MATHEMATICAL SCIENCE (MSCI)

Department of Mathematics and Statistics, College of Engineering and Physical Sciences

Major (Honours Program)

Knowledge of Mathematics and Statistics is crucial for understanding our world. This unique program provides a core of both mathematics and statistics with a choice of a Mathematics stream or a Statistics stream. This major also requires the completion of an area of emphasis as listed. Students are encouraged to speak with a Program Counsellor when choosing courses for the selected stream and area of emphasis.

Students may enter this major in Semester 1 or any semester thereafter. A student wishing to declare the major must consult the Faculty Advisor.

A total of 20.00 credits is required to complete the Major which includes at least 10.00 credits in Mathematics & Statistics, 0.50 credits in Computing and Information Science, and an additional 2.50 credits in an area of emphasis. Students are required to complete 2.00 Mathematics and/or Statistics credits at the 4000 level and an additional 3.00 Mathematics and/or Statistics credits must be at the 3000 or 4000 level.

Note: A major in Mathematical Science cannot be combined with a minor in Mathematical Science, Mathematics, or Statistics.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Semester 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATH*1160</td>
<td>Linear Algebra I</td>
<td>0.50</td>
</tr>
<tr>
<td>MATH*1200</td>
<td>Calculus I</td>
<td>0.50</td>
</tr>
<tr>
<td>1.50 credits selected from the College of Arts and the College of Social and Applied Human Sciences</td>
<td>1.50</td>
<td></td>
</tr>
<tr>
<td>Semester 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATH*1210</td>
<td>Calculus II</td>
<td>0.50</td>
</tr>
<tr>
<td>STAT*2040</td>
<td>Statistics I</td>
<td>0.50</td>
</tr>
<tr>
<td>1.50 electives</td>
<td></td>
<td>1.50</td>
</tr>
<tr>
<td>Semester 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CIS*1300</td>
<td>Programming</td>
<td>0.50</td>
</tr>
<tr>
<td>or CIS*1500</td>
<td>Introduction to Programming</td>
<td></td>
</tr>
<tr>
<td>MATH*2200</td>
<td>Advanced Calculus I</td>
<td>0.50</td>
</tr>
<tr>
<td>STAT*3100</td>
<td>Introductory Mathematical Statistics I</td>
<td>0.50</td>
</tr>
<tr>
<td>1.00 electives or restricted electives</td>
<td></td>
<td>1.00</td>
</tr>
<tr>
<td>Semester 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATH*2130</td>
<td>Numerical Methods</td>
<td>0.50</td>
</tr>
<tr>
<td>STAT*2050</td>
<td>Statistics II</td>
<td>0.50</td>
</tr>
<tr>
<td>1.50 electives or restricted electives</td>
<td></td>
<td>1.50</td>
</tr>
<tr>
<td>Semester 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.50 electives or restricted electives</td>
<td></td>
<td>2.50</td>
</tr>
<tr>
<td>Semester 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.50 electives or restricted electives</td>
<td></td>
<td>2.50</td>
</tr>
<tr>
<td>Semester 7</td>
<td></td>
<td></td>
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<tr>
<td>2.50 electives or restricted electives</td>
<td></td>
<td>2.50</td>
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<tr>
<td>Semester 8</td>
<td></td>
<td></td>
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</tbody>
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<tr>
<th>Code</th>
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</thead>
<tbody>
<tr>
<td>MATH*4440</td>
<td>Case Studies in Mathematics and Statistics</td>
<td>0.50</td>
</tr>
<tr>
<td>2.00 electives or restricted electives</td>
<td></td>
<td>2.00</td>
</tr>
<tr>
<td>1 MATH*1080</td>
<td>Elements of Calculus I or IPS<em>1500 Integrated Mathematics and Physics I can be taken in place of MATH</em>1200 Calculus I</td>
<td></td>
</tr>
<tr>
<td>2 These courses should be chosen from the list of Semester 1 requirements as listed in the Program Regulations for the BA.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 MATH*1090</td>
<td>Elements of Calculus II or IPS<em>1510 Integrated Mathematics and Physics II can be taken in place of MATH</em>1210 Calculus II</td>
<td></td>
</tr>
<tr>
<td>4 Students are reminded that they must meet the BA distribution requirements of 1.50 credits in the humanities and 1.50 credits in the social sciences. PHIL*2110 Formal Logic is recommended.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 CIS*2500</td>
<td>Intermediate Programming is recommended</td>
<td></td>
</tr>
</tbody>
</table>

