

# Biomedical Science

## Director

Prabhat Goswami

**Graduate degrees:** MS in biomedical science; PhD in biomedical science

**Website:** <https://biomed.medicine.uiowa.edu/>

## Courses

- Biomedical Science Courses [p. 1]
- Cancer Biology Courses [p. 1]

## Biomedical Science Courses

### **BMED:5207 Principles of Molecular and Cellular Biology** 3 s.h.

Structure of DNA, RNA, and Protein; DNA replication, genetic and epigenetic regulation; RNA production and processing; protein production and post-translation modification; cellular membranes and trafficking; cytoskeleton and regulation of cell junctions and migration; signal transduction and regulation of cell cycle and apoptosis; didactic lectures and group discussion of primary research publications.

### **BMED:5208 Topics in Principles of Molecular and Cellular Biology** 1 s.h.

Research literature discussion that parallels subjects discussed in BMED:5207. Corequisites: BMED:5207.

### **BMED:7270 Scholarly Integrity/Responsible Conduct of Research I** 0 s.h.

Training in principles of scholarly integrity and the responsible conduct of research; facilitated discussions of case studies; student/mentor responsibilities in pursuit of scholarly work (ownership, authorship, plagiarism/falsification/fabrication of data); student/mentor relationships and intellectual dialogues (communication, collaboration, grievance management); student responsibilities to institution/scholarly community/society (intellectual property, conflict of interest, fiscal responsibilities, protection of human/animal subjects). Requirements: successful completion of CITI online training (greater than 80% score for each module) and enrollment in Graduate College degree-seeking program. Recommendations: minimum first-year graduate standing (PhD, MS/MA), and involvement in mentored research activities (extramurally or intramurally funded).

### **BMED:7271 Scholarly Integrity/Responsible Conduct of Research II** 0 s.h.

Training in principles of scholarly integrity and the responsible conduct of research; facilitated discussions of case studies; student/mentor responsibilities in pursuit of scholarly work (ownership, authorship, plagiarism/falsification/fabrication of data); student/mentor relationships and intellectual dialogues (communication, collaboration, grievance management); student responsibilities to institution/scholarly community/society (intellectual property, conflict of interest, fiscal responsibilities, protection of human/animal subjects). Requirements: successful completion of CITI online training (greater than 80% score for each module) and enrollment in Graduate College degree-seeking program. Recommendations: minimum of first-year graduate standing (PhD, MS/MA) and involvement in mentored research activities (extramurally or intramurally funded).

### **BMED:7604 Scholarly Integrity/Responsible Conduct of Research I** 0 s.h.

Training in principles of scholarly integrity and the responsible conduct of research; facilitated discussions of case studies; student/mentor responsibilities in pursuit of scholarly work (ownership, authorship, plagiarism/falsification/fabrication of data); student/mentor relationships and intellectual dialogues (communication, collaboration, grievance management); student responsibilities to institution/scholarly community/society (intellectual property, conflict of interest, fiscal responsibilities, protection of human/animal subjects); meets responsible conduct of research training obligation for postdocs and faculty holding an NIH K award. Requirements: successful completion of CITI online training (greater than 80% score for each module).

### **BMED:7605 Scholarly Integrity/Responsible Conduct of Research II** 0 s.h.

Training in principles of scholarly integrity and the responsible conduct of research; facilitated discussions of case studies; student/mentor responsibilities in pursuit of scholarly work (ownership, authorship, plagiarism/falsification/fabrication of data); student/mentor relationships and intellectual dialogues (communication, collaboration, grievance management); student responsibilities to institution/scholarly community/society (intellectual property, conflict of interest, fiscal responsibilities, protection of human/animal subjects); meets responsible conduct of research training obligation for postdocs and faculty holding an NIH K award. Requirements: successful completion of CITI online training (greater than 80% score for each module).

### **BMED:7777 Biomedical Science Seminar** 1 s.h.

Foundational professional development in writing and oral presentation skills; presentations from local and visiting professors focusing on career pathways for biomedical scientists; students practice presenting their research in rotation presentations with detailed feedback.

### **BMED:7888 Biomedical Science Research** arr.

Research experience in biomedical science graduate program faculty member's lab; students rotate in three labs during their first year to provide a range of biomedical research experience before choosing a dissertation research mentor.

## Cancer Biology Courses

### **CBIO:3310 Practical Data Science and Bioinformatics** 3 s.h.

Understanding how to access large biological data sets and use them to answer biological questions is an important skill for researchers; immersive introduction to computational handling of data; how to access and analyze publicly available data; critically evaluate data quality and analysis in context of measuring gene expression; basic coding in R/RStudio, plotting and data display, fitting and regression, statistical inference, statistical models, downloading and data wrangling; basic introduction to machine learning (clustering); for students with no computational background. Prerequisites: BIOL:1411 with a minimum grade of C- and BIOL:1412 with a minimum grade of C-. Requirements: college algebra. Recommendations: BMB:3110, or BMB:3120 and BMB:3130, or other upper-level life sciences courses. Same as BMB:3310, MMED:3310.

### **CBIO:5500 Topics in Cancer Biology** 1 s.h.

Discussion and presentation of new scientific literature in cancer biology fields; how to evaluate and critically interpret scientific literature, data, and conclusions; journal club format. Requirements: admission to cancer biology graduate program.

**CBIO:6000 Seminar: Cancer Research** **1 s.h.**

Attendance at seminar presentations of cutting-edge science in the field of cancer biology; presentations by experts in the field and trainees. Requirements: admission to cancer biology graduate program.

**CBIO:6500 Research in Cancer Biology** **arr.**

Research experience through research rotations and conduction of dissertation research in cancer research laboratories. Requirements: admission to cancer biology graduate program.

**CBIO:7000 Clinical Connections** **1 s.h.**

Shadowing experiences arranged with clinicians who are treating cancer patients at University of Iowa Health Care. Requirements: admission to cancer biology graduate program.

**CBIO:7001 Molecular and Cellular Biology of Cancer** **3 s.h.**

Fundamental aspects of oncology at cellular and molecular levels; mechanisms of cancer initiation and progression, oncogene action, DNA damage and repair, carcinogenesis by radiation, chemicals, viruses; tumor immunology, anticancer therapies. Offered spring semesters. Prerequisites: BMED:5207. Requirements: strong basic science background. Same as FRRB:7001, PATH:7001.

**CBIO:7500 Crafting a Scientific Proposal** **1 s.h.**

Training in areas of scientific writing and development of a scientific proposal; students develop a proposal related to, but not identical to, the proposal for the comprehensive exam. Requirements: admission to cancer biology program.