Pre-requisites: ME/BMED/ChBE/TFE 6776 or permission from the instructors. Basic knowledge of chemistry, materials science and engineering, & biochemistry/cell biology concepts.

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Objectives:  
1. Provide graduate-level foundation on contemporary biomaterial principles.  
2. Discuss concepts of surfaces & interfaces in biomaterial function.  
3. Introduce biomimetic & rational design approaches to biomaterial engineering.  
4. Discuss elements controlling biological responses to materials.  
5. Discuss cellular and molecular aspects of host responses to biomaterials.  
6. Develop critical analyses of biomaterials through grant proposal writing & review.

Readings: Required reading & analysis of research papers & material posted on webpage. Readings form basis of in-class discussions and integral part of class participation.


Web Page: Log in to https://t-square.gatech.edu/portal using GTID.

Exams: Two in-class exams (Feb 26, April 25).

Grant Proposal: Each student is required to submit a NIH-style research proposal (see guidelines in webpage) to address a significant fundamental or device-related biomaterial problem. The proposal must include (i) objective, hypothesis, and specific aims of the proposed research, (ii) a statement of significance and critical review of relevant literature, and (iii) experimental design and methods outlining proposed experiments, including experimental variables and appropriate controls, expected outcomes, and potential problems and alternative solutions. Students are required to submit a proposal topic (1/2 page summary) by February 14 for approval by the instructors. Students are also required to submit the specific aims section (1-1.5 page) by March 7 for scientific and technical feedback from the instructors. Final proposals (4 collated, bound copies) are due in class on April 23.

Study Section: Students will be assigned to one of two study sections (chaired by instructors) that will review grant proposals based on NIH merit criteria (see webpage). For each assigned proposal, students will provide a score and present a critique at the panel discussion session (final exam slot, April 30). Peer- and instructor-reviewed scores will be factored into final grade.

All students are expected to abide by the Georgia Tech Honor Code.

Grading:  
10% Class participation  
40% Exam (20% each)  
5% Specific aims  
35% Grant proposal  
10% Study section score