## Applied Mathematics (MS)

### Degree Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
<th>Counts towards</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Required Courses</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>See “Required Courses” listed below</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MA 676</td>
<td>Master's Project (Optional)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>In Depth Courses</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>See “In Depth Course Sequences” listed below</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Total Hours</strong></td>
<td>30</td>
<td></td>
</tr>
</tbody>
</table>

1. At least 18 credits must be MA courses level (500+)
2. Up to 9 credits may be in math related disciplines, determined in conjunction with the academic committee

### Required Courses

Select at least one course from each category below:

#### Continuous Mathematics
- MA 513: Introduction to Complex Variables
- MA 515: Analysis I
- MA 531: Dynamic Systems and Multivariable Control I
- MA 532: Ordinary Differential Equations I
- MA 534: Introduction to Partial Differential Equations
- MA 546: Probability and Stochastic Processes I
- MA 551: Introduction to Topology
- MA 555: Introduction to Manifold Theory

#### Discrete Mathematics
- MA 505: Linear Programming
- MA 520: Linear Algebra
- MA 521: Abstract Algebra I

### In Depth Course Sequences

Select two course sequences or three related courses from the categories below:

#### Analysis Course Sequence
- MA 515: Analysis I
- MA 715: Measure Theory and Integration

#### Linear & Lie Algebra Course Sequence
- MA 520: Linear Algebra
- MA 720: Lie Algebras

#### Abstract Algebra Course Sequence
- MA 521: Abstract Algebra I
- MA 721: Abstract Algebra II

#### Computer Algebra Course Sequence
- MA 522: Computer Algebra
- MA 722: Computer Algebra II

#### Matrix Theory Course Sequence
- MA 523: Linear Transformations and Matrix Theory
- MA 723: Theory of Matrices and Applications
### Combinatorics Course Sequence

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MA 524</td>
<td>Combinatorics I</td>
<td>3</td>
</tr>
<tr>
<td>MA 724</td>
<td>Combinatorics II</td>
<td>3</td>
</tr>
</tbody>
</table>

### Control Course Sequence

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MA 531</td>
<td>Dynamic Systems and Multivariable Control I</td>
<td>3</td>
</tr>
<tr>
<td>MA 731</td>
<td>Dynamic Systems and Multivariable Control II</td>
<td>3</td>
</tr>
</tbody>
</table>

### PDEs Course Sequence

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MA 534</td>
<td>Introduction To Partial Differential Equations</td>
<td>3</td>
</tr>
<tr>
<td>MA 734</td>
<td>Partial Differential Equations</td>
<td>3</td>
</tr>
</tbody>
</table>

### Probability Course Sequence

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MA 546</td>
<td>Probability and Stochastic Processes I</td>
<td>3</td>
</tr>
<tr>
<td>MA 747</td>
<td>Probability and Stochastic Processes II</td>
<td>3</td>
</tr>
</tbody>
</table>

### Topology Course Sequence

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MA 551</td>
<td>Introduction to Topology</td>
<td>3</td>
</tr>
<tr>
<td>MA 753</td>
<td>Algebraic Topology</td>
<td>3</td>
</tr>
</tbody>
</table>

### Differential Geometry Course Sequence

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MA 555</td>
<td>Introduction to Manifold Theory</td>
<td>3</td>
</tr>
<tr>
<td>MA 755</td>
<td>Introduction to Riemannian Geometry</td>
<td>3</td>
</tr>
</tbody>
</table>

### Modeling Course Sequence

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MA 573</td>
<td>Mathematical Modeling of Physical and Biological Processes I</td>
<td>3</td>
</tr>
<tr>
<td>MA 574</td>
<td>Mathematical Modeling of Physical and Biological Processes II</td>
<td>3</td>
</tr>
</tbody>
</table>

### Numerical Analysis Course Sequence

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MA 580</td>
<td>Numerical Analysis I</td>
<td>3</td>
</tr>
</tbody>
</table>

### Other

Three related courses approved in conjunction with the academic committee | 9

### Accelerated Bachelor’s/Master’s Degree Requirements

The Accelerated Bachelor’s/Master’s (ABM) degree program allows exceptional undergraduate students at NC State an opportunity to complete the requirements for both the Bachelor’s and Master’s degrees at an accelerated pace. These undergraduate students may double count up to 12 credits and obtain a non-thesis Master’s degree in the same field within 12 months of completing the Bachelor’s degree, or obtain a thesis-based Master’s degree in the same field within 18 months of completing the Bachelor’s degree.

