OPERATIONS RESEARCH, MS

Banner Code: VS-MS-OPRS

Academic Advising

2100 Nguyen Engineering Building
Fairfax Campus

Phone: 703-993-1670
Email: seor@gmu.edu
Website: seor.gmu.edu/grad.html

The MS prepares students for research and professional practice associated with the formulation and analysis of mathematical models for decision making and their computer implementation. Major components include optimization, queuing and network modeling, computer simulation and modeling, applied and computational probability, and application of these components to realistic and relevant operational analysis problems. Students are expected to become proficient in these areas, as well as in supporting areas of information technology necessary to implement operations research methods.

The program includes core courses and electives selected by the student with the aid of a faculty advisor. To obtain the MS degree, students complete an approved plan of study that contains a minimum of 30 graduate credits. Students may take courses through the Commonwealth Graduate Engineering Program. Appropriate courses may be transferred, with advisor approval, into this Mason degree program.

Admissions & Policies

Admissions

To be admitted to the program, students must hold a baccalaureate degree from an accredited institution in engineering, mathematics, computer science, physical sciences, economics, or a related field. They also must have completed courses in:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 113</td>
<td>Analytic Geometry and Calculus I (Mason Core)</td>
<td>4</td>
</tr>
<tr>
<td>MATH 114</td>
<td>Analytic Geometry and Calculus II</td>
<td>4</td>
</tr>
<tr>
<td>MATH 213</td>
<td>Analytic Geometry and Calculus III</td>
<td>3</td>
</tr>
<tr>
<td>MATH 203</td>
<td>Linear Algebra</td>
<td>3</td>
</tr>
</tbody>
</table>

Differential Equations

MATH 214 | Elementary Differential Equations | 3       |

Applied Probability and Statistics

STAT 346 | Probability for Engineers | 3       |

Scientific Programming Language

CS 112 | Introduction to Computer Programming (Mason Core) | 4       |

Specific application deadlines and requirements (https://admissions.gmu.edu/grad/application-deadlines-and-requirements/?academicUnit=VS&_ga=1.107632321.273102085.1480697294) are available through the Office of Graduate Admissions.

Requirements

Degree Requirements

Total credits: 30

Students must complete four core courses and the project (15 credits). The remaining 15 credits are electives subject to the requirements below, and can be taken in one of five concentration areas or in an individual plan approved by the student’s advisor.

Required Core Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>OR 541</td>
<td>Operations Research: Deterministic Models</td>
<td>3</td>
</tr>
<tr>
<td>OR 542</td>
<td>Operations Research: Stochastic Models</td>
<td>3</td>
</tr>
<tr>
<td>OR 568</td>
<td>Applied Predictive Analytics</td>
<td>3</td>
</tr>
<tr>
<td>OR 635</td>
<td>Discrete System Simulation</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 12

Project

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>OR 699</td>
<td>Masters Project</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 3

Methods Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>OR 641</td>
<td>Linear Programming</td>
<td></td>
</tr>
<tr>
<td>OR 642</td>
<td>Integer Programming</td>
<td></td>
</tr>
<tr>
<td>OR 643</td>
<td>Network Modeling</td>
<td></td>
</tr>
<tr>
<td>OR 644</td>
<td>Nonlinear Programming</td>
<td></td>
</tr>
<tr>
<td>OR 670</td>
<td>Metaheuristics for Optimization</td>
<td></td>
</tr>
<tr>
<td>OR 645</td>
<td>Stochastic Processes</td>
<td></td>
</tr>
<tr>
<td>OR 647</td>
<td>Queuing Theory</td>
<td></td>
</tr>
<tr>
<td>OR 674</td>
<td>Dynamic Programming</td>
<td></td>
</tr>
<tr>
<td>OR 675</td>
<td>Reliability Analysis</td>
<td></td>
</tr>
<tr>
<td>SYST 664</td>
<td>Bayesian Inference and Decision Theory</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 6

Additional Electives

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 112</td>
<td>Introduction to Computer Programming (Mason Core)</td>
<td>4</td>
</tr>
</tbody>
</table>

Select up to three additional electives from the list of allowable electives with written concurrence of the advisor.

