MASTER OF SCIENCE IN SPACE STUDIES (MSSPS) DEGREE

Program Learning Outcomes for the MSSpS Degree

Upon completing the MSSpS Degree, students will be able to:

1. Achieve advanced science, engineering, and computational skills and a broad understanding of the methodologies applied in the space industry.
2. Gain real life experience in solving technical problems in a science and technology environment.
3. Develop business and communication skills to bridge the gap between science and business.

Requirements for the MSSpS Degree

The MSSpS degree is a non-thesis master's degree. For general university requirements, please see Non-Thesis Master’s Degrees (https://ga.rice.edu/graduate-students/academic-policies-procedures/regulations-procedures-non-thesis-masters-degrees/). For additional requirements, regulations, and procedures for all graduate programs, please see All Graduate Students (https://ga.rice.edu/graduate-students/academic-policies-procedures/regulations-procedures-all-degrees/).

Students pursuing the MSSpS degree must complete:

- A minimum of 15 courses (minimum of 39 credit hours) to satisfy degree requirements.
- A minimum of 30 credit hours of graduate-level study (graduate semester credit hours, coursework at the 500-level or above).
- A minimum of 24 graduate semester credit hours must be taken at Rice University.
- A minimum of 24 graduate semester credit hours must be taken in standard or traditional courses (with a course type of lecture, seminar, laboratory, lecture/laboratory).
- A minimum residency enrollment of one fall or spring semester of part-time graduate study at Rice University.
- A maximum of 2 courses (6 graduate semester credit hours) from transfer credit. For additional departmental guidelines regarding transfer credit, see the Policies (p. 2) tab.
- A 3-6 month internship. Instead of a thesis, at the conclusion of their internship, students must present their internship project in both oral and written form as part of the Professional Master's Project (NSCI 512). Part-time students who already work in their area of study may request approval to fulfill the internship requirement by working on a specific, pre-approved project with their current employer.
- A minimum overall GPA of 2.67 or higher in all Rice coursework.
- A minimum program GPA of 2.67 or higher in all Rice coursework that satisfies requirements for the non-thesis master's degree.

Note: Some of the listed courses are not offered every year, and some may also have prerequisites or require instructor permission.

The courses listed below satisfy the requirements for this degree program. In certain instances, courses not on this official list may be substituted upon approval of the program's academic advisor, or where applicable, the department or program's Director of Graduate Studies. Course substitutions must be formally applied and entered into Degree Works by the department or program's Official Certifier (https://registrar.rice.edu/facstaff/degreeworks/officialcertifier/). Additionally, these must be approved by the Office of Graduate and Postdoctoral Studies. Students and their academic advisors should identify and clearly document the courses to be taken.

### Summary

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Total Credit Hours Required for the MSSpS Degree</td>
<td>39</td>
</tr>
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</table>

### Degree Requirements

#### Core Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>ASTR 570</td>
<td>SOLAR SYSTEM PHYSICS</td>
<td>3</td>
</tr>
<tr>
<td>MECH 578</td>
<td>ORBITAL MECHANICS AND MISSION DESIGN</td>
<td>3</td>
</tr>
<tr>
<td>STAT 605</td>
<td>R FOR DATA SCIENCE</td>
<td>3</td>
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</table>

#### Core Science and Engineering Courses

Select 2 courses (minimum of 6 hours) from the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASTR 554</td>
<td>ASTROPHYSICS OF THE SUN</td>
<td>3</td>
</tr>
<tr>
<td>BIOS 524</td>
<td>MICROBIOLOGY AND BIOTECHNOLOGY</td>
<td>3</td>
</tr>
</tbody>
</table>

#### Core Statistics/Computation Courses

Select 1 course (minimum of 3 credit hours) from the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>CAAM 550</td>
<td>NUMERICAL ANALYSIS I</td>
<td>3</td>
</tr>
<tr>
<td>CEVE 528</td>
<td>ENGINEERING ECONOMICS</td>
<td>3</td>
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</tbody>
</table>

#### Core Technical Courses

Select 1 course (minimum of 3 credit hours) from the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MECH 554 / BIO 554 / CEVE 554</td>
<td>COMPUTATIONAL FLUID MECHANICS</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 517</td>
<td>COMPUTATIONAL PHYSICS</td>
<td>3</td>
</tr>
</tbody>
</table>

