



COLUMBIA | ENGINEERING

The Fu Foundation School of Engineering and Applied Science

INDUSTRIAL ENGINEERING AND OPERATIONS RESEARCH

The Department of Industrial Engineering and Operations Research offers courses and M.S. programs in (1) financial engineering on a full-time basis only; (2) management science and engineering on a full-time basis only; (3) business analytics on a full-time basis only; (4) industrial engineering, and (5) operations research.

M.S. Degrees

In industrial engineering, research is conducted in the area of logistics, routing, scheduling, production and supply chain management, inventory control, revenue management, and quality control. In operations research, new developments are being explored in mathematical programming, combinatorial optimization, stochastic modeling, computational and mathematical finance, queueing theory, reliability, simulation, and both deterministic and stochastic network flows. In engineering and management systems, research is conducted in the areas of logistics, supply chain optimization, and revenue and risk management. In financial engineering, research is being carried out in portfolio management; option pricing, including exotic and real options; computational finance, such as Monte Carlo simulation and numerical methods; as well as data mining and risk management.

Industrial Engineering M.S.

the branch of the engineering profession that is concerned with the design, analysis, and control of production and service systems. