UNDERGRADUATE L&S MAJOR IN
OPERATIONS RESEARCH AND MANAGEMENT SCIENCE

In the ORMS major, students will develop solid quantitative, model building, and problem solving skills through core courses in mathematics, statistics, and operations research, and will learn how to apply these skills to solving problems in an area of their choice. We outline four possible concentrations below, but many other areas can also benefit from applying an OR perspective. Students may design their own concentrations according to their interests, with guidance from their faculty advisor in IEOR.

Curriculum

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<tr>
<th>Lower-Division Required Courses</th>
<th>Upper-Division Required Courses</th>
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<tbody>
<tr>
<td>Math 1A  Calculus (4 units)</td>
<td>IEOR 172 (*) Prob. and Risk Analysis (3)</td>
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<tr>
<td>Math 1B  Calculus (4)</td>
<td>or Stat 134 (or 140) Probability (for Data Science) (3)</td>
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<td>Math 53  Multivariable Calculus (4)</td>
<td>Econ 101A Economic Theory Micro (4)</td>
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<td>Math 54  Linear Algebra &amp; Diff’l Eqns (4)</td>
<td>IEOR 142 Machine Learning and Data Analytics (3)</td>
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<td>Engin 7  Intro. to Computer Programming (4)</td>
<td>or IEOR 165 Eng. Stats, Quality, Forecasting (3)</td>
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<td>or CS61A Computer Programming (4)</td>
<td>IEOR 160 Nonlinear &amp; Discrete Optimization (3)</td>
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<td>Bus. Admin. 10 Principles of Business (3)</td>
<td>or IEOR 162 Linear Programming (3)</td>
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<tr>
<td>Econ 1, 2, or 3 Intro. To Economics (4)</td>
<td>IEOR 173 Intro to Stochastic Processes (3)</td>
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A Concentration of Four or Five Clustered Electives:

ORMS majors, with the signed advance approval of their faculty advisors, select a minimum of four upper division elective courses (minimum 12 units), in addition to the courses above, to form a coherent cluster, or concentration, in an area where Operations Research is applied. Courses in other departments may count toward this requirement if they have substantial relevant content at an appropriately advanced level. The following are some suggestions for concentration areas.

1. Decision Making in Economic Systems

   Econ 104  Advanced Microeconomic Theory (4)  Econ C110 (4), UGBA 143 (3), or STAT 155 (3) Game Theory
   Econ 141  Economic Statistics and Econometrics (4)  IEOR 142  Machine Learning and Data Analytics (3)
   IEOR 165  Eng. Stats, Quality Control, Forecasting (3)  Math 104  Introduction to Analysis (4)

2. Decision Making in Industrial and Service Systems

   IEOR 150  Production Systems Analysis (3)  IEOR 166  Decision Analysis (3)
   or UGBA 141 Prod. and Opsn. Mgt. (3)  IEOR 170  Human Factors for Engin Design (3)
   IEOR 160 or 162 Linear Prog. or Nonlinear & Discrete Opt.  IEOR 151  Service Opsn Design and Analysis (3)
   IEOR 153  Logistics and Supply Chain Mgt. (3)  UGBA 102B  Managerial Accounting (3)
   IEOR 165  Eng. Stats, Quality Control, Forecasting (3)  Econ C110 (4), UGBA 143 (3), or STAT 155 (3) Game Theory
   IEOR 130  Methods of Manuf. Improvement (3)  IEOR 115  Indust. and Comm’l. Data Syst. (3)
   IEOR 142  Machine Learning and Data Analytics (3)

3. Decision Making in Societal Systems

   IEOR 165  Eng. Stats, Quality Control, Forecasting (3)  Econ C110 (4), UGBA 143 (3), or STAT 155 (3) Game Theory
   IEOR 142  Machine Learning and Data Analytics (3)  IEOR 166  Decision Analysis (3)

4. Algorithmic Decision Making

   (CS 61B)  Data Structures (4) (prereq, not counted)  IEOR 115  Indust. and Comm’l. Data Syst. (3)
   CS 170  Efficient Alg. and Intractable Prob. (4)  IEOR 160 or 162 Linear Prog. or Nonlinear & Discrete Opt.
   CS 172  Computability and Complexity (4)  IEOR 166  Decision Analysis (3)
   CS 174  Combinatorics and Discrete Probability (4)  IEOR 142  Machine Learning and Data Analytics (3)
   Math 110  Linear Algebra (4)

(*) Students will receive no credit for IEOR 173 after taking IEOR 161, or for IEOR 172 after taking STAT 134.  Rev 10/17