#### Degree Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>DSCI 535</td>
<td>APPLIED MACHINE LEARNING AND DATA SCIENCE PROJECTS</td>
<td>3</td>
</tr>
<tr>
<td>EEPS 586</td>
<td>DATA SCIENCE METHODS AND DATA MANAGEMENT</td>
<td>3</td>
</tr>
<tr>
<td>EEPS 636</td>
<td>GIS FOR SCIENTISTS AND ENGINEERS</td>
<td>3</td>
</tr>
<tr>
<td>MECH 554 / BIO 554 / CEVE 554</td>
<td>COMPUTATIONAL FLUID MECHANICS</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 517</td>
<td>COMPUTATIONAL PHYSICS</td>
<td>3</td>
</tr>
<tr>
<td>STAT 502 / COMP 502 / ELEC 502</td>
<td>NEURAL MACHINE LEARNING I</td>
<td>3</td>
</tr>
</tbody>
</table>

#### Cohort Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>NSCI 501</td>
<td>PROFESSIONAL MASTER'S SEMINAR</td>
<td>1</td>
</tr>
<tr>
<td>NSCI 502</td>
<td>SPACE STUDIES SEMINAR</td>
<td>1</td>
</tr>
<tr>
<td>NSCI 511</td>
<td>SCIENCE POLICY, AND ETHICS</td>
<td>3</td>
</tr>
<tr>
<td>NSCI 512</td>
<td>PROFESSIONAL MASTER'S PROJECT</td>
<td>1</td>
</tr>
</tbody>
</table>
NSCI 515  FOUNDATIONS OF PROJECT AND PROGRAM MANAGEMENT  3
NSCI 610 / ENGI 610  MANAGEMENT FOR SCIENCE AND ENGINEERING  3

Three to Six Month Internship
A three to six month internship is required.

Elective Requirements
Select a minimum of 3 courses (minimum of 9 credit hours) from 1 of the following areas, depending on the student’s individual interests and career goals:

Engineering
CEVE 504  ATMOSPHERIC PARTICULATE MATTER
CEVE 511  ATMOSPHERIC CHEMISTRY AND CLIMATE
CEVE 576 / MECH 576  STRUCTURAL DYNAMIC SYSTEMS
COMP 598 / ELEC 598 / MECH 598  INTRODUCTION TO ROBOTICS
ENGI 515  LEADING TEAMS AND INNOVATION
ENGI 614  LEARNING HOW TO INNOVATE?
MECH 554 / BIOE 554 / CEVE 554  COMPUTATIONAL FLUID MECHANICS
MECH 574  TURBULENCE
MECH 578  ORBITAL MECHANICS AND MISSION DESIGN
MECH 579  LAUNCH VEHICLE AND SPACECRAFT DESIGN
MECH 590  AEROSPACE PROPULSION
MECH 591  GAS DYNAMICS
MECH 592  DESIGN FOR AEROSPACE ENVIRONMENTS
MECH 594  INTRODUCTION TO AERONAUTICS
MECH 596  INTRODUCTION TO FLIGHT MECHANICS
MECH 691  INTRODUCTION TO HYPERSONIC AERODYNAMICS

Sciences (Astro Science/Earth Science/Life Sciences)
ASTR 542  NEBULAR ASTROPHYSICS
ASTR 554  ASTROPHYSICS OF THE SUN
ASTR 555  PROTOSTARS AND PLANETS
ASTR 565  COMPACT OBJECTS
BIOS 524  MICROBIOLOGY AND BIOTECHNOLOGY
BIOS 543  DEVELOPMENTAL NEUROBIOLOGY
BIOS 570  COMPUTATION WITH BIOLOGICAL DATA
EEPS 540  CRYOSPHERE
EEPS 581  MODERN EXPLORATION TECHNOLOGY
EEPS 667  GEOMECHANICS
EEPS 672  EARTH SYSTEMS MODELING: NUMERICAL TECHNIQUES AND APPLICATIONS
MGMT 633 / BIOE 633  ROLES OF PHYSICIANS, SCIENTISTS, ENGINEERS AND MBA’S IN HIGH-TECH STARTUPS
PHYS 510  MAGNETOSPHERIC PHYSICS
PHYS 541  RADIATIVE PROCESSES
PHYS 580  INTRODUCTION TO PLASMA PHYSICS

Management and Entrepreneurship
ENGI 515  LEADING TEAMS AND INNOVATION
ENGI 614  LEARNING HOW TO INNOVATE?
MGMT 601  FINANCIAL STATEMENT ANALYSIS
MGMT 618  BESTSELLERS: THE SCIENCE AND WISDOM
MGMT 629  BUSINESS PLAN DEVELOPMENT
MGMT 633 / BIOE 633  ROLES OF PHYSICIANS, SCIENTISTS, ENGINEERS AND MBA’S IN HIGH-TECH STARTUPS
MGMT 658  APPLIED RISK MANAGEMENT
MGMT 734  TECHNOLOGY ENTREPRENEURSHIP

Interdisciplinary Interest Electives
Select 3 courses (9 credit hours) from any of the Electives listed in the areas above.

