

# Cornell Engineering

## School of Operations Research and Information Engineering

### OPERATIONS RESEARCH AND 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.

**BREAK  
THE RULES to  
CREATE NEW  
CAREER PATHS**

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 REQUIRED COURSES

ENGRD 2110	Object-Oriented Programming and Data Structures
ENGRD 2700	Basic Engineering Probability and Statistics
ORIE 3120	Industrial Data and Systems Analysis
ORIE 3150	Financial and Managerial Accounting
ORIE 3300	Optimization I
ORIE 3310	Optimization II
ORIE 3500	Engineering Probability and Statistics II
ORIE 3510	Introductory Engineering Stochastic Processes I
ORIE 4580	Simulation Modeling and Analysis

# OPERATIONS RESEARCH AND ENGINEERING



## 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

## MASTER OF ENGINEERING DEGREE PROGRAM

The one-year Master of Engineering (M.Eng.) degree will prepare you to hit the ground running and stand out in the career of your choice.

The ORIE M.Eng. program offers specializations that are highly sought after in today's job market, including: data analytics, financial engineering, information technology, applied operations research, strategic operations, systems engineering, and manufacturing.

Building upon a curriculum encompassing optimization, probability and statistics, stochastic processes, and simulation, our M.Eng. students undertake industry-sponsored project work to solve real problems in the real world. Recent project sponsors include Canadian National Railway, New York Presbyterian Hospital/ Cornell Weill Medical Center, and Walmart.com.

### ORE By the Numbers

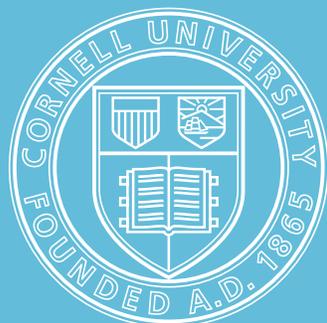
ORE undergraduate students	174
ORIE graduate students	207

Starting salaries of B.S. Operations Research and Engineering graduates (for 2018)

Low	\$22,880
Median	\$72,500
High	\$113,500

## ORE SAMPLE ELECTIVE COURSES

<b>ENGRI 1101</b>	Engineering Applications of Operations Research
<b>ORIE 3800</b>	Information Systems and Analysis
<b>ORIE 4120</b>	Inventory, Operations and Supply Chain Management: models and Optimization
<b>ORIE 4130</b>	Service System Modeling and Design
<b>ORIE 4150</b>	Economic Analysis of Engineering Systems
<b>ORIE 4152</b>	Entrepreneurship for Engineers
<b>ORIE 4154</b>	Revenue Management
<b>ORIE 4300</b>	Optimization Modeling
<b>ORIE 4330</b>	Discrete Models
<b>ORIE 4350</b>	Introduction to Game Theory
<b>ORIE 4360</b>	A Mathematical Examination of Fair Representation
<b>ORIE 4520</b>	Introductory Engineering Stochastic Processes II
<b>ORIE 4600</b>	Introduction to Financial Engineering
<b>ORIE 4630</b>	Operations Research Tools for Financial Engineering
<b>ORIE 4740</b>	Statistical Data Mining I
<b>ORIE 4741</b>	Learning with Big Messy Data
<b>ORIE 4742</b>	Information Theory, Probabilistic Modeling and Deep Learning with Scientific and Financial Applications
<b>ORIE 4820</b>	Spreadsheet-Based Modeling and Data Analysis
<b>ORIE 4990</b>	Teaching in ORIE
<b>ORIE 4999</b>	ORIE Project
<b>ORIE 5100</b>	Design of Manufacturing Systems
<b>ORIE 5122</b>	Inventory Management
<b>ORIE 5126</b>	Principles of Supply Chain Management



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