Total Credits 9
At least two of these electives must be taken from SEOR course offerings, and one of these must be OR 600-level or higher. The remaining course should be taken in an area appropriate to the student’s interests, such as operations research, systems engineering, computer science, information systems, statistics, data analytics, electrical and computer engineering, economics, mathematics or supply chain management. The allowable elective for MS students includes:

A. Within VSE:
   - Any OR course ≥600
   - Any SYST course > 500
   - Any STAT course ≥ 554
   - Any CS course ≥ 500
   - Any ECE course ≥ 500 but not 528
   - Any CEIE course > 500 but not 601

B. External to VSE (subject to approval by the Department Chair):
   - Any MATH course > 601 and permitted for Math majors;
   - Any CSI course > 610
   - Any ECON course ≥ 611

**Concentrations**

Students may construct concentration areas by choosing electives from among special groupings. The six concentrations available are data analytics, decision analysis, financial engineering, military operations research, optimization, and stochastic modeling. In addition to the required core courses (12 credits) and project course (3 credits), the remaining 15 credit hours consist of methods and elective courses associated with the concentration areas as outlined below. Students can also devise their own grouping of electives subject to prior approval of their advisor.

**Available Concentrations**

- Concentration in Data Analytics (DNIC)
- Concentration in Decision Analysis (DA)
- Concentration in Financial Engineering (FNNE)
- Concentration in Military Operations Research (MOR)
- Concentration in Optimization (OPT)
- Concentration in Stochastic Models (STM)

**Concentration in Data Analytics (DNIC)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 504</td>
<td>Principles of Data Management and Mining</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>One deterministic methods course</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>One stochastics methods course</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>and two courses from the following:</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>OR 604 Practical Optimization</td>
<td></td>
</tr>
<tr>
<td></td>
<td>OR 670 Metaheuristics for Optimization</td>
<td></td>
</tr>
<tr>
<td></td>
<td>STAT 663 Statistical Graphics and Data Exploration</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>SYST 664 Bayesian Inference and Decision Theory</td>
<td></td>
</tr>
</tbody>
</table>

**Total Credits** 15

**Concentration in Decision Analysis (DA)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>OR 671</td>
<td>Judgment and Choice Processing and Decision Making</td>
<td>3</td>
</tr>
<tr>
<td>OR 681</td>
<td>Decision and Risk Analysis</td>
<td>3</td>
</tr>
<tr>
<td>SYST 664</td>
<td>Bayesian Inference and Decision Theory</td>
<td>3</td>
</tr>
<tr>
<td>Select one deterministic methods course</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Select one stochastics methods course</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

**Total Credits** 15

**Concentration in Financial Engineering (FNNE)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>OR 588</td>
<td>Financial Systems Engineering I: Introduction to Options, Futures, and Derivatives</td>
<td>3</td>
</tr>
<tr>
<td>OR 688</td>
<td>Financial Systems Engineering II: Derivative Products and Risk Management</td>
<td>3</td>
</tr>
<tr>
<td>Select one from the following:</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>OR 538</td>
<td>Analytics for Financial Engineering and Econometrics</td>
<td></td>
</tr>
<tr>
<td>OR 645</td>
<td>Stochastic Processes</td>
<td></td>
</tr>
<tr>
<td>OR 671</td>
<td>Judgment and Choice Processing and Decision Making</td>
<td></td>
</tr>
<tr>
<td>OR 681</td>
<td>Decision and Risk Analysis</td>
<td></td>
</tr>
<tr>
<td>OR 682</td>
<td>Computational Methods in Engineering and Statistics</td>
<td></td>
</tr>
</tbody>
</table>

Students must also complete: 6

- One deterministic methods course
- One stochastics methods course

**Total Credits** 15

1 If the student has already taken OR 645 Stochastic Processes this can be substituted for an elective course with written concurrence of the student’s advisor

**Concentration in Military Operations Research (MOR)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>OR 651</td>
<td>Military Operations Research I: Cost Analysis</td>
<td>3</td>
</tr>
<tr>
<td>OR 652</td>
<td>Military Operations Research Modeling II: Effectiveness Analysis</td>
<td>3</td>
</tr>
<tr>
<td>SYST 683</td>
<td>Modeling, Simulation, and Gaming</td>
<td>3</td>
</tr>
<tr>
<td>One deterministic methods course</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>One stochastics methods course</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

