

# CELLULAR AND MOLECULAR BIOLOGY, M.S.

## REQUIREMENTS

### MINIMUM GRADUATE SCHOOL REQUIREMENTS

Review the Graduate School minimum academic progress and degree requirements (<http://guide.wisc.edu/graduate/#policiesandrequirements>), in addition to the program requirements listed below.

### MAJOR REQUIREMENTS

#### MODE OF INSTRUCTION

| Face to Face | Evening/<br>Weekend | Online | Hybrid | Accelerated |
|--------------|---------------------|--------|--------|-------------|
| Yes          | No                  | No     | No     | No          |

#### Mode of Instruction Definitions

**Accelerated:** Accelerated programs are offered at a fast pace that condenses the time to completion. Students typically take enough credits aimed at completing the program in a year or two.

**Evening/Weekend:** Courses meet on the UW-Madison campus only in evenings and/or on weekends to accommodate typical business schedules. Students have the advantages of face-to-face courses with the flexibility to keep work and other life commitments.

**Face-to-Face:** Courses typically meet during weekdays on the UW-Madison Campus.

**Hybrid:** These programs combine face-to-face and online learning formats. Contact the program for more specific information.

**Online:** These programs are offered 100% online. Some programs may require an on-campus orientation or residency experience, but the courses will be facilitated in an online format.

### CURRICULAR REQUIREMENTS

#### Requirement Detail

|   |   |
|---|---|
| Minimum Credit Requirement              | 30 credits  |
| Minimum Residence Credit Requirement    | 16 credits  |
| Minimum Graduate Coursework Requirement | 15 credits must be graduate-level coursework. Details can be found in the Graduate School's Minimum Graduate Coursework (50%) policy ( <a href="https://policy.wisc.edu/library/UW-1244">https://policy.wisc.edu/library/UW-1244</a> ). |
| Overall Graduate                        | 3.00 GPA required. This program follows the Graduate School's GPA Requirement policy  |

GPA Requirement (<https://policy.wisc.edu/library/UW-1203>) (<https://policy.wisc.edu/library/UW-1203/>).

Other Grade Requirements n/a

Assessments and Examinations See PhD requirements.

Language Requirements No language requirements.

### REQUIRED COURSES

Eleven credits of coursework, not including 990 research credits, are required to complete the CMB course requirements. One course must be taken from the "core" list of molecular biology courses and one course must be taken from the "core" list of cell biology courses. The remaining credits can come from either the "core" or "elective" list of classes to bring the total number of credits to ten. In addition, one credit must be fulfilled through the required ethics course. All CMB course requirements must be completed by the end of the student's second year, before completing the preliminary exam and obtaining dissertator status.

| Code  | Title  | Credits |
|---|--|---------|
| <b>Course Requirements <sup>1</sup></b>   |  |         |
| <i>Molecular Biology Core</i>   |  | 3       |
| Choose one of the following:  |  |         |
| BIOCHEM/<br>GENETICS/<br>MD GENET 620   | Eukaryotic Molecular Biology                 |         |
| BIOCHEM/<br>GENETICS/<br>MICROBIO 612   | Prokaryotic Molecular Biology                |         |
| ONCOLOGY/<br>PL PATH 640  | General Virology-Multiplication of Viruses   |         |
| <i>Cell Biology Core</i>  |  | 2-3     |
| Choose one of the following:  |  |         |
| BOTANY 860  | Plant Cell Biology                           |         |
| ZOOLOGY/<br>NEURODPT/<br>NTP 765  | Developmental Neuroscience                   |         |
| PATH 750  | Cellular and Molecular Biology/<br>Pathology |         |
| ONCOLOGY 703  | Carcinogenesis and Tumor Cell<br>Biology     |         |
| GENETICS/<br>CRB 710  | Developmental Genetics                       |         |
| GENETICS/<br>BOTANY/M M & I/<br>PL PATH 655   | Biology and Genetics of Fungi                |         |
| <i>Ethics Core</i>  |  | 1       |
| BIOCHEM 729   | Advanced Topics                              |         |
| ONCOLOGY 715  | Ethics in Science                            |         |
| SURG SCI 812  | Research Ethics and Career<br>Development    |         |
| Remaining credits can come from either the core or elective list of classes to bring the total number of credits to eleven. |  |         |
| <i>Elective Courses</i>   |  | 4-5     |

