BMED 4603/8804 Syllabus

Advanced Capstone Design, Section A, 3 Credits
Fall 2026

Instructor Information

CRN	Section	Instructor	Email
TBD	A	Dr. Chris Hermann	chris.hermann@bme.gatech.edu

Office Hours are available to book by appointment with instructor or teaching assistant via email or online booking request.

General Course Information

Description

Georgia Tech BME students develop excellent analytical and process skills while taking a broad range of biomedical-focused classes. BME students, whether planning to enter industry, graduate school or medical school, can benefit from knowledge and experience in the interdependence of design and development processes with the multiple business and regulatory functions essential to biomedical product development. The following considerations are essential components of the BME capstone design courses: clinical or research relevant projects, human factors and ergonomics, economic and societal impacts, regulatory standards and compliance, environmental and sustainability issues, ethical, health and safety issues, and political/legislative influences.

The BME Advanced Capstone Senior Design courses provide student teams with hands-on experience with project planning, prototype refinement, design verification testing, customer discovery, design controls and regulatory pathways for commercialization of medical devices. Additionally, requirements of business functions such as marketing, sales, manufacturing, finance, intellectual property and their effects on the product development process are integrated into lectures, class presentations, projects and reports.

The Advanced Capstone design courses include weekly class presentations and project-based learning experiences. Students are expected to attend classes, actively participate in team meetings and contribute in work to meet milestones for projects and course deliverables in a timely and professional manner. Each student is expected to dedicate at least 5 hours per week (80 hours per semester) outside class time toward meeting project goals and course requirements.

Teams may be reformed based on the specific students who register for 4603/8804. Based on the design solutions proposed in BMED 4602, teams construct and evaluate a functional prototype(s), technical simulations or related proof-of-concept devices. Performance verification testing should be conducted on the prototype(s) based on a written protocol to evaluate the design output against the Engineering Design Specifications. The project and final prototype will be presented in a class poster or oral presentation session. A final team project grant is required at the end of the semester and may take the format of SBIR style grant submission.

Course Learning Outcomes

Upon completion of this course, you should be able to:

- To inform and engage students in understanding the medical and clinical relevance of healthcare product opportunities and problems, the importance of proper definition of user requirements and functional metrics.
- To encourage developing creative solutions that address project parameters and metrics, to refine initial prototypes into working devices testing and to document proper engineering justification for project solutions.

The BMED Advanced Capstone design courses prepare students for future team activities through a project design experience incorporating relevant biomedical and engineering practices, constraints, timelines, deliverables, and professional oral and written communications. Each student is expected to dedicate at least 5 hours per week (80 hours per semester) outside class time toward meeting project goals and course requirements.

Required Course Materials

There are no required course materials for this course.

Grading Policy

Guidelines and rubrics will be provided for all graded assignments.

Disputing Grades: Starting at the time a grade is released, a student has seven (7) calendar days to dispute your grade in writing with your instructor. Any disputes after seven (7) calendar days will not be evaluated.

Final grading will be based on the Georgia Institute of Technology system (A, B, C, D, F). No plus or minuses will be applied to the final grade. Individual course deliverables will receive number grades.

A (100-90)	B (89-80)	C (79-70)	D (69-60)	F (59->)
Exceptional	Proficient	Acceptable	Novice	Failure

Description of Graded Components

Capstone Proposed Design Solution: The Advanced Capstone Design Course culminates in each team creating a functional solution/prototype that addresses the unmet clinical need your team has been working on throughout the course. The final prototype will be assessed according to its creativity, functionality, and its ability to meet user needs and design requirements.

Electronic Notebooks: Each student is required to maintain an up-to-date electronic project notebook to document their work on the project. All communications, meetings, research, and project work should be documented in the student's project notebook on an ongoing basis. Additionally, the lectures will at times contain activities to be performed by students and documented in their project notebook. Students are expected to follow the provided electronic notebook guideline and rubric. There will be three random and unannounced notebook checks for grading.

Studio Engagement and Preparation:

- Each student is expected to come to class prepared for the week's activities.
- Preparation includes having watched the digital material before class and coming to class able to discuss the digital content and prepared questions related to the lecture content.
- All students should be able to discuss the status of the team's project, including achievements in the past week, possible roadblocks and hurdles the team is facing and next steps for the project.
- Students will be assessed individually on engagement and preparation on a weekly basis and these grades will be combined for a final engagement and preparation grade at the end of the semester.

Professionalism: This course aims to introduce students to the professional expectations that come with post-graduation career opportunities, including industry, graduate and/or medical school. The professionalism portion of a student's grade will be assessed three times throughout the semester and will include evaluations of team contribution, conflict management, respect, interpersonal dynamics, general professional behaviors and studio attendance.

- We treat studio attendance and performance as though it is a professional work environment. As such, being late for studio, or not attending (without excused absence) is not tolerated.
- ***Tardiness Penalty:*** One point is deducted for each minute you arrive late or leave unexcused from studio, without reasonable justification and notifying your instructor and TA. By way of example, 75 minutes late, without a valid excuse, results in 75 points dropped from Professionalism. 100 minutes, or missing studio entirely results in zero (0) for Professionalism grade for that grade period, representing a third of a letter grade loss.
- The final professionalism grade will be an average of the three professionalism assessments performed throughout the semester. However, the instructor may amend the final professionalism grade in the event that a student's behavior and contributions positively or negatively impact the performance of the team.

