# Microbiology and Molecular Genetics

# Advising Form 2018-2019

## UVM Overall Requirements

120 course credits and a cumulative GPA above 2.0 are required to graduate.

### UVM Required Courses

**Foundational Writing and Information Literacy:** One required (first-year students).

| **Course** | **Semester and Year Completed** |
| --- | --- |
| ENGS 001 |  |
| or HCOL 085 |  |

**Diversity Requirement:** Two 3-credit University-approved Diversity (D) courses on race and ethnic relations (before graduation).

| **Course** | **Semester and Year Completed** |
| --- | --- |
| Category D1 |  |
| Category D1 or D2 |  |

**Sustainability Requirement:** One 3-credit University Approved Sustainability (SU) Course

| **Course** | **Semester and Year Completed** |
| --- | --- |
|  |  |

## College of Agriculture and Life Sciences (CALS) Requirements

### *Knowledge-based*

#### Physical and Life Sciences

Satisfied by MMG Major Core Requirements

#### Social Sciences (6 credits)

Anthropology, Community Development and Applied Economics, Economics, Geography, History, Political Science, Psychology, Sociology, Women and Gender Studies, HCOL 185 or HCOL 186 (certain sections)

| **Course** | **Semester and Year Completed** |
| --- | --- |
|  |  |
|  |  |
|  |  |

#### Humanities and Fine Arts (6 credits)

Art, Classics, Theater, Music, Philosophy, Religion, Foreign Language, American Sign Language, English/Literature, Poetry, Film, HCOL 185 or HCOL 186 (certain sections)

| **Course** | **Semester and Year Completed** |
| --- | --- |
|  |  |
|  |  |
|  |  |

### *Skills-based:*

#### Oral Communication

CALS 001 or CALS183 or SPCH011: Communication Methods *and* one or more courses in which the student presents a total of three graded oral presentations

| **Course** | **Semester and Year Completed** |
| --- | --- |
|  |  |
|  |  |

#### Written Communication

Foundational Writing and Information Literacy Requirement (see above) *and* one or more courses in which the student writes a total of three graded “process” paper (papers requiring redrafting)

| **Course** | **Semester and Year Completed** |
| --- | --- |
|  |  |
|  |  |

#### Information Technology

| **Course** | **Semester and Year Completed** |
| --- | --- |
| Information Technology: CALS 002 *or* CALS 085 *or* CS 021 |  |

#### Quantitative

Mathematics, Quantitative Skills Application (satisfied by Program Core Requirements) *and* Statistics: STAT 141 *or* STAT 200

| **Course** | **Semester and Year Completed** |
| --- | --- |
| Statistics: STAT 141 *or* STAT 200 |  |

## For Transfer Students:

The University's Transfer sheet, which will arrive with a transferring advisee's folder, will list the course(s) being transferred and whether UVM accepts or rejects the transfer. The course(s) may be acceptable to UVM but not for a particular UVM course, in which case it will be listed with X’s in the number. The MMG Undergraduate Program Director will then decide if this course will replace one of the required or elective courses. If so, it will be noted with a copy to the advisee’s file. It is recommended that transfer students take **CALS183** or **SPCH011** and **CALS085** or **CS021** instead of **CALS 001** and **CALS 002**, respectively. MMG001 will be waived for transfer students.

## Microbiology (MICR) *and* Molecular Genetics (MGEN) Core Requirements:

### Major Requirements – 54 total credits

* **MMG 001** First-Year Colloquium (1 credit)
* **MMG 002 (SU)** Unseen Worlds – Microbes and You (3 credits)
* **BCOR 11 & 12** or **BCOR 21** Exploring Biology (8 or 4 credits)
* **MATH 19 & 20** or **21 & 22** Calculus (6 or 8 credits)
* **CHEM 31 & 32** General Chemistry (8 credits)
* **CHEM 141 & 142** or **143 & 144** Organic Chemistry (8 credits)
* **MMG 101** Microbiology & Infectious Disease (4 credits)
* **MMG 104** Introduction to Recombinant DNA Technology (2 credits)
* **BCOR 101** Genetics (3 credits)
* **BCOR 103** or **MMG196C** Molecular Cell Biology (4 or 3 credits)
* **MMG 205** or **MMG 206** orBiochemistry (3 credits)
* **BIOC 295** or **BIOC 296**
* **STAT 141** or **STAT 200** Statistics (3 credits)
* **MMG 299** Senior Seminar (1 credit)

Note: Although one year of physics (PHYS11/21 and 12/22) is *not* required for MICR and MGEN majors, most graduate, medical, dental, and other post-graduate programs do require this.