Total Credit Hours
39

Footnotes and Additional Information
1  Note: Some of the listed courses are not offered every year, and other coursework may be offered that satisfies the stated requirements upon approval. Depending on the student’s background or interest, course substitutions for any required or elective course may be approved by the program’s academic advisor. Students should consult with their academic advisors before enrolling.
2  Practical experience is offered via a three to six month immersion. The internship will be under the guidance of a host company, government agency, or non-profit organization. At the conclusion of the internship, students must present a summary of their internship project in both oral and written form for the cohort course Professional Master’s Project (NSCI 512). Part-time students who already work in their area of study may fulfill the internship requirements by working on an approved project with their current employer.

Policies for the MSSpS Degree
Professional Science Master’s Graduate Program Handbook
The General Announcements (GA) is the official Rice curriculum. As an additional resource for students, the Professional Science Master’s Program publishes a graduate program handbook, which can be found here: https://gradhandbooks.rice.edu/2021_22/Professional_Science_Masters_Handbook.pdf

Admission
Admission to graduate study in Space Studies is open to qualified students holding a bachelor’s degree in a related science or engineering program that included course work in general physics, chemistry, calculus, linear algebra, and differential equations. Good scores from the general Graduate Record Examination (GRE), good critical thinking and communication skills, and strong quantitative abilities. Statistics, introductory economics, and computer skills preferred. Department faculty evaluate the previous academic record and credentials of each applicant individually and make admission decisions.

Transfer Credit
For Rice University’s policy regarding transfer credit, see Transfer Credit (https://ga.rice.edu/graduate-students/academic-policies-procedures/regulations-procedures-all-degrees/#transfer). Some departments...
and programs have additional restrictions on transfer credit. Students are encouraged to meet with their academic program's advisor when considering transfer credit possibilities.

Program Transfer Credit Guidelines
Students pursuing the MSSpS degree should be aware of the following program-specific transfer credit guidelines:

- No more than 2 courses (6 credit hours) of transfer credit from U.S. or international universities of similar standing as Rice may apply towards the degree.
- Requests for transfer credit will be considered by the program director on an individual case-by-case basis.

Additional Information
For additional information, please see the Space Studies website: [https://profms.rice.edu/](https://profms.rice.edu/)

Opportunities for the MSSpS Degree
Fifth-Year Master's Degree Option for Rice Undergraduate Students

In certain situations and with some terminal master’s degree programs, Rice students have an option to pursue a master’s degree by adding an additional fifth year to their four years of undergraduate studies.

Advanced Rice undergraduate students in good academic standing typically apply to the master’s degree program during their junior or senior year. Upon acceptance, depending on course load, financial aid status, and other variables, they may then start taking some required courses of the master’s degree program. A plan of study will need to be approved by the student's undergraduate major advisor and the master’s degree program director.

As part of this option and opportunity, Rice undergraduate students:

- must complete the requirements for a bachelor's degree and the master’s degree independently of each other (i.e. no course may be counted toward the fulfillment of both degrees).
- should be aware there could be financial aid implications if the conversion of undergraduate coursework to that of graduate level reduces their earned undergraduate credit for any semester below that of full-time status (12 credit hours).
- more information on this Undergraduate-Graduate Concurrent Enrollment opportunity, including specific information on the registration process can be found here [https://ga.rice.edu/undergraduate-students/academic-opportunities/undergraduate-graduate-concurrent-enrollment/](https://ga.rice.edu/undergraduate-students/academic-opportunities/undergraduate-graduate-concurrent-enrollment/).

Rice undergraduate students completing studies in science may have the option to pursue the Master of Science in Space Studies (MSSpS) degree. For additional information, students should contact their undergraduate major advisor, the faculty MSSpS program director, and the Professional Science Master’s (PSM) program director.

Additional Information
For additional information, please see the Space Studies website: [https://profms.rice.edu/](https://profms.rice.edu/)