Weekly Updates: Each group is required to update a GANTT chart through Asana.

External Factors: Societal influences, economic and regulatory factors significantly affect the development and adaptation of medical products and the delivery of healthcare. Teams will investigate factors influencing their project and provide reports on prior art and intellectual property, potential societal impact of their proposed solution, and regulatory strategy.

USG Required Course Policies

Attendance and/or Participation

Course Structure: The BMED Advanced Capstone Design course is structured with **weekly in-person, problem-based learning experiences**. Students are expected to attend classes, actively participate in team meetings, and contribute work to meet milestones for projects and course deliverables in a timely and professional manner. Each student is expected to dedicate **at least 5 hours per week** (80 hours per semester) outside class time toward meeting project goals and course requirements.

Studio:

- Students will meet **weekly in person** with their instructor and team in a problem-based learning environment where they will work together on their design project as well as seek advice and guidance on their work effort.
- As described in the Professionalism section above, studio **attendance is mandatory**. As such, being late or not attending (without an excused absence) will not be tolerated.
- Studio sections will held in the BME Design Garden, which is located under the Veterans Resources Center between the Ford Environmental Sciences and Technology (ES&T) building and Molecular Sciences and Technology (MoSE) building

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.

Unauthorized use of any previous semester coursework is prohibited in this course (i.e., Word). Using these materials will be considered a direct violation of academic policy and will be dealt with according to the GT Academic Honor Code.

Core IMPACTS

Not applicable.

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 your instructor as soon as possible in order to set up a time to discuss your learning needs.

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. It is the students' responsibility to proactively discuss this with the instructors. Please also e-mail your instructor as soon as possible in order to set up a time to discuss your learning needs. Students who experience hardships for any number of reasons that interfere with their ability to attend class, meet course expectations, and collaborate with their teams need to receive approval from the Dean of Students office.

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 your instructors and that we have of you. In the end, simple respect for knowledge, hard work, and cordial interactions will help build the environment we seek. Therefore, we encourage you to remain committed to the ideals of Georgia Tech while in this class.

Course Expectations, Policies, and Resources

Pre- &/or Co-Requisites

The following two courses are **pre-requisites** for BMED 4603: **BMED 4602** (Capstone Design).

Collaboration, Group Work, and Use of Generative AI

We recognize that AI, and in particular Generative AI, is transforming all aspects of biomedical engineering and want to encourage design teams to use AI responsibly.

- We want you to learn the engineering design process and be able to communicate this; we do not want to read completely AI-generated text, data, designs, or figures, which will be considered plagiarism. The content that your team produces can use AI as an aid, not as a sole creator.
- Examples of acceptable AI usage include, but are not limited to, general background research, competitive product and patent landscape search, brainstorming, and general writing improvement.
- Transparency is important; all written assignments will require an AI attestation, where each individual will need to clearly state how they leveraged AI in the preparation of the assignment. The AI attestation will not contribute towards your overall word count, so we expect a thorough explanation of how AI was used. If AI is used, links to the full threads must be provided.
- All written assignments must be generated in a digital document that illustrates every addition and change made by each team member.
- All written documents will be analyzed by TurnItIn, the GT AI/plagiarism checker. You will have immediate access to the report when you submit your assignment. Please carefully review this before submission. Any suspected instance of dishonesty will be reported to the Office of Student Integrity.
- **If you have any questions about the appropriate use of AI please ask your TA and/or Instructor prior to submission.**

Extensions, Late Assignments, & Re-Scheduled/Missed Exams

Late Penalty: If an assignment is submitted late, but on the same day as the due date, 10% will be deducted from the assignment grade. After the due date, 20% per day will be deducted from the assignment grade.

Institute-Approved Absences and Religious Observances

The attendance requirements for this course are described above and are in accordance with the Georgia Tech Attendance Policy.

Students who are absent from Studio due to an Institute-approved absence should notify their Instructor and Teaching Assistant by the end of the class meeting immediately following **receipt** of their approval notice (per the Institute policy).

Students who are expected to be absent from Studio due to participation in a particular religious observance must inform their Instructor and Teaching Assistant of the upcoming absence, in writing, within the **first two weeks of class** (per the Institute policy).

Students who are absent from Studio due to an excused absence should work with their Instructor and Teaching Assistant **before** the expected absence to establish reasonable deadlines and/or make-up materials for missed work.

Inclement Weather and Digital Learning Days

In the event of a weather-related event on campus, this course will follow guidance from the Institute and the Office of the Provost. Once a decision regarding campus operations has been made by the Institute, the instructors will contact all students via Canvas about plans for a digital learning day (preferred) or cancelling class.

Campus Resources for Students

Undergraduate Student Academic Success Resources

A list of resources for undergraduate students' academic success and information about advising can be found at Success at Tech.

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).