**Total Credits** 15

**Concentration in Optimization (OPT)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Select three courses from the following:</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>OR 604</td>
<td>Practical Optimization</td>
<td></td>
</tr>
<tr>
<td>OR 641</td>
<td>Linear Programming</td>
<td></td>
</tr>
<tr>
<td>OR 642</td>
<td>Integer Programming</td>
<td></td>
</tr>
<tr>
<td>OR 643</td>
<td>Network Modeling</td>
<td></td>
</tr>
<tr>
<td>OR 644</td>
<td>Nonlinear Programming</td>
<td></td>
</tr>
<tr>
<td>OR 646</td>
<td>Stochastic Optimization</td>
<td></td>
</tr>
</tbody>
</table>

**Total Credits** 15
OR 670  Metaheuristics for Optimization
OR 682  Computational Methods in Engineering and Statistics

Students must also complete: 6
  One stochastic methods course
  One elective course with written concurrence of the student's advisor

Total Credits 15

Concentration in Stochastic Models (STM)

Select three courses from the following: 9
  OR 645  Stochastic Processes
  OR 647  Queuing Theory
  OR 674  Dynamic Programming
  OR 719  Graphical Models for Inference and Decision Making
  SYST 664  Bayesian Inference and Decision Theory
  STAT 554  Applied Statistics I
  or STAT 663  Statistical Graphics and Data Exploration I

Select must also complete: 6
  One deterministic methods course
  One elective course with written concurrence of the student's advisor

Total Credits 27

Operations Research and Statistical Science Dual-Degree MS

This program allows students to earn an MS in Operations Research and an MS in Statistical Science by completing 48 credits of coursework in both areas instead of the 60 that would be required if the degrees were sought independently.

Admission Requirements

Applicants must satisfy admission requirements for the MS in Operations Research Program and the MS in Statistical Science Program. A joint faculty committee from the Statistics and Systems Engineering and Operations Research Departments make final admission decisions into the dual-degree program.

MS-OPRS/STAT Dual Degree Requirements

Total credits: 48

Required Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>OR 541</td>
<td>Operations Research: Deterministic</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Models</td>
<td></td>
</tr>
<tr>
<td>OR 542</td>
<td>Operations Research: Stochastic</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Models</td>
<td></td>
</tr>
<tr>
<td>OR 635</td>
<td>Discrete System Simulation</td>
<td>3</td>
</tr>
<tr>
<td>OR 699</td>
<td>Masters Project</td>
<td>3</td>
</tr>
<tr>
<td>STAT 544</td>
<td>Applied Probability</td>
<td>3</td>
</tr>
<tr>
<td>STAT 554</td>
<td>Applied Statistics I</td>
<td>3</td>
</tr>
<tr>
<td>STAT 634</td>
<td>Case Studies in Data Analysis</td>
<td>3</td>
</tr>
<tr>
<td>STAT 652</td>
<td>Statistical Inference</td>
<td>3</td>
</tr>
<tr>
<td>STAT 654</td>
<td>Applied Statistics II</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 27

Elective Credits in OR Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Select 12 elective credits in</td>
<td></td>
</tr>
<tr>
<td></td>
<td>OR courses at the 600 level,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>including at least one</td>
<td></td>
</tr>
<tr>
<td></td>
<td>deterministic methods course</td>
<td></td>
</tr>
<tr>
<td></td>
<td>and at least one stochastic</td>
<td></td>
</tr>
<tr>
<td></td>
<td>methods course:</td>
<td></td>
</tr>
</tbody>
</table>

Deterministic Methods Courses:
- OR 641  Linear Programming
- OR 642  Integer Programming
- OR 643  Network Modeling
- OR 644  Nonlinear Programming

Stochastic Methods Courses:
- OR 645  Stochastic Processes
- OR 647  Queuing Theory
- OR 674  Dynamic Programming
- OR 675  Reliability Analysis

