Microbiology

Department Information

- **Department Location:** 150 Van Es Hall
- **Department Phone:** 701-231-7512
- **Department Web Site:** www.ndsu.edu/microbiology/ (http://www.ndsu.edu/microbiology/)
- **Credential Offered:** B.S.; Minor
- **Sample Program Guide:** catalog.ndsu.edu/programs-study/undergraduate/microbiology/#planofstudytext (http://catalog.ndsu.edu/programs-study/undergraduate/microbiology/#planofstudytext)

Major Requirements

**Major: Microbiology**

**Degree Type:** B.S.

**Minimum Degree Credits to Graduate:** 120

**University Degree Requirements**

1. Satisfactory completion of all requirements of the curriculum in which one is enrolled.
2. Earn a minimum total of 120 credits in approved coursework. Some academic programs exceed this minimum.
3. Satisfactory completion of the general education requirements as specified by the university.
4. A minimum institutional GPA of 2.00 based on work taken at NDSU.
5. At least 36 credits presented for graduation must be in courses numbered 300 or higher.
6. Transfer Students: Must earn a minimum of 60 credits from a baccalaureate-degree granting or professional institution.
   a. Of these 60, at least 36 must be NDSU resident credits as defined in #7.
   b. Within the 36 resident credits, a minimum of 15 must be in courses numbered 300 or higher and 15 credits in the major field of study.
7. At least 36 credits must be NDSU resident credits. Resident credits include credits registered and paid for at NDSU.

For complete information, please refer to the Degree and Graduation Requirements (http://catalog.ndsu.edu/academic-policies/undergraduate-policies/degree-and-graduation/) section of this Bulletin.

**University General Education Requirements**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 110</td>
<td>College Composition I</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 120</td>
<td>College Composition II</td>
<td>3</td>
</tr>
<tr>
<td>COMM 110</td>
<td>Fundamentals of Public Speaking</td>
<td>3</td>
</tr>
</tbody>
</table>

**Total Credits** 39
May be satisfied by completing courses in another General Education category.

General education courses may be used to satisfy requirements for both general education and the major, minor, and program emphases, where applicable. Students should carefully review major requirements to determine if specific courses can also satisfy these general education categories.

- A list of university approved general education courses and administrative policies are available here (http://catalog.ndsu.edu/academic-policies/undergraduate-policies/general-education/#genedcoursestext).

**Major Requirements**

A grade of 'C' or better is required for the microbiology core and elective requirements.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Required Courses for Microbiology Major</strong></td>
<td></td>
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</tr>
<tr>
<td>MICR 350</td>
<td>General Microbiology and General Microbiology Lab</td>
<td>5</td>
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<tr>
<td>&amp; 350L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MICR 352</td>
<td>Critical Skills in Microbiology and Critical Skills in Microbiology Laboratory Research</td>
<td>5</td>
</tr>
<tr>
<td>&amp; 352L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MICR 452</td>
<td>Microbial Ecology</td>
<td>3</td>
</tr>
<tr>
<td>MICR 470</td>
<td>Basic Immunology</td>
<td>3</td>
</tr>
<tr>
<td>MICR 475</td>
<td>Virology</td>
<td>3</td>
</tr>
<tr>
<td>MICR 480</td>
<td>Microbial Physiology</td>
<td>3</td>
</tr>
<tr>
<td>MICR 482</td>
<td>Microbial Genetics</td>
<td>3</td>
</tr>
<tr>
<td>MICR 485</td>
<td>Capstone Experience in Microbiology - Experimental Design (HON 491 can substitute)</td>
<td>1</td>
</tr>
<tr>
<td>or HON 491</td>
<td>Seminar</td>
<td></td>
</tr>
<tr>
<td>MICR 486</td>
<td>Capstone Experience in Microbiology - Research Project (HON 489 can substitute)</td>
<td>2</td>
</tr>
<tr>
<td>or HON 489</td>
<td>Senior Thesis</td>
<td></td>
</tr>
</tbody>
</table>

**Microbiology Electives - Must include at least one laboratory course**

No more than 3 credits may come from courses numbered 371-399 or 491-499 to fulfill this requirement.