|   |   |
|---|---|
| B M E 510   | Introduction to Tissue Engineering                            |
| B M E 520   | Stem Cell Bioengineering                                      |
| B M E/CBE 783   | Design of Biological Molecules                                |
| B M E/CRB 670   | Biology of Heart Disease and Regeneration                     |
| B M E 545   | Engineering Extracellular Matrices                            |
| B M E 556   | Systems Biology: Mammalian Signaling Networks                 |
| B M I/COMP SCI 576  | Introduction to Bioinformatics                                |
| B M I/STAT 541  | Introduction to Biostatistics                                 |
| B M I/STAT 877  | Statistical Methods for Molecular Biology                     |
| B M I 826   | Special Topics in Biostatistics and Biomedical Informatics    |
| BIOCHEM/B M I/BMOLCHEM/MATH 609   | Mathematical Methods for Systems Biology                      |
| BOTANY/BIOCHEM/GENETICS 840   | Regulatory Mechanisms in Plant Development                    |
| BIOCHEM/BOTANY 621  | Plant Biochemistry  |
| BIOCHEM/CHEM 665  | Biophysical Chemistry   |
| BIOCHEM/NUTR SCI 619  | Advanced Nutrition: Intermediary Metabolism of Macronutrients |
| BIOCHEM/PHMCOL-M/ZOOLOGY 630  | Cellular Signal Transduction Mechanisms                       |
| BIOCHEM 570   | Computational Modeling of Biological Systems                  |
| BIOCHEM 601   | Protein and Enzyme Structure and Function                     |
| BMOLCHEM 675  | Advanced or Special Topics in Biomolecular Chemistry          |
| BOTANY/ENTOM/PL PATH 505  | Plant-Microbe Interactions: Molecular and Ecological Aspects  |
| BOTANY/PL PATH 563  | Phylogenetic Analysis of Molecular Data                       |
| CRB/MEDICINE 701  | Cell Signaling and Human Disease                              |
| CRB 640   | Fundamentals of Stem Cell and Regenerative Biology            |
| CRB 650   | Molecular and Cellular Organogenesis                          |
| F&W ECOL/HORT/STAT 571  | Statistical Methods for Bioscience I                          |
| GENETICS/HORT 550   | Molecular Approaches for Potential Crop Improvement           |
| GENETICS/MD GENET 677   | Advanced Topics in Genetics                                   |
| GENETICS/BIOCHEM 631  | Plant Genetics and Development                                |
| GENETICS 633  | Population Genetics   |
| GENETICS 885  | Advanced Genomic and Proteomic Analysis                       |
| M M & I/PATH-BIO 528  | Immunology  |
| M M & I 740   | Mechanisms of Microbial Pathogenesis                          |
| MICROBIO 657  | Bioinformatics for Microbiologists                            |
| NEURODPT/NTP/PSYCH 611  | Systems Neuroscience  |
| NTP 670   | Stem Cells and the Central Nervous System                     |
| M M & I/PATH-BIO 750  | Host-Parasite Relationships in Vertebrate Viral Disease       |
| MED PHYS 671  | Selected Topics in Medical Physics                            |
| MICROBIO/BMOLCHEM 668   | Microbiology at Atomic Resolution                             |
| MICROBIO 607  | Advanced Microbial Genetics                                   |
| ONCOLOGY 675  | Advanced or Special Topics in Cancer Research                 |
| ONCOLOGY 778  | Bioinformatics for Biologists                                 |
| OPHTHALM 750  | Ocular Diseases of the Mammalian Vision System                |
| PATH 751  | Biology of Aging  |
| PATH 803  | Pathogenesis of Major Human Diseases                          |
| PATH 807  | Immunopathology: The Immune System in Health and Disease      |
| PATH-BIO 675  | Special Topics  |
| ZOOLOGY 604   | Computer-based Gene and Disease/Disorder Research Lab         |
| <b>Research Credits</b>   |   |
| A minimum of 51 credits taken in graduate level courses are required: the 11 above, and the remaining credits can be 990 research credits. 41 |   |
| <b>Total Credits</b> 51-53  |   |
| <b>1</b>  |   |
| EXCEPTION: M.D./Ph.D. students are only required to take 3 credits from the Core Curriculum or the Elective Courses list.                     |   |
| <b>2</b>  |   |
| EXCEPTION: M.D./Ph.D. students are not required to take an ethics course because they received this training in their M.D. courses.           |   |