trained to work at the biochemical (e.g. genetics), cellular, tissue, organs and systems levels of the human. This course provides an introductory overview of the regulation of bodily functions as well as analysis and design applications in areas central to BME such as biomaterials, biomechanics, respiration, tissue engineering, and biorobotics. The course introduces anatomy, physiology, basic engineering analysis and design of instruments and devices as a prelude to the more detailed treatments given in the subsequent courses in the program.

STUDENT LEARNING OUTCOMES

After successful completion of this course, students will be able to...

- Describe how medical devices and tools are used in the clinical setting for the benefit of patients
- Discuss current issues and concepts in biomedical engineering with professionals in the field
- Explain how designing biomedical devices differs from designing devices in other engineering fields
- Work with a team to generate an optimal design for an orthopedic fixation device

COURSE FORMAT AND STRUCTURE

Course Logistics

I invite you to actively participate in lectures and interact with the various lecturers. I strive to present a wide variety of topics within the biomedical engineering field to provide an opportunity to learn about where a career in biomedical engineering may lead. Lecturers are both members of our faculty as well as alumni from industry. The more participation, the more learning and valuable information for educational and personal growth.

I encourage you to ask questions! This is your opportunity to connect with BMEs both in research and in industry. Many networks are available for you to establish and explore for your own educational and career growth.

When assignments are due, they are due by the due date listed on CANVAS.

Deadlines are an unavoidable part of being a professional and this course is no exception. Course requirements must be completed and posted or submitted on or before specified due date and delivery time deadline. Avoid any inclination to procrastinate. To encourage you to stay on schedule, due dates have been established for each assignment; 20% of the total points will be deducted for assignments received 1-6 days late; assignments received more than 1 week late will receive 0 points.

Instructor's Online Hours

I will be available via email and will respond as soon as I am available (generally within 24-48) hours. Please include your name, BME 306, and topic of discussion in your email subject. This will help me tremendously in locating emails quicker when I scan the many emails that make it into my inbox each day.

If you feel a meeting is required, please provide a few timeslots that work for your schedule. I try to make myself available to students during business hours (9AM-5PM) throughout the week and am always open to talking.

Etiquette Guidelines

Your instructors and fellow students wish to foster a safe learning environment. All opinions and experiences, no matter how different or controversial they may be perceived, must be respected in the tolerant spirit of academic discourse. You are encouraged to comment, question, or critique an idea but you are not to attack an individual. Our differences, some of which are outlined in the University's inclusion statement below, will add richness to this learning experience. Please consider that sarcasm and humor can be misconstrued in interactions and generate unintended disruptions. Working as a community of learners, we can build a polite and respectful course ambience. Please read the etiquette rules for this course:

- Do not dominate any discussion. Give other students the opportunity to join in the discussion.
- Do not use offensive language. Present ideas appropriately.
- Avoid using vernacular and/or slang language. This could possibly lead to misinterpretation.
- Keep an open mind and be willing to express even your minority opinion.
- Do not hesitate to ask for feedback.
- Do not ask about specific salaries – this information is personal to each lecturer

TENTATIVE COURSE SCHEDULE

Changes to the course schedule below will be communicated by email through Canvas.

Date	Topic	Lecturer
Week 1	1/18 Introduction to Course	Dr. Tucci
	1/20 Library Information	Vicky Orlofsky
Week 2	1/25 Industry: Medical Device R&D	Jessie Tripi
	1/27 Anatomy: Introduction & Medical Terminology	Dr. Tucci
Week 3	2/1 Industry: Medical Student	Nicole Fosko
	2/3 Anatomy: Brain & Spinal Cord	Dr. Tucci
Week 4	2/8 Industry: Medical Device R&D	Nicole Miller
	2/10 Anatomy: Peripheral Nervous System	Dr. Tucci
Week 5	2/15 Industry: Clinical Engineering - Neuropace	Hannah Timm
	2/17 Anatomy: Integumentary System & Tissues	Dr. Tucci
Week 6	2/22 NO CLASS – Monday Schedule	
	2/24 Anatomy: Musculoskeletal System – Upper Extremity/Trunk	Dr. Tucci
Week 7	3/1 Industry: Upstream Marketing - Stryker	Grace Modderman & Nicole Pappas
	3/3 Anatomy: Musculoskeletal System – Lower Extremity	Dr. Tucci
Week 8	3/8 Industry: Pharmaceuticals	Chris Tucci
	3/10 Anatomy: Cardiovascular System	Dr. Tucci
Week 9	3/15 NO CLASS – SPRING BREAK	
	3/17	
Week 10	3/22 Industry: Medical Device R&D	Cory Zegel
	3/24 Anatomy: Respiratory System	Dr. Tucci
Week 11	3/29 Orthopedic Biomechanics	Dr. Tucci
	3/31 Faculty: Physical Therapy & Engineering	Dr. Tucci
Week 12	4/5 Faculty: Lung Mechanics/Pathophysiology	Dr. Perlman
	4/7 Faculty: Neural Engineering	Dr. McConnell
Week 13	4/12 Faculty: Biomedical Imaging	Dr. S. Wang
	4/14 Faculty: Tissue Engineering	Dr. Yu
Week 14	4/19 Faculty: Biomechanics of Whole-body Rotations	Dr. Zaferiou
	4/21 Faculty: Rehabilitation Engineering	Dr. Nataraj
Week 15	4/26 NO CLASS – work on final	
	4/28 Final presentation due – LAST DAY OF CLASS – VIRTUAL DISCUSSION	
Week 16	5/3 Final presentation peer discussion due	

