School of Operations Research and Information Engineering

UNDERGRADUATE DEGREE PROGRAM

The Operations Research and Engineering (ORE) undergraduate degree program will give you a broad understanding of the modeling concepts and solution techniques you’ll need to analyze and improve business and industrial systems.

Such systems are complex: people, equipment, information, materials, and methods are brought together to achieve financial, schedule, and quality goals. There are numerous tradeoffs to be investigated and uncertainties to be resolved. As an operations analyst, you will be studying such systems, analyzing why they behave the way they do, and making recommendations for system improvements—a better way to organize the flow of work, a better way to forecast the results, a better way to make decisions and allocate scarce resources—to name a few. Your tools will be the tools of operations research (optimization, probability, statistics, simulation, and stochastic processes) and other disciplines such as engineering economics and behavioral science. You will work with people at all levels of an organization, from the shop floor to the corporate boardroom, and you will use advanced software packages to conduct your analysis. In some cases, you will develop new approaches as well as new software to support their implementation.

Examples of operations analysis abound. An automobile manufacturer might be able to save millions of dollars each year by identifying and eliminating bottlenecks in an assembly line. A marketing company might want a better strategy to bid for advertising slots on Google search results. A hospital could more efficiently schedule the use of its operating rooms, lowering costs and improving the quality of patient care. An Internet retailer could reduce costs and improve delivery performance with optimized inventory policies and better demand forecasts. These are the kinds of problems that are tackled by experts in ORE. As work becomes more complex and data-intensive, and the demands of the economy require a more efficient use of resources, you’ll find your ORE skills in ever greater demand.

So where will a major in ORE take you? Historically, the field has been concerned with manufacturing and the delivery of goods and services. Many operations analysts find career opportunities in those areas. In recent years, however, the field has expanded as business and industry leaders have discovered that the methods of ORE can be used profitably in fields like finance, data analytics, and information technology. As a result, you’ll find ORE graduates working in a wide variety of areas as analysts, consultants, industrial engineers, management associates, project managers, and even investment bankers. This major provides robust analytical tools and experiences that lead into flexible career paths.

ORE CORE REQUIRED COURSES

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<tr>
<th>Course</th>
<th>Title</th>
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<tbody>
<tr>
<td>ENGRD 2110</td>
<td>Object-Oriented Programming and Data Structures</td>
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<tr>
<td>ENGRD 2700</td>
<td>Basic Engineering Probability and Statistics</td>
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<td>ORIE 3120</td>
<td>Industrial Data and Systems Analysis</td>
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<td>ORIE 3150</td>
<td>Financial and Managerial Accounting</td>
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<td>ORIE 3300</td>
<td>Optimization I</td>
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<tr>
<td>ORIE 3310</td>
<td>Optimization II</td>
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<tr>
<td>ORIE 3500</td>
<td>Engineering Probability and Statistics II</td>
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<td>ORIE 3510</td>
<td>Introductory Engineering Stochastic Processes I</td>
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<tr>
<td>ORIE 4580</td>
<td>Simulation Modeling and Analysis</td>
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SOME AREAS OF FACULTY RESEARCH

algorithm theory, design, and analysis
biomedical statistics
combinatorial optimization
data analytics
financial engineering
game theory
information technology
inventory and logistics control
mathematical programming
network design
production planning
queuing and storage theory
revenue management
scheduling
service systems planning
simulation
statistics
stochastic processes
supply chain management

ORE ELECTIVE COURSE SAMPLER

ENGRI 1101 Engineering Applications of Operations Research
ORIE 3800 Information Systems and Analysis
ORIE 5130 Service System Modeling and Design
ORIE 4150 Economic Analysis of Engineering Systems
ORIE 4152 Entrepreneurship for Engineers
ORIE 4154 Revenue Management
ORIE 4300 Optimization Modeling
ORIE 4320 Nonlinear Optimization
ORIE 4330 Discrete Models
ORIE 4350 Introduction to Game Theory
ORIE 4360 A Mathematical Examination of Fair Representation
ORIE 4520 Introductory Engineering Stochastic Processes II
ORIE 4600 Introduction to Financial Engineering
ORIE 4710 Applied Linear Statistical Models
ORIE 4740 Statistical Data Mining I
ORIE 4741 Learning with Big Messy Data
ORIE 4800 Information Technology
ORIE 4820 Spreadsheet-Based Modeling and Data Analysis
ORIE 4850 Applications of Operations Research and Game Theory to Information Technology
ORIE 4990 Teaching in ORIE
ORIE 4999 ORIE Project
ORIE 5100 Design of Manufacturing Systems
ORIE 5122 Inventory Management
ORIE 5126 Principles of Supply Chain Management
ORIE 5128 Applications of Operations Research to Health Systems

ORE ELECTIVE COURSE SAMPLER

www.oarie.cornell.edu