**BIOMEDICAL SCIENCES (BMSC)**

**Explanation of Course Numbers**
- Courses in the 1000s are primarily introductory undergraduate courses
- Those in the 2000–4000s are for upper-division undergraduate courses that can also be taken for graduate credit with permission and additional work
- Those in the 6000s and 8000s are for master’s, doctoral, and professional-level students
- The 6000s are open to advanced undergraduate students with approval of the instructor and the dean or advising office

**BMSC 8218. Ethics for Translational Sciences. 2 Credits.**
Ethical issues relevant to the design and conduct of translational research, such as data management, human-based research, conflict of interest, and responsible use of animals. Students debate contemporary cases on ethical issues related to translational sciences and write in-depth analyses on ethical issues in human genome research, stem cell research, and clinical research involving children. Prerequisites: permission of instructor. Recommended background: ANAT 6130 (Human Clinical Embryology), ANAT 6160 (Human Clinical Neuroanatomy), ANAT 6181 (Human Gross Anatomy), ANAT 6292 (Projects in Anatomical Sciences), ANAT 6150 (Human Clinical Microscopic Anatomy).

**BMSC 8210. Genes to Cells. 4 Credits.**
Proteins structure and function, introduction to metabolic processes. Structure and function of nucleic acids, organization of the genome, and regulation of protein synthesis and processing. Registration with permission of instructor.

**BMSC 8212. Developmental Cell Biology and Systems Physiology. 4 Credits.**
Structure and functions of cells and tissues, techniques used for the analysis of cell function (image analysis, microscopy). Physiological bases of organ systems and origins of disease. Registration with permission of instructor.

**BMSC 8215. Lab Rotations. 1 Credit.**
For Ph.D. students enrolled in the Institute for Biomedical Sciences. Laboratory training in advanced techniques in biomedical sciences research practices. May be repeated for credit.

**BMSC 8216. Career Skills for the Biomedical Sciences. 1 Credit.**
Scientific writing, presentation skills, and seminar planning. Developing roles in the field: research in varying settings, policy and program planning, grants administration, and the biotechnology issues within intellectual property law. Ethical issues related to the conduct of research, animal use, and human subject participation. The design of a successful grant proposal.

**BMSC 8217. Career Skills for the Biomedical Sciences. 1 Credit.**
Continuation of BMSC 8216. Scientific writing, presentation skills, and seminar planning. Developing roles in the field: research in varying settings, policy and program planning, grants administration, and the biotechnology issues within intellectual property law. Ethical issues related to the conduct of research, animal use, and human subject participation. The design of a successful grant proposal.

**BMSC 8218. Career Skills for the Biomedical Sciences. 1 Credit.**
Continuation of BMSC 8217. Scientific writing, presentation skills, and seminar planning. Developing roles in the field: research in varying settings, policy and program planning, grants administration, and the biotechnology issues within intellectual property law. Ethical issues related to the conduct of research, animal use, and human subject participation. The design of a successful grant proposal.

**BMSC 8230. Molecular Basis of Human Disease. 3 Credits.**
Principles of systems biology in the context of specific diseases. Problem solving at multiple levels of biology, integrating knowledge of DNA, RNA, proteins, cell biology, and tissue physiology. Prerequisite: BMSC 8210, BMSC 8212.

**BMSC 8231. Advanced Proteomics Methods and Applications. 2 Credits.**
Proteomics approaches to specific questions about a biological system. Advanced methods and applications. Prerequisite: BMSC 8230.

**BMSC 8233. Integrative Bioinformatics. 3 Credits.**
Bioinformatics techniques for analysis of macromolecular sequences, structures, gene expression arrays, and proteomics. Systems biology approaches to research problems. Restricted to permission of instructor. Prerequisites: BMSC 8230. Recommended background: undergraduate background in biology, computer sciences, biochemistry, or a related field.

**BMSC 8234. Seminar in Systems Biology. 2 Credits.**
Prerequisite: permission of instructor.

**BMSC 8235. Applied Biostatistics for Basic Research. 2 Credits.**
The handling and interpretation of large data sets, including biological data and genomic data. Restricted to Permission of instructor. Prerequisites: none.

**BMSC 8237. Muscle: Heath and Disease. 2 Credits.**
Genetics, physiology, and signaling in muscle health and disease, including muscle basics, growth, damage and repair, classification of weakness-causing diseases, treatment and research. Restricted to Permission of Instructor. Prerequisites: BMSC 8230. Recommended background: Undergraduate degree in biology, chemistry, biochemistry, or related field.

**BMSC 8998. Readings and Research. 1-12 Credits.**
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit.
BMSC 8999. Dissertation Research. 3-12 Credits.
Limited to Doctor of Philosophy candidates. May be repeated for credit.