Schedule and Assignments/Exams subject to change at any time dependent upon lecturer schedules and COVID-19 developments

COURSE MATERIALS

Textbook(s): There is no assigned textbook.

COURSE REQUIREMENTS

Attendance/Participation:

10% of your grade will be attendance/participation. Except for emergency situations, if you will miss class for an excused reason (determined by the instructor), advanced written notice to the instructor is

required by the business day before the class you will miss. If there is a medical reason for you to miss class, you could be asked for documentation. Your participation grade will depend on your attendance.

Each class, you can receive up to 2 points: one point for each time you provide feedback or each question you ask/answer. Without an excused absence, if you are not present in class, you will not be able to earn these participation points.

Homework:

30% of your grade will be homework assignments. A homework assignment will be given each week. Assigned homework will be posted on CANVAS. All assignments must be uploaded to CANVAS by 11:59PM on the posted due date and will be graded. Format of homework assignments include (but are not limited to): multiple choice, short-answer, computations, and group projects.

Exams:

60% of your grade will be based upon the mid-term and final. In preparation for the exams, students are expected to review the homework and lecture slides posted on Canvas. Format includes (but is not limited to): short-answer, multiple-choice, fill-in-the-blank, true/false, reports

GRADING PROCEDURES

Grades will be based on:

- | | |
|------------------------|----------|
| 1. Class Participation | 10% |
| 2. Homework | 30% |
| 3. Exams | 30% each |

TOTAL	100%
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Late Policy:

20% of the total points will be deducted for assignments received 1-6 days late; assignments received more than 1 week late will receive 0 points.

Other Policies:

- No cellphone use is permitted during virtual meetings.

ACADEMIC INTEGRITY

Undergraduate Honor System

Enrollment into the undergraduate class of Stevens Institute of Technology signifies a student's commitment to the Honor System. Accordingly, the provisions of the Stevens Honor System apply to all undergraduate students in coursework and Honor Board proceedings. It is the responsibility of each student to become acquainted with and to uphold the ideals set forth in the Honor System Constitution. More information about the Honor System including the constitution, bylaws, investigative procedures, and the penalty matrix can be found online at <http://web.stevens.edu/honor/> (Links to an external site.)

The following pledge shall be written in full and signed by every student on all submitted work (including, but not limited to, homework, projects, lab reports, code, quizzes and exams) that is assigned by the course instructor. No work shall be graded unless the pledge is written in full and signed.

“I pledge my honor that I have abided by the Stevens Honor System.”

Reporting Honor System Violations

Students who believe a violation of the Honor System has been committed should report it within ten business days of the suspected violation. Students have the option to remain anonymous and can report violations online at www.stevens.edu/honor (Links to an external site.).

EXAM ROOM CONDITIONS

The following procedures apply to quizzes and exams for this course. As the instructor, I reserve the right to modify any conditions set forth below by printing revised Exam Conditions on the quiz or exam.

1. Students may use the following materials during quizzes and/or exams. Any materials that are not mentioned in the list below are not permitted.

