Microbiology (MS)

Degree Requirements

Students may choose from the Microbiology course tracks below to complete coursework within a focus area.

Degrees earned will be distributed as: “Master of Science in Microbiology” without focus area track specifications.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core Courses</td>
<td></td>
<td>11</td>
</tr>
<tr>
<td>MB 601</td>
<td>Seminar</td>
<td></td>
</tr>
<tr>
<td>MB 670</td>
<td>Laboratory Research Methods</td>
<td></td>
</tr>
<tr>
<td>MB 686</td>
<td>Teaching Experience</td>
<td></td>
</tr>
<tr>
<td>MB 590</td>
<td>Topical Problems (Professional Development)</td>
<td></td>
</tr>
<tr>
<td>MB 695</td>
<td>Master's Thesis Research (6 credits minimum)</td>
<td></td>
</tr>
<tr>
<td>Microbiology Courses</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>See &quot;Microbiology Courses&quot; listed below</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Professional Development course</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>&quot;Professional Development Course&quot; is determined in conjunction with the academic committee</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elective Courses</td>
<td></td>
<td>12</td>
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<tr>
<td>See &quot;Elective Courses&quot; listed below</td>
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<tr>
<td>Total Hours</td>
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<td>30</td>
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</tbody>
</table>

Microbiology Courses

The field of Microbiology includes several specialized disciplines such as bacterial physiology, microbial genomics and metagenomics, microbiomes, environmental microbiology, immunology, host-pathogen interactions, molecular genetics and virology. At NC State, M.S. students can take courses that represent, and focus on, the various disciplines of Microbiology. Example courses, fitting into two microbiology “tracks” or focus areas are:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MB 520</td>
<td>Fundamentals of Microbial Cell Biotransformations</td>
<td>2</td>
</tr>
<tr>
<td>MB 555</td>
<td>Microbial Biotechnology</td>
<td>3</td>
</tr>
<tr>
<td>MB 590</td>
<td>Topical Problems</td>
<td>1-3</td>
</tr>
<tr>
<td>MB 505</td>
<td>Food Microbiology</td>
<td>3</td>
</tr>
<tr>
<td>MB 714</td>
<td>Microbial Metabolic Regulation</td>
<td>3</td>
</tr>
<tr>
<td>MB 725</td>
<td>Fermentation Microbiology</td>
<td>3</td>
</tr>
<tr>
<td>MB 758</td>
<td>Microbial Genetics &amp; Genomics</td>
<td>3</td>
</tr>
</tbody>
</table>

Environmental / Industrial Track

- MB 532 Soil Microbiology 4
- MB 532 Soil Microbiology 4
- MB 654 Topical Problems 1-3
- MB 714 Microbial Metabolic Regulation 3
- MB 725 Fermentation Microbiology 3
- MB 758 Microbial Genetics & Genomics 3

Host-Pathogen Interactions Track

- MB 535 Bacterial Pathogenesis 3
- MB 718 Introductory Virology 3
- MB 751 Immunology 3
- BCH 553 Biochemistry of Gene Expression 3
- BCH 705 Molecular Biology Of the Cell 3
- BMA 771/772 Biomatics I 3
- CBS 712 Reproductive Management and Disease in Domestic Animals 1
- ENT 582 Medical and Veterinary Entomology 3
- PP 707 Plant Microbe Interactions 3
- ST 511/512 Statistical Methods For Researchers I 3

Elective Courses

Selection of elective courses is done by the student, in consultation with and approval by the advisory committee.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIT 505</td>
<td>Special Topics</td>
<td>1-6</td>
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<tr>
<td>GN 701</td>
<td>Molecular Genetics</td>
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<td>GN 735</td>
<td>Functional Genomics</td>
<td>3</td>
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<td>GN 850</td>
<td>Professionalism and Ethics</td>
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<td>MB/PP 730</td>
<td>Fungal Genetics and Physiology</td>
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<tr>
<td>MB 610</td>
<td>Special Topics Microbiology</td>
<td>1-6</td>
</tr>
<tr>
<td>MB 620</td>
<td>Special Problems</td>
<td>1-6</td>
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<tr>
<td>MB 601/801</td>
<td>Seminar</td>
<td>1</td>
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<tr>
<td>MB 690/890</td>
<td>Master's Examination</td>
<td>1-9</td>
</tr>
<tr>
<td>MB 695/895</td>
<td>Master's Thesis Research</td>
<td>1-9</td>
</tr>
<tr>
<td>MB/IMM 783</td>
<td>Advanced Immunology</td>
<td>3</td>
</tr>
<tr>
<td>MB 790</td>
<td>Topical Problems (Practical Digital Imaging)</td>
<td>1-3</td>
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</tbody>
</table>

Additional Requirements

- 18 credits must be graded
- All graduate students must maintain a minimum cumulative grade point average of 3.0
- The program is completed upon submission of a thesis and completion of all credit requirements

Faculty

Full Professors

- Prema Arasu
- Rodolphe Barrangou
- Frederick Breidt
- Dennis T. Brown
- Jose Manuel Bruno-Barcena
- Susan B. Carson
- Mari S. Chinn
- Marc A. Cubeta
- Francis De Los Reyes
- Robert R. Dunn
Frederick J. Fuller
Amy Michele Grunden
Hosni Moustafa Hassan
Christine Veronica Hawkes
Shuijin Hu
Michael Hyman
Lee-Ann Jaykus
Sophia Kathariou
Robert M. Kelly
Matthew D. Koci
Scott M. Laster
Hsiao-Ching Liu
John M. Mackenzie Jr.
Eric S. Miller
Ian T. Petty
Barbara Sherry
Siddhartha Thakur
Jeffrey A. Yoder

Nathan Crook
Angela Rose Harris
Manuel Kleiner
Ryan William Paerl
Ilenys Muniz Perez Diaz
Casey Michelle Theriot

Emeritus Faculty
Paul Edward Bishop
James W. Brown
Walter J. Dobrogosz
Gerald Hugh Elkan
Michael Carl Flickinger
Todd Robert Klaenhammer
Wesley Edwin Kloos
Geraldine Luginbuhl
Paul E. Orndorff
Leo W. Parks
Jason C. Shih

Adjunct Faculty
James M. Ligon
Maria Andrea Azcarate Peril
Scott Harold Shore
Daniel van der Lelie

Associate Professors
Nicolas Emile Buchler
Jonathan E. Fogle
Reza A. Ghiladi
Megan E. Jacob
Cristina Lanzas
Jonathan W. Olson
Joshua Glenn Pierce
Frank Scholle
Michael L. Sikes
Robert G. Upchurch
Gavin John Williams

Assistant Professors
Oliver Baars
Benjamin John Callahan
Wei-Chen Chang