### Minimum Upper-Level Requirements for MICR Majors – 18 credits

* **MMG 211** Prokaryotic Molecular Genetics (3 credits)

### 9 credits from these MMG courses:

Note: asterisk (\*) indicates a 300-level courses that can only be taken with permission of course instructor and academic advisor

* **MMG 201** Molecular Cloning Lab (3 credits)
* **MMG 203** Mammalian Cell & Molecular Biology Lab (4 credits)
* **MMG 207** Biochemistry Laboratory (2 credits)
* **MMG 220** Environmental Microbiology (3 credits)
* **MMG 222** Advanced Medical Microbiology (4 credits)
* **MMG 223** Immunology (3 credits)
* **MMG 225** Eukaryotic Virology (3 credits)
* **MMG 230** Advanced Studies in Emerging Infectious Diseases (D2, SU) (3 credits)
* **MMG 232** Methods in Bioinformatics (3 credits)
* **MMG 233** Genetics & Genomics (3 credits)
* **MMG 240** Macromolecular Structures of Proteins & Nucleic Acids (3 credits)
* **MMG 312\*** Eukaryotic Genetics (3 credits)
* **MMG 320\*** Cellular Microbiology (4 credits)
* **MMG 352\*** Protein:Nucleic Acid Interactions (3 credits)

### 6 credits from these additional approved electives:

* **MMG 195,196** Special Topics (Internships; Teaching Assistants) (variable)
* **MMG 197,198** Undergraduate Research (variable)
* **MMG 295,296**  Special Topics (variable)
* **MMG 295,296** Special Topics (Internships; Teaching Assistants) (variable)
* **MMG 297,298** Advanced Undergraduate Research (variable)
* **ASCI 216** Endocrinology (3 credits)
* **BIOL 223** Developmental Biology (3 credits)
* **BIOL 246** Ecological Parasitology (3 credits)
* **BIOL 261** Neurobiology (3 credits)
* **BIOL 263** Genetics of Cell Cycle Regulation (3 credits)
* **BIOL 265** Developmental Molecular Genetics (3 credits)
* **BIOL 275** Human Genetics (3 credits)
* **BIOL 286** Forensic DNA Analysis (3 credits)
* **MLS 255** Clinical Microbiology II (4 credits)
* **MLRS 242** Immunology (3 credits)
* **MLRS 244** Immunology Lab (1 credit)
* **NFS 203/295** Food Microbiology (4/3 credits)
* **PHRM 201** Introduction to Pharmacology (3 credits)
* **PHRM 240** Molecules and Medicine (3 credits)
* **PHRM 272** Toxicology (3 credits)
* **PHRM 290** Topics in Molecular & Cell Pharmacology (3 credits)
* **XXX 200+** 200-level course in Life Sciences (by permission of MMG advisor)

## Minimum Upper-Level Requirements for MGEN Majors – 18 credits

* **MMG 233** Genetics & Genomics (3 credits)

## 9 credits from these MMG courses:

Note: asterisk (\*) indicates a 300-level courses that can only be taken with permission of course instructor and academic advisor

* **MMG 201** Molecular Cloning Lab (3 credits)
* **MMG 203** Mammalian Cell & Molecular Biology Lab (4 credits)
* **MMG 207** Biochemistry Laboratory (2 credits)
* **MMG 211** Prokaryotic Molecular Genetics (3 credits)
* **MMG 220** Environmental Microbiology (3 credits)
* **MMG 222** Advanced Medical Microbiology (4 credits)
* **MMG 223** Immunology (3 credits)
* **MMG 225** Eukaryotic Virology (3 credits)
* **MMG 230** Advanced Studies in Emerging Infectious Diseases (D2, SU) (3 credits)
* **MMG 232** Methods in Bioinformatics (3 credits)
* **MMG 240** Macromolecular Structures of Proteins & Nucleic Acids (3 credits)
* **MMG 312\*** Eukaryotic Genetics (3 credits)
* **MMG 320\*** Cellular Microbiology (4 credits)
* **MMG 352\*** Protein: Nucleic Acid Interactions (3 credits)