Total Credits 12

Elective Credits in STAT Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Select 9 elective credits</td>
<td></td>
</tr>
<tr>
<td></td>
<td>from any STAT courses</td>
<td></td>
</tr>
<tr>
<td></td>
<td>numbered 540-775</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 12

Notes

- Students currently enrolled in one of the MS programs must declare pursuit of the dual MS within one year of matriculation into the first MS program.
- A maximum of 6 credits across the two disciplines may be in independent research (thesis). The requirements for independent research are the same as detailed for the associated MS program.
- Students in either the BS (selected)/Operations Research, Accelerated MS program or the BS (selected)/Statistical Science, Accelerated MS program cannot get a reduction of 6 credits toward this dual degree. Students who want to proceed to a PhD degree will only be able to waive the number of credits specified in the associated PhD degree requirements, even though they will have 48 credits at the MS level.
- If a student decides not to complete the required 48 credits, a single MS degree will not be granted unless the student fulfills the requirements for the MS in Operations Research or the MS in Statistical Science.
- Once a student receives one of the MS degrees from either department, the student will no longer be eligible for the reduction in credit (i.e., will need to complete 30 credits) if the student later decides to earn the other MS degree.
**Accelerated Master’s**

### Bioengineering, BS/Operations Research, Accelerated MS

**Overview**

Highly-qualified students in the Bioengineering, BS have the option of obtaining an accelerated Operations Research, MS.

For more detailed information, see AP6.7 Bachelor’s/Accelerated Master’s Degrees. For policies governing all graduate degrees, see AP6 Graduate Policies.

**Admission Requirements**

Mason undergraduate students majoring in Bioengineering, BS may apply to this option if they have earned 90 undergraduate credits with an overall GPA of at least 3.30 and completed all MATH and PHYS requirements. Criteria for admission are identical to criteria for admission to the Operations Research, MS program.

**Accelerated Options Requirement**

Students must complete all credits that satisfy requirements for both the BS and MS programs. Up to two courses (6 credits) of approved master’s level courses taken as part of the undergraduate degree may be applied to the graduate degree. The courses selected for this purpose must be approved by the academic advisors of both the BS and MS programs and by the SEOR department chair. For the BS programs that allow undergraduate electives from the department of system engineering and operations research, the students may chose the graduate version of such elective courses to replace the corresponding undergraduate courses.

**Degree Conferral**

Students must apply the semester before they expect to complete the BS requirements to have the BS degree conferred. In addition, at the beginning of the student’s final undergraduate semester, students must complete a Bachelor’s/Accelerated Master’s Transition form that is submitted to the Office of the University Registrar and the VSE Graduate Admissions Office. At the completion of MS requirements, a master’s degree is conferred.

### Cyber Security Engineering, BS/Operations Research, Accelerated MS

**Overview**

Highly-qualified students in the Cyber Security Engineering, BS have the option of obtaining an accelerated Operations Research, MS.

For more detailed information, see AP6.7 Bachelor’s/Accelerated Master’s Degrees. For policies governing all graduate degrees, see AP6 Graduate Policies.

**Admission Requirements**

Mason undergraduate students majoring in Cyber Security Engineering, BS may apply to this option if they have earned 90 undergraduate credits with an overall GPA of at least 3.30 and completed all MATH and PHYS requirements. Criteria for admission are identical to criteria for admission to the Operations Research, MS program.

**Accelerated Options Requirement**

Students must complete all credits that satisfy requirements for both the BS and MS programs. Up to two courses (6 credits) of approved master’s level courses taken as part of the undergraduate degree may be applied to the graduate degree. The courses selected for this purpose must be approved by the academic advisors of both the BS and MS programs and by the SEOR department chair. For the BS programs that allow undergraduate electives from the department of system engineering and operations research, the students may chose the graduate version of such elective courses to replace the corresponding undergraduate courses.

**Degree Conferral**

Students must apply the semester before they expect to complete the BS requirements to have the BS degree conferred. In addition, at the beginning of the student’s final undergraduate semester, students must complete a Bachelor’s/Accelerated Master’s Transition form that is submitted to the Office of the University Registrar and the VSE Graduate Admissions Office. At the completion of MS requirements, a master’s degree is conferred.