- MICR 379 | Study Tour Abroad                                                  |         |
- or MICR 492 | Study Abroad                                                      |         |
- MICR 394 | Individual Study                                                  |         |
- MICR 453 | Food Microbiology                                                  |         |
- MICR 460 | Microbial Pathogenesis                                             |         |
- MICR 463 | Clinical Parasitology                                             |         |
- MICR 481 | Microbial Genomics with Computational Laboratory                   |         |
- MICR 491 | Seminar                                                           |         |
- MICR 493 | Undergraduate Research                                            |         |
- MICR 494 | Individual Study                                                  |         |
- MICR 496 | Field Experience                                                  |         |
- BIOC 483 | Cellular Signal Transduction Processes and Metabolic Regulations  |         |
- BIOC 487 | Molecular Biology of Gene Expression                               |         |
- BIOL 359 | Evolution                                                        |         |
- BIOL 370 | Cell Biology                                                      |         |
- MLS 435 | Hematology                                                        |         |
- PH 474 | Epidemiology                                                      |         |
- PLSC 431 | Intermediate Genetics                                             |         |
- SOIL 351 | Soil Ecology                                                      |         |

**Laboratory Courses - Must include at least one from the following as part of the 12 credits of microbiology electives:**

- BIOC 474 | Methods of Recombinant DNA Technology                            |         |
- MICR 445 | Animal Cell Culture Techniques                                   |         |
- MICR 460L | Microbial Pathogenesis Laboratory                                 |         |
- MICR 471 | Immunology and Serology Laboratory                                |         |

**Related Requirements for the Microbiology Major**

- MICR 189 | Skills for Academic Success                                       | 1       |
PHIL 111  Professional Responsibility and Ethics  3
BIOL 150  General Biology I  4
& 150L  and General Biology I Laboratory
BIOL 151  General Biology II  4
& 151L  and General Biology II Laboratory
CHEM 121  General Chemistry I  4
& 121L  and General Chemistry I Laboratory (May satisfy general education category S)
CHEM 122  General Chemistry II  4
& 122L  and General Chemistry II Laboratory (May satisfy general education category S)
CHEM 341  Organic Chemistry I  4
& 341L  and Organic Chemistry I Laboratory
CHEM 342  Organic Chemistry II  3
BIOC 461  Foundations of Biochemistry and Molecular Biology II  3
BIOC 460  Foundations of Biochemistry and Molecular Biology I  3
PHYS 211  College Physics I  4
& 211L  and College Physics I Laboratory (May satisfy general education category S)
PHYS 212  College Physics II  4
& 212L  and College Physics II Laboratory (or higher (May satisfy general education category S)
PLSC 315  Genetics  4
& 315L  and Genetics Laboratory (May satisfy general education category S)
STAT 330  Introductory Statistics (May satisfy general education category R)  3

Select one of the following or higher level math:  3-4
MATH 105  Trigonometry
MATH 107  Precalculus
MATH 146  Applied Calculus I

Total Credits  91

MICR189 is only required for first-time, first-year students—A first-time, first-year student is defined as a student who has not yet completed a college course as a college student. Students that are not first-time, first-year students that either transfer into the university or change their major are not required to take MICR189.

Degree Requirements and Notes

• A cumulative 2.50 GPA is required for graduation.

Minor Requirements

Minor: Microbiology

Required Credits: 16

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>MICR 350 &amp; 350L</td>
<td>General Microbiology and General Microbiology Lab</td>
<td>5</td>
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</table>

Elective Courses: Select 11 credits from the following:

No more than 3 credits may come from courses numbered 491-499 to fulfill this requirement.

MICR 352  Critical Skills in Microbiology
MICR 379  Study Tour Abroad
MICR 445  Animal Cell Culture Techniques
MICR 452  Microbial Ecology
MICR 453  Food Microbiology
MICR 460  Microbial Pathogenesis
MICR 460L  Microbial Pathogenesis Laboratory
MICR 463  Clinical Parasitology
MICR 470  Basic Immunology
MICR 471  Immunology and Serology Laboratory
<table>
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<tbody>
<tr>
<td>MICR 474</td>
<td>Epidemiology (see SAFE)</td>
</tr>
<tr>
<td>MICR 475</td>
<td>Virology</td>
</tr>
<tr>
<td>MICR 480</td>
<td>Microbial Physiology</td>
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<tr>
<td>MICR 481</td>
<td>Microbial Genomics with Computational Laboratory</td>
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<td>MICR 482</td>
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<tr>
<td>MICR 491</td>
<td>Seminar</td>
</tr>
<tr>
<td>MICR 494</td>
<td>Individual Study</td>
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<tr>
<td>MICR 496</td>
<td>Field Experience</td>
</tr>
<tr>
<td>MICR 499</td>
<td>Special Topics</td>
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</tbody>
</table>

**Total Credits**: 16

### Minor Requirements and Notes

- A minimum of 8 credits must be taken at NDSU.
- Students must earn a 2.50 minimum GPA for the minor with a grade of ‘C’ or better in the courses used to satisfy the minor requirements.