### 6 credits from these additional approved electives:

* **MMG 195,196** Special Topics (Internships; Teaching Assistants) (variable)
* **MMG 197,198** Undergraduate Research (variable)
* **MMG 295,296** Special Topics (variable)
* **MMG 295,296** Special Topics (Internships; Teaching Assistants) (variable)
* **MMG 297,298** Advanced Undergraduate Research (variable)
* **ASCI 216** Endocrinology (3 credits)
* **BIOL 223** Developmental Biology (3 credits)
* **BIOL 246** Ecological Parasitology (3 credits)
* **BIOL 261** Neurobiology (3 credits)
* **BIOL 263** Genetics of Cell Cycle Regulation (3 credits)
* **BIOL 265** Developmental Molecular Genetics (3 credits)
* **BIOL 275** Human Genetics (3 credits)
* **BIOL 286** Forensic DNA Analysis (3 credits)
* **MLS 255** Clinical Microbiology II (4 credits)
* **MLRS 242** Immunology (3 credits)
* **MLRS 244** Immunology Lab (1 credit)
* **NFS 203/295** Food Microbiology (4/3 credits)
* **PHRM 201** Introduction to Pharmacology (3 credits)
* **PHRM 240** Molecules and Medicine (3 credits)
* **PHRM 272** Toxicology (3 credits)
* **PHRM 290** Topics in Molecular & Cell Pharmacology (3 credits)
* **XXX 200+** 200-level course in Life Sciences (by permission of MMG advisor)

## MMG COURSE OFFERINGS BY SEMESTER AND YEAR

MMG 001\* First-Year Colloquium Every Fall

MMG 002 (SU)\* Unseen Worlds – Microbes and You Every Fall

MMG 101\* Microbiology and Infectious Disease Every Fall

MMG 104\* Introduction to Recombinant DNA Technology Every Spring

MMG 196C\* Molecular Cell Biology Every Spring

MMG 195 Special Topics (Internships; Teaching Assistants) Every Fall

MMG 196 Special Topics (Internships; Teaching Assistants) Every Spring

MMG 197 Undergraduate Research Every Fall

MMG 198 Undergraduate Research Every Spring

MMG 201 Molecular Cloning Lab Every Fall

MMG 203 Mammalian Cell & Molecular Biology Lab Spring, Odd Years

MMG 205 Biochemistry I Every Fall

MMG 206 Biochemistry II Every Spring

MMG 207 Biochemistry Laboratory & Discussion Every Spring

MMG 211\* Prokaryotic Molecular Genetics Every Fall

MMG 220 Environmental Microbiology Spring, Even Years

MMG 222 Advanced Medical Microbiology Every Spring

MMG 223 Immunology Spring, Odd Years

MMG 225 Eukaryotic Virology Fall, Even Years

MMG 230 (D2, SU) Advanced Studies in Emerging Infectious Diseases Fall, Odd Years

MMG 232 Methods in Bioinformatics Every Spring

MMG 233\* Genetics and Genomics Every Fall

MMG 240 Macromolecular Structures of Proteins & Nucleic Acids Spring, Even Years

MMG 295 Advanced Special Topics Every Fall

MMG 296 Advanced Special Topics Every Spring

MMG 295 Advanced Special Topics (Internships; TAs) Every Fall

MMG 296 Advanced Special Topics (Internships; TAs) Every Spring

MMG 297 Advanced Undergraduate Research Every Fall

MMG 298 Advanced Undergraduate Research Every Spring

##### MMG 299\* Senior Seminar Every Fall and Spring

MMG 312\*\* Eukaryotic Genetics Spring, Odd Years

MMG 320\***\*** Cellular Microbiology Spring, Even Years

MMG 352\*\* Protein: Nucleic Acid Interactions Spring, Even Years

R=Required Courses

\*\*300-level courses can only be taken with permission of course instructor and academic advisor

## DOUBLE MAJORS AND MINORS

* You will need to complete a form to add or change your major (online)

### MICR/MGEN Double Major Requirements:

**12** additional credits beyond the 18 credits required for a single MICR or MGEN major. Only **1** course may be double-counted.