### Civil and Infrastructure Engineering, BS/Operations Research, Accelerated MS

**Overview**

Highly-qualified students in the Civil and Infrastructure Engineering, BS have the option of obtaining an accelerated Operations Research, MS.

For more detailed information, see AP6.7 Bachelor’s/Accelerated Master’s Degrees. For policies governing all graduate degrees, see AP6 Graduate Policies.

**Admission Requirements**

Mason undergraduate students majoring in Civil and Infrastructure Engineering, BS may apply to this option if they have earned 90 undergraduate credits with an overall GPA of at least 3.30 and completed all MATH and PHYS requirements. Criteria for admission are identical to criteria for admission to the Operations Research, MS program.

**Accelerated Options Requirement**

Students must complete all credits that satisfy requirements for both the BS and MS programs. Up to two courses (6 credits) of approved master’s level courses taken as part of the undergraduate degree may be applied to the graduate degree. The courses selected for this purpose must be approved by the academic advisors of both the BS and MS programs and by the SEOR department chair. For the BS programs that allow undergraduate electives from the department of system engineering and operations research, the students may chose the graduate version of such elective courses to replace the corresponding undergraduate courses.

**Degree Conferral**

Students must apply the semester before they expect to complete the BS requirements to have the BS degree conferred. In addition, at the beginning of the student’s final undergraduate semester, students must complete a Bachelor’s/Accelerated Master’s Transition form that is submitted to the Office of the University Registrar and the VSE Graduate Admissions Office. At the completion of MS requirements, a master’s degree is conferred.
Admissions Office. At the completion of MS requirements, a master’s degree is conferred.

**Mechanical Engineering, BS/Operations Research, Accelerated MS**

**Overview**
Highly-qualified students in the Mechanical Engineering, BS have the option of obtaining an accelerated Operations Research, MS.

For more detailed information, see AP 6.7 Bachelor’s/Accelerated Master’s Degrees. For policies governing all graduate degrees, see AP 6 Graduate Policies.

**Admission Requirements**
Mason undergraduate students majoring in Mechanical Engineering, BS may apply to this option if they have earned 90 undergraduate credits with an overall GPA of at least 3.30 and completed all MATH and PHYS requirements. Criteria for admission are identical to criteria for admission to the Operations Research, MS program.

Students must additionally complete MATH 203 Linear Algebra prior to applying for the graduate program.

**Accelerated Options Requirement**
Students must complete all credits that satisfy requirements for both the BS and MS programs. Up to two courses (6 credits) of approved master’s level courses taken as part of the undergraduate degree may be applied to the graduate degree. The courses selected for this purpose must be approved by the academic advisors of both the BS and MS programs and by the SEOR department chair. For the BS programs that allow undergraduate electives from the department of system engineering and operations research, the students may choose the graduate version of such electives to replace the corresponding undergraduate courses.

**Degree Conferral**
Students must apply the semester before they expect to complete the BS requirements to have the BS degree conferred. In addition, at the beginning of the student’s final undergraduate semester, students must complete a Bachelor’s/Accelerated Master’s Transition form that is submitted to the Office of the University Registrar and the VSE Graduate Admissions Office. At the completion of MS requirements, a master’s degree is conferred.

**Statistics, BS/Operations Research, Accelerated MS**

**Overview**
Highly-qualified students in the Statistics, BS have the option of obtaining an accelerated Operations Research, MS.

For more detailed information, see AP 6.7 Bachelor’s/Accelerated Master’s Degrees. For policies governing all graduate degrees, see AP 6 Graduate Policies.

**Admission Requirements**
Mason undergraduate students majoring in Statistics, BS may apply to this option if they have earned 90 undergraduate credits with an overall GPA of at least 3.30 and completed all MATH and PHYS requirements.

**Criteria for admission are identical to criteria for admission to the Operations Research, MS program.**

**Accelerated Options Requirement**
Students must complete all credits that satisfy requirements for both the BS and MS programs. Up to two courses (6 credit hours) of approved master’s level courses taken as part of the undergraduate degree may be applied to the graduate degree. The courses selected for this purpose must be approved by the academic advisors of both the BS and MS programs and by the SEOR department chair. For the BS programs that allow undergraduate electives from the department of system engineering and operations research, the students may choose the graduate version of such electives to replace the corresponding undergraduate courses.

