# Biomedical Science

## Director
- Prabhat Goswami

## Graduate degrees:
- MS in biomedical science; PhD in biomedical science

## Website:
https://medicine.uiowa.edu/biomed/

## Courses

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### Biomedical Science Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>BMED:5207</td>
<td>Principles of Molecular and Cellular Biology</td>
<td>3 s.h.</td>
</tr>
<tr>
<td>BMED:5208</td>
<td>Topics in Principles of Molecular and Cellular Biology</td>
<td>1 s.h.</td>
</tr>
<tr>
<td>BMED:7270</td>
<td>Scholarly Integrity/Responsible Conduct of Research I</td>
<td>0 s.h.</td>
</tr>
<tr>
<td>BMED:7271</td>
<td>Scholarly Integrity/Responsible Conduct of Research II</td>
<td>0 s.h.</td>
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### 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.)

### 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 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). Requirements: admission to cancer biology graduate program. Recommendations: BMB:3110, or BMB:3120 and BMB:3130, or other upper-level life sciences courses. Same as BMB:3310, MMED:3310.

### 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). Requirements: admission to cancer biology graduate program. Recommendations: BMB:3110, or BMB:3120 and BMB:3130, or other upper-level life sciences courses. Same as BMB:3310, MMED:3310.

### 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

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<tr>
<td>CBIO:3310</td>
<td>Practical Data Science and Bioinformatics</td>
<td>3 s.h.</td>
</tr>
<tr>
<td>CBIO:5000</td>
<td>Experimental Methodologies</td>
<td>2 s.h.</td>
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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/STUDIO, 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:

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

### CBIO:5000 Experimental Methodologies (2 s.h.)
Practical experience in common laboratory methods including polymerase chain reaction (PCR), western blotting, immunostaining, cell culture, and bioinformatics. Requirements: admission to cancer biology graduate program.
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 Hospitals & Clinics. Requirements: admission to cancer biology graduate program.

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.