#### Required:

* **MMG 211** Prokaryotic Molecular Genetics
* **MMG 233** Genetics & Genomics

#### First Major:

* 9 credits 200-level MMG courses
* 6 credits MMG electives

#### Second Major:

* 9 credits 200-level MMG courses
* 3 credits MMG electives

### MICR/MGEN or MGEN/MICR Major/Minor Requirements:

**6** additional credits beyond the MICR or MGEN major. **No** courses may be double-counted.

* 6 credits 200-level **MMG** courses

### MICR or MGEN Minor Requirements:

### 15 or 16 additional credits beyond primary major requirements

* **MMG 101** Microbiology & Infectious Disease (4 credits)
* **MMG 104** Introduction to Recombinant DNA Technology (2 credits)
* **BCOR 101** or Genetics (3 credits)

**BCOR 103/MMG 196C** Molecular Cell Biology (4 or 3 credits)

**6** additional credits of 200-level **MMG** courses chosen with the approval of your minor advisor (only 3 credits of MMG195/295 Special Topics courses or MMG 197/198, MMG 297/298 research may apply). NOTE: MLRS 242 (Immunology) cannot be used to satisfy a minor requirement. **No** courses may be double counted between your major and minor.

**The following descriptions are intended only as examples.**

**MICROBIOLOGY (MICR) MAJORS**

FALL SPRING

###### FIRST YEAR

MMG 001 1 credits BCOR 12 4 credits

MMG 002 (SU) 3 credit CHEM 32 4 credits

BCOR 11 4 credits MATH 20 3 credits

CHEM 31 4 credits CALS 002 3 credits

MATH 19 3 credits ENGS 001 3 credits

###### SECOND YEAR

CHEM 141 4 credits CHEM 142 4 credits

MMG 101 4 credits MMG 196C 3 credits

BCOR 101 3 credits MMG 104 2 credits

Elective (Fine Arts) 3 credits Elective (D1) 3 credits

###### STAT 141/200 3 credits

###### THIRD YEAR

BIOC 296 3 credits MMG 206 3 credits

MMG 201 or 225 3 credits MMG 220` 3 credits

Elective (Soc. Sci.) 3 credits MMG 198 3 (var) credits

SPCH 011 3 credits Elective (Soc. Sci.) 3 credits

###### FOURTH YEAR

MMG 211 3 credits MMG 222 4 credits

MMG 230 (D2,SU) 3 credits MMG 198/298 3 (var) credits

Elective (Fine Arts) 3 credits MMG 223 3 credits

MMG 197/297 3 (var) credits MMG 299 1 credit

PHYS 11/21 5 credits (Pre-Med; Pre-Grad) PHYS 12/22 5 credits

If one is interested in pursuing a **medically oriented microbiology career**, consider the following courses: **MMG 230**, **MMG 222, and MLS 255** are absolutely essential. Also, **MMG 197/297 and 198/298, MMG 203**, **MMG223**, **MMG 225,** and **MMG 201** are strongly suggested.

If one is interested in pursuing an **applied microbiology career**, consider the following courses: **MMG 201** and **NFS 203** are absolutely essential. Also, **MMG 203**, **MMG 220, MMG 222, MLS 255**, and **MMG223** are strongly suggested.

If one is interested in pursuing a **general microbiology experience**, consider the following courses: **MMG 201**, **MMG 220, MMG 222, MMG230, MLS 255**, **MMG223,** and **MMG 225** are absolutely essential. Any of the other courses listed would suffice.

**The following descriptions are intended only as examples.**

**MOLECULAR GENETICS MAJORS**

FALL SPRING

###### FIRST YEAR

MMG 001 1 credits BCOR 12 4 credits

MMG 002 (SU) 3 credit CHEM 32 4 credits

BCOR 11 4 credits MATH 20 3 credits

CHEM 31 4 credits CALS 002 3 credits

MATH 19 3 credits ENGS 001 3 credits

###### SECOND YEAR

CHEM 141 4 credits CHEM 142 4 credits

MMG 101 4 credits MMG196C 3 credits

BCOR 101 3 credits MMG 104 2 credits

Elective (Fine Arts) 3 credits Elective (D1) 3 credits

###### SPCH 011 3 credits

###### THIRD YEAR

MMG 205 3 credits MMG 206 3 credits

MMG 201 or 225 3 credits MMG 198 3 (var) credits

Elective (Soc. Sci.) 3 credits MMG 232 3 credits

STAT 141/200 3 credits Elective (D2) 3 credits

Elective (Fine Arts) 3 credits Elective (Soc. Sci.) 3 credits

###### FOURTH YEAR

MMG 233 3 credits MMG 203 4 credits

MMG 197/297 3 (var) credits MMG 198/298 3 (var) credits

PHYS 11/21 5 credits (Pre-Med; Pre-Grad) PHYS 12/22 5 credits

MMG 201 or 225 3 credits MMG 299 1 credit