

Suggested Pre-Course Content for Advanced Seminars

While the only prerequisite for any Advanced Seminar course is that the student must be in their second year or later, students will be more successful in and get more out of each Advanced Seminar course if they have or obtain the suggested pre-course content listed below. This content is highly recommended by the course instructors.

Biomaterials & Regenerative Medicine Advanced Seminar

- At least one of the following engineering courses:
 - o BMED 6720 (Biotransport)
 - o CHBE 6100 (Thermodynamics)
 - o CHBE 6260 (Mass Transfer)
 - o CHBE 6120 (Molecular Modeling)
 - o PTFE/MSE/ME 6768 (Polymer Structure & Properties)
- At least one of the following bioscience courses:
 - o APPH 6211 (Systems Physiology I)
 - o BIOL 6570 (Immunology)
 - o BIOL 7001 (Foundations in Molecular & Cell Biology)
 - o BIOL 7010 (Advanced Cell Biology)
 - o BMED 6042 (Systems Physiology)
 - o BMED/ME 6793 (Systems Pathophysiology)
 - o CHEM 6501 (Biochemistry I)
 - o IBS 514 (Cellular & Developmental Neuroscience)
 - o IBS 526 (Systems Neuroscience)
 - o IBS 555 (Basic Biomedical & Biological Science I)
- An undergraduate or equivalent course in general biomaterials/biologically-inspired materials. If you have not had such a class, it is strongly recommended that you take BMED 4751 (Intro to Biomaterials).

Cardiovascular Biology & Biomechanics Advanced Seminar

At least one bioscience and one bioengineering course listed below:

- IBS 555/556 (Basic Biomedical and Biological Sciences)
- BMED 6042 (Systems Physiology)
- BMED 6743 (Tissue Mechanics)
- ME 3340/4340/6601 (Fluid Mechanics)
- BMED 6720 (Biotransport)
- BMED 6793 (Systems Pathophysiology)

Cellular & Biomolecular Engineering Advanced Seminar

Fundamental knowledge in the following areas:

- Advanced Cell & Molecular Biology
- Thermodynamics
- Mass transport
- Optics
- Molecular Biotechnology (cloning, protein engineering, etc.)

Integrative Biosystems Advanced Seminar

- Strongly suggested:
 - o IBS 555/556 (Basic Biomedical and Biological Sciences)
 - o BMED 7013 (Integrative Core-Computational Problem Solving)
- Other optional classes:
 - o BMED 8823 (Bioinformatics)
 - o BMED 6700 (Biostatistics); of not available, then ISYE 6420
 - o BMED 7413 (Biochemical Systems Analysis)
- Recommended pre-course skills: differential equations and proficiency in Matlab, Mathematica, Python, C/C++

Biomedical Imaging & Optics

Fundamental knowledge in the following areas:

- Imaging modalities, methods, and techniques (PET, SPECT, MRI, X-ray CT, optical)
- Image processing and analysis and/or DSP
- Systems physiology

Neuroengineering Advanced Seminar

Strongly Suggested Bioscience (2 suggested):

IBS 514 - Cellular & Developmental Neuroscience (4 units)

IBS 526 - Systems Neuroscience (7 units)

IBS 555 - Basic Biomedical and Biological Science I

Strongly Suggested Traditional Engineering:

ECE 4270/6250 - Signal Processing

ECE 4551/6550, ME 6401 - Controls

ECE 6435 - Circuits

ECE 7251 - Detection and Estimation

ME 6441/6201/6206/6782 - Mechanics

ME/MSE 6768/6796 - Materials

Strongly Suggested Neuroengineering Courses:

BMED/ECE 6787 - Quantitative Electrophysiology (Bhatti)

BMED 7610 - Quantitative Neuroscience (Stanley)

BMED/ECE 8813 - Information Processing Models in Neural Systems (Rozell)

IBS 534 - Computational Neuroscience (Jaeger)

BMED 8813 - Computational Neuromechanics of Human Movement (Ting)