**Degree Conferral**
Students must apply the semester before they expect to complete the BS requirements to have the BS degree conferred. In addition, at the beginning of the student’s final undergraduate semester, students must complete a Bachelor’s/Accelerated Master’s Transition form that is submitted to the Office of the University Registrar and the VSE Graduate Admissions Office. At the completion of MS requirements, a master’s degree is conferred.

**Systems Engineering BS/Operations Research, Accelerated MS**

**Overview**
Qualified undergraduate students may apply for a five-year accelerated BS/MS program leading to a Bachelor of Science in Systems Engineering and an MS degree in Operations Research.

For more detailed information, see AP 6.7 Bachelor’s/Accelerated Master’s Degrees. For policies governing all graduate degrees, see AP 6 Graduate Policies.

**Admission Requirements**
Mason undergraduate students majoring in systems engineering may apply to this option if they have earned 90 undergraduate credits with an overall GPA of at least 3.30 and completed all MATH and PHYS requirements. Criteria for admission are identical to criteria for admission to the Operations Research, MS program.

**Accelerated Option Requirements**
Up to two courses (six credit hours) of master’s level courses may be applied to both the undergraduate and the graduate degrees. These two courses may be chosen from the list of graduate courses in the following table. For Systems Engineering, BS students, these graduate courses replace the corresponding undergraduate courses listed in the table. The undergraduate version of these courses may not be applied toward the Operations Research, MS.

<table>
<thead>
<tr>
<th>Undergraduate</th>
<th>Graduate</th>
<th>Credit may not be received for both courses.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SYST 420</td>
<td>SYST 521/OR 643</td>
<td></td>
</tr>
<tr>
<td>SYST 473</td>
<td>SYST 573</td>
<td></td>
</tr>
</tbody>
</table>
Any other 500-level course may be applied to both the undergraduate and graduate degrees with approval of the advisor and SEOR department chair.

Degree Conferral

Students must apply the semester before they expect to complete the BS requirements to have the BS degree conferred. In addition, at the beginning of the student's final undergraduate semester, students must complete a Bachelor's/Accelerated Master's Transition form that is submitted to the Office of the University Registrar and Graduate Recruitment and Enrollment Services. At the completion of MS requirements, a master's degree is conferred.

BS (selected)/Operations Research, Accelerated MS

Overview

Highly-qualified students in BS programs have the option of obtaining an accelerated Operations Research, MS.

For more detailed information, see AP6.7 Bachelor's/Accelerated Master's Degrees. For policies governing all graduate degrees, see AP6 Graduate Policies.

Admission Requirements

Mason undergraduate students majoring in both engineering and non-engineering disciplines may apply to this option if 1) such an accelerated Operations Research, MS pathway is allowable from the student's BS program, which will be determined by the academic advisors of both the BS and MS programs and by the SEOR department chair, 2) they have earned 90 undergraduate credits with an overall GPA of at least 3.30, and 3) they have completed all MATH and PHYS requirements. Criteria for admission are identical to criteria for admission to the Operations Research, MS program.

Students must additionally complete MATH 203 prior to applying for the graduate program.

Accelerated Option Requirements

Students must complete all credits that satisfy requirements for both the BS and MS programs. Up to two courses (6 credits) of approved master's level courses taken as part of the undergraduate degree may be applied to the graduate degree. The courses selected for this purpose must be approved by the academic advisors of both the BS and MS programs and by the SEOR department chair.

For the BS programs that allow undergraduate electives from the department of systems engineering and operations research, the students may choose the graduate version of such elective courses to replace the corresponding undergraduate courses.

Degree Conferral

Students must apply the semester before they expect to complete the BS requirements to have the BS degree conferred. In addition, at the beginning of the student's final undergraduate semester, students must complete a Bachelor's/Accelerated Master's Transition form that is submitted to the Office of the University Registrar and the VSE Graduate Admissions Office. At the completion of MS requirements, a master's degree is conferred.