Material	Permitted?	
	Yes	No
Handwritten Notes		X
Typed Notes		X
Textbooks		X
Readings		X
Other (specify): CANVAS		X

2. Students are/are not allowed to work with or talk to other students during quizzes and/or exams

LEARNING ACCOMMODATIONS

Stevens Institute of Technology is dedicated to providing appropriate accommodations to students with documented disabilities. The Office of Disability Services (ODS) works with undergraduate and graduate students with learning disabilities, attention deficit-hyperactivity disorders, physical disabilities, sensory impairments, psychiatric disorders, and other such disabilities in order to help students achieve their academic and personal potential. They facilitate equal access to the educational programs and opportunities offered at Stevens and coordinate reasonable accommodations for eligible students. These services are designed to encourage independence and self-advocacy with support from the ODS staff. The ODS staff will facilitate the provision of accommodations on a case-by-case basis.

For more information about Disability Services and the process to receive accommodations, visit <https://www.stevens.edu/office-disability-services> (Links to an external site.). If you have any questions please contact: Phillip Gehman, the Director of Disability Services Coordinator at Stevens Institute of Technology at pgehman@stevens.edu or by phone 201-216-3748.

Disability Services Confidentiality Policy

Student Disability Files are kept separate from academic files and are stored in a secure location within the Office of Disability Services. The Family Educational Rights Privacy Act (FERPA, 20 U.S.C. 1232g; 34CFR, Part 99) regulates disclosure of disability documentation and records maintained by Stevens Disability Services. According to this act, prior written consent by the student is required before our Disability Services office may release disability documentation or records to anyone. An exception is made in unusual circumstances, such as the case of health and safety emergencies.

INCLUSIVITY

Name and Pronoun Usage

As this course includes group work and class discussion, it is vitally important for us to create an educational environment of inclusion and mutual respect. This includes the ability for all students to have their chosen gender pronoun(s) and chosen name affirmed. If the class roster does not align with your name and/or pronouns, please inform the instructor of the necessary changes.

Inclusion Statement

Stevens Institute of Technology believes that diversity and inclusiveness are essential to excellence in academic discourse and innovation. In this class, the perspective of people of all races, ethnicities, gender expressions and gender identities, religions, sexual orientations, disabilities, socioeconomic backgrounds, and nationalities will be respected and viewed as a resource and benefit throughout the semester. Suggestions to further diversify class materials and assignments are encouraged. If any course meetings conflict with your religious events, please do not hesitate to reach out to your instructor to make alternative arrangements.

You are expected to treat your instructor and all other participants in the course with courtesy and respect. Disrespectful conduct and harassing statements will not be tolerated and may result in disciplinary actions.

MENTAL HEALTH RESOURCES

Part of being successful in the classroom involves a focus on your whole self, including your mental health. While you are at Stevens, there are many resources to promote and support mental health. The Office of Counseling and Psychological Services (CAPS) offers free and confidential services to all enrolled students who are struggling to cope with personal issues (e.g., difficulty adjusting to college or trouble managing stress) or psychological difficulties (e.g., anxiety and depression). CAPS is open daily from 9:00 am – 5:00 pm M-F. Evening hours are available by appointment in the Fall / Spring semesters and up-to-date information regarding the availability of evening appointments can be found by visiting www.stevens.edu/CAPS ([Links to an external site.](#)). To schedule an appointment, call 201-216-5177.

Due to the pandemic, in-person appointments may be limited until further notice. Up-to-date information about the availability of in-person services can be found at www.stevens.edu/CAPS ([Links to an external site.](#)). Teletherapy (therapy via secure video platform) is available to registered students physically located in the states of New York or New Jersey. Students located outside of NY / NJ are encouraged to pursue local treatment through their personal health insurance. To learn more about the process of finding a therapist please visit the CAPS webpage on [Seeking Help Off-Campus](#) ([Links to an external site.](#)).

EMERGENCY INFORMATION

In the event of an urgent or emergent concern about the safety of yourself or someone else in the Stevens community, please immediately call the Stevens Campus Police at 201-216-5105 or on their emergency line at 201-216-3911. These phone lines are staffed 24/7, year round. For students who do not reside near the campus and require emergency support, please contact your local emergency response providers at 911 or via your local police precinct. Other 24/7 national resources for students dealing with mental health crises include the National Suicide Prevention Lifeline (1-800-273-8255) and the Crisis Text Line (text “Home” to 741-741). If you are concerned about the wellbeing of another

Stevens student, and the matter is *not* urgent or time sensitive, please email the CARE Team at care@stevens.edu. A member of the CARE Team will respond to your concern as soon as possible.