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>
<th>Counts towards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core Courses</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>MB 601</td>
<td>Seminar</td>
<td>11</td>
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<tr>
<td>MB 670</td>
<td>Laboratory Research Methods</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MB 686</td>
<td>Teaching Experience</td>
<td></td>
<td></td>
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<tr>
<td>MB 590</td>
<td>Topical Problems (Professional Development)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MB 695</td>
<td>Master's Thesis Research (6 credits minimum)</td>
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</tr>
<tr>
<td>Microbiology Courses</td>
<td>6</td>
<td></td>
<td></td>
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<tr>
<td>See &quot;Microbiology Courses&quot; listed below</td>
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<tr>
<td>Professional Development course</td>
<td>1</td>
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<tr>
<td>&quot;Professional Development Course&quot; is determined in conjunction with the academic committee</td>
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<tr>
<td>Elective Courses</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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</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>
<th>Counts towards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental / Industrial Track</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MB 520</td>
<td>Fundamentals of Microbial Cell Biotransformations:</td>
<td>2</td>
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<tr>
<td>MB 532</td>
<td>Soil Microbiology</td>
<td>4</td>
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<tr>
<td>MB 555</td>
<td>Microbial Biotechnology</td>
<td>3</td>
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<tr>
<td>MB 590</td>
<td>Topical Problems</td>
<td>1-3</td>
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</tr>
<tr>
<td>MB 505</td>
<td>Food Microbiology</td>
<td>3</td>
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</tbody>
</table>

Below are examples of elective courses available:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
<th>Counts towards</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAE 525</td>
<td>Industrial Microbiology and Bioprocessing</td>
<td>3</td>
<td></td>
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<tr>
<td>BCH 553</td>
<td>Biochemistry of Gene Expression</td>
<td>3</td>
<td></td>
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<tr>
<td>BCH 701</td>
<td>Macromolecular Structure</td>
<td>3</td>
<td></td>
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<tr>
<td>BCH 703</td>
<td>Macromolecular Synthesis and Regulation</td>
<td>3</td>
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<tr>
<td>BCH 705</td>
<td>Molecular Biology Of the Cell</td>
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<tr>
<td>BIT 510</td>
<td>Core Technologies in Molecular and Cellular Biology</td>
<td>4</td>
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</table>

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

Host-Pathogen Interactions Track

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
<th>Counts towards</th>
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<tbody>
<tr>
<td>MB 535</td>
<td>Bacterial Pathogenesis</td>
<td>3</td>
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<tr>
<td>MB 718</td>
<td>Introductory Virology</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>MB 751</td>
<td>Immunology</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>BCH 553</td>
<td>Biochemistry of Gene Expression</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>BCH 705</td>
<td>Molecular Biology Of the Cell</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>BMA 771/772</td>
<td>Biomathematics I</td>
<td>3</td>
<td></td>
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<tr>
<td>CBS 712</td>
<td>Reproductive Management and Disease in Domestic Animals</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

ENT 582 | Medical and Veterinary Entomology                  | 3     |                |
PP 707 | Plant Microbe Interactions                          | 3     |                |
ST 511/512 | Statistical Methods For Researchers I              | 3     |                |

Selection of elective courses is done by the student, in consultation with and approval by the advisory committee.
BIT 595  Special Topics  1-6
GN 701  Molecular Genetics  3
GN 735  Functional Genomics  3
GN 850  Professionalism and Ethics  1
MB/PP 730  3
MB 610  Special Topics Microbiology  1-6
MB 620  Special Problems  1-6
MB 601/801  Seminar  1
MB 690/890  Master's Examination  1-9
MB 695/895  Master's Thesis Research  1-9
MB/IMM 783  Advanced Immunology  3
MB 790  Topical Problems (Practical Digital Imaging)  1-3

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

Associate Professors

Nicolas Emile Buchler
Douglas Franklin Call
Jonathan E. Fogle
Reza A. Ghiad.
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
Louis-Marie Bobay
Benjamin John Callahan
Wei-Chen Chang
Mallory Choudoir
Nathan Crook

Kevin Garcia
Angela Rose Harris
Manuel Kleiner
Zhe Lyu
Erin Alison McKenney
Aram Arshak Mikaelyan
Ryan William Paerl
Ilenys Muniz Perez Diaz
William Kevin Petry
Kasie Raymann
Casey Michelle Theriot

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**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

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**Adjunct Faculty**

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