Modeling and Simulation, MS

Program Coordinator: Mikel D. Petty, Director, Center for Modeling Simulation and Analysis

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301 Sparkman Drive, Huntsville, AL 35899
Ph: 256.824.4368

Degrees

Master of Science

Mission

The Modeling and Simulation (M&S) Graduate Program is an interdisciplinary program of the University of Alabama in Huntsville committed to research in and advancement of this rapidly expanding field. The program’s focus is on graduate level education leading to the Master of Science and Doctor of Philosophy degrees.

M&S has become increasingly important in the modern technological world, with nearly all aspects of engineering and the physical sciences making use of, or depending on, M&S. Additionally, use of M&S has steadily increased in economics, politics, and the social sciences. M&S is not a singular area of study but has rather emerged as a distinct, cross-cutting, inter-disciplinary academic discipline. As an inter-disciplinary program, the majority of the courses associated with the M&S degree program will come from existing University of Alabama in Huntsville programs. Students seeking M&S degrees will primarily be taking courses offered by the Industrial and Systems Engineering and Engineering Management, Computer Science, Physics, Mathematics, and Psychology departments.

The objectives of the M&S degree programs are to prepare graduates to make significant contributions in:

1. M&S practitioner positions in industrial and government organizations.
2. Research staff positions in industry, government, and research laboratories focused on M&S.
3. Teaching and research careers at academic institutions.
4. Expanding the university’s research activities in M&S.

Distance Learning

Courses in both the Master of Science and Doctor of Philosophy programs in Modeling & Simulation are available as part of the UAH Distance Learning (DL) program. The UAH DL program provides course access over high speed internet or via mailed CDs. All registered DL students are welcome to attend the live class when possible.

Master of Science in Modeling and Simulation

The Master of Science in Modeling and Simulation (M&S) program prepares students for careers as simulation professionals in government and industry, teachers of modeling and simulation at the high school or junior college level, and advanced graduate studies in modeling and simulation or related disciplines. The program of study includes a required set of core courses addressing M&S fundamentals and a set of approved elective courses facilitating a more detailed study of M&S fundamentals or addressing applications areas for M&S.

Admission Requirements

Admission to the Master of Science program in M&S conforms to those of the School of Graduate for master’s degrees. Additional requirements include:

1. A Bachelor’s degree in computer science, engineering, mathematics, or the physical or life sciences. Applicants with other than the above degrees may still be admitted and may be required to complete additional coursework as determined by the admissions committee.
2. A minimum grade-point-average in undergraduate course work of 3.0/4.0 is required of most students. A student having a grade-point-average less than 3.0/4.0 and with evidence of a high level of professional capability may be eligible for admission upon submission of a petition to the graduate program coordinator.
3. A minimum total score of 1000 on the verbal plus quantitative portions of the Graduate Record Examination (GRE) and a minimum score of 3.0 on the analytical writing portion.
4. Applicants are expected to have the following foundation knowledge for admission to the M.S. Program in Modeling and Simulation:
   a. Mathematics fundamentals including differential and integral calculus, probability and statistics, and elementary differential equations.
   b. Computer Science fundamentals including the algorithmic approach to problem solving, proficiency in an object-oriented programming language such as C++ or Java, and familiarity with standard data structures.

Students who do not meet the above requirements may petition the School of Graduate Studies and the Program Coordinator for conditional admission.
Degree Requirements

Two options are available for the master's degree:

- The thesis option requires completion of 24 semester hours of course work and 6 semester hours of thesis research, for a total of 30 semester hours.
- The non-thesis option requires completion of 33 semester hours of course work and a final comprehensive examination.

The School of Graduate Studies policies on transfer courses and degree timelines apply.

Plan I - Thesis Option

<table>
<thead>
<tr>
<th>Required Core Courses</th>
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<tbody>
<tr>
<td>MOD 501 SVY MODELING &amp; SIMULATION</td>
<td>3</td>
</tr>
<tr>
<td>MA 565 INTERM MATH MODELING</td>
<td>3</td>
</tr>
<tr>
<td>ISE 690 STATISTICAL METHODS FOR ENGR</td>
<td>3</td>
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</tbody>
</table>

Plan I - Thesis Option

<table>
<thead>
<tr>
<th>Electives</th>
<th>6</th>
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</thead>
<tbody>
<tr>
<td>CS 545 INTRO COMPUTER GRAPHICS</td>
<td>3</td>
</tr>
<tr>
<td>ISE 547 INTRO TO SYSTEMS SIMULATION</td>
<td>3</td>
</tr>
<tr>
<td>ISE 627 ENGINEERING SYSTEMS</td>
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Plan I - Thesis Option

<table>
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<tr>
<th>Electives</th>
<th>6</th>
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</thead>
<tbody>
<tr>
<td>MOD 699 MASTER'S THESIS</td>
<td>6</td>
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</tbody>
</table>

Total Semester Hours 30

1 Approved electives to complement intended thesis research

Plan II - Non-Thesis Option

<table>
<thead>
<tr>
<th>Required Core Courses</th>
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<tbody>
<tr>
<td>MOD 501 SVY MODELING &amp; SIMULATION</td>
<td>3</td>
</tr>
<tr>
<td>MA 565 INTERM MATH MODELING</td>
<td>3</td>
</tr>
<tr>
<td>ISE 690 STATISTICAL METHODS FOR ENGR</td>
<td>3</td>
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Plan II - Non-Thesis Option

<table>
<thead>
<tr>
<th>Electives</th>
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</thead>
<tbody>
<tr>
<td>CS 545 INTRO COMPUTER GRAPHICS</td>
<td>3</td>
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<tr>
<td>CS 630 ARTIFICIAL INTELLIGENCE I</td>
<td>3</td>
</tr>
<tr>
<td>ISE 547 INTRO TO SYSTEMS SIMULATION</td>
<td>3</td>
</tr>
<tr>
<td>or CS 581 MODELING &amp; SIMULATION I</td>
<td>3</td>
</tr>
<tr>
<td>ISE 627 ENGINEERING SYSTEMS</td>
<td>3</td>
</tr>
<tr>
<td>or CS 650 SOFT'W ENGINEERING PROC</td>
<td>12</td>
</tr>
</tbody>
</table>

Total Semester Hours 33

1 Approved electives to add depth to core courses or to investigate one or more application areas for modeling and simulation

The Master of Science in Modeling and Simulation is also available through UAH's Distance Learning program. For additional information contact the Distance Learning Office at 256.824.6976.