Students are required to complete 5.50 credits from either the Mathematics Stream or the Statistics Stream as follows:

Mathematics Stream

<table>
<thead>
<tr>
<th>Code</th>
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</tr>
</thead>
<tbody>
<tr>
<td>MATH*2000</td>
<td>Proofs, Sets, and Numbers</td>
<td>0.50</td>
</tr>
<tr>
<td>MATH*2210</td>
<td>Advanced Calculus II</td>
<td>0.50</td>
</tr>
<tr>
<td>MATH*2270</td>
<td>Applied Differential Equations</td>
<td>0.50</td>
</tr>
<tr>
<td>MATH*3160</td>
<td>Linear Algebra II</td>
<td>0.50</td>
</tr>
<tr>
<td>MATH*3200</td>
<td>Real Analysis</td>
<td>0.50</td>
</tr>
<tr>
<td>3.00 additional credits in MATH or STAT at 3000 level or above of which at least 1.50 credits must be MATH at the 4000 level</td>
<td>3.00</td>
<td></td>
</tr>
</tbody>
</table>

Statistics Stream

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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</tr>
</thead>
<tbody>
<tr>
<td>STAT*3110</td>
<td>Introductory Mathematical Statistics II</td>
<td>0.50</td>
</tr>
<tr>
<td>STAT*3240</td>
<td>Applied Regression Analysis</td>
<td>0.50</td>
</tr>
<tr>
<td>0.50 additional credits in MATH at 2000 level or above</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.00 additional credits in MATH or STAT at 2000 level or above</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>3.00 additional credits in MATH or STAT at 3000 level or above of which at least 1.50 credits must be STAT at the 4000 level</td>
<td>3.00</td>
<td></td>
</tr>
</tbody>
</table>

Areas of Emphasis

Students are required to complete 2.50 credits from one of the following Areas of Emphasis:

Each Area of Emphasis is 2.50 credits from a single field of study.

Computer Science (CS)*

The following credits must be taken:

<table>
<thead>
<tr>
<th>Code</th>
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</tr>
</thead>
<tbody>
<tr>
<td>CIS*2430</td>
<td>Object Oriented Programming</td>
<td>0.50</td>
</tr>
<tr>
<td>CIS*2500</td>
<td>Intermediate Programming</td>
<td>0.50</td>
</tr>
<tr>
<td>CIS*2520</td>
<td>Data Structures</td>
<td>0.50</td>
</tr>
</tbody>
</table>

Select at least 1.00 credits from the following:
CIS*3110 Operating Systems I 0.50
CIS*3190 Software for Legacy Systems 0.50
CIS*3490 The Analysis and Design of Computer Algorithms 0.50
CIS*3530 Data Base Systems and Concepts 0.50

* Students are reminded that they must meet the BA requirement that at least 7.00 credits must be at the 3000 level of above.

Note: CIS*2750 Software Systems Development and Integration is recommended in addition to the Area of Emphasis requirements for students interested in Computer Science.

Economics (ECON) *

The following credits must be taken:

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>ECON*1050</td>
<td>Introductory Microeconomics</td>
<td>0.50</td>
</tr>
<tr>
<td>ECON*1100</td>
<td>Introductory Macroeconomics</td>
<td>0.50</td>
</tr>
<tr>
<td>ECON*2310</td>
<td>Intermediate Microeconomics</td>
<td>0.50</td>
</tr>
</tbody>
</table>

Select at least 1.00 credits from the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON*3100</td>
<td>Game Theory</td>
<td>0.50</td>
</tr>
<tr>
<td>ECON*3710</td>
<td>Advanced Microeconomics</td>
<td>0.50</td>
</tr>
<tr>
<td>ECON*4710</td>
<td>Advanced Topics in Microeconomics</td>
<td>0.50</td>
</tr>
</tbody>
</table>

* Students are reminded that they must meet the BA requirement that at least 7.00 credits must be at the 3000 level of above.

Individualized (IND) *

It is required that 2.50 credits are taken from humanities and social science electives where 1.00 credits must be at the 3000 level or above.

Students declaring an Individualized Area of Emphasis must have their choice of 2.50 credits approved by an academic advisor.

* Students are reminded that they must meet the BA requirement that at least 7.00 credits must be at the 3000 level of above.