This degree program also provides an opportunity for the Directors of Graduate Programs (DGPs) at NC State to recruit rising juniors in their major to their graduate programs. However, permission to pursue an ABM degree program does not guarantee admission to the Graduate School. Admission is contingent on meeting eligibility requirements at the time of entering the graduate program.

### Faculty

**Full Professors**

- Bojko Nentchev Bakalov
- Alina Emil Chertock
- Moody Ten-Chao Chu
- Jo-Ann D. Cohen
- Patrick Louis Combettes
- Pierre Alain Gremaud
- Mansoor Abbas Haider
- Hoon Hong
- Ilse Ipsen
- Kazufumi Ito
- Naihuan Jing
- Erich L. Kaltofen
- Carl Timothy Kelley
- Arkady Kheyfets
- Irina Aleksandrovna Kogan
- Rachel Levy
- Zhilin Li
- Xiao-Biao Lin
- Alun L. Lloyd
- Sharon R. Lubkin
Negash G. Medhin
Kailash Chandra Misra
Mette Olufsen
Tao Pang
Nathan P. Reading
Jesus Rodriguez
Michael Shearer
Jack William Silverstein
Ralph Conover Smith
Ernest Lester Sitzinger
Seth M. Sullivant
Agnes Szanto
Hien Trong Tran
Semyon Victor Tsynkov
Dmitry Valerievich Zenkov

Associate Professors
Lorena Viorica Bociu
Min Jeong Kang
Ricky Ini Liu
Larry Keith Norris
David Papp
Arvind Krishna Saibaba
Cynthia Leslie Vinzant

Assistant Professors
Alen Alexanderian
Zixuan Cang
Mohammad Mehdi Farazmand
Kevin Bryant Flores
Laura Colmenarejo Hernando
P. Ivanisvili
Hangjie Ji
C. Jones
Yerkin Kitapbayev

Tye Lidman
Andrew Jason Marion
P. McGrath
Ryan William Murray
Tien Khai Nguyen
A. Papanicolaou
Andrew O'Shea Sageman-Furnas
T. Saksala
Radmila Sazdanovic
Fatma Terzioglu

Adjunct Faculty
Scott Christopher Batson
Jonathan D. Hauenstein
Patricia L. Hersh
John Lavery
Jordan E. Massad
Jessica Loock Matthews
Johnny T. Ottesen

Practice/Research/Teaching Professors
Elisabeth M. M. Brown
L. Castle
Alina Nicoleta Duca
Molly A. Fenn
Bevin Laurel Maultsby
S. Paul
Brenda B. Williams

Emeritus Faculty
John William Bishir
Stephen LaVern Campbell
Richard E. Chandler
H. Charlton
Ethelbert N. Chukwu
Lung-ock Chung
Joseph C. Dunn
Gary Doyle Faulkner
John E. Franke
Ronald O. Fulp
Dennis E. Garoutte
John Richard Griggs
Robert E. Hartwig
Aloysius G. Helminck
Robert H. Martin Jr
Carl Meyer Jr.
Thomas J. Lada
Joe A. Marlin
Larry Keith Norris
L. Page
Sandra Paur
E. Peterson
Mohan Sastri Putcha
N. Rose
Stephen Schecter
Jeffrey Scott Scroggs
James Francis Selgrade
C. Siewert
Robert Silber
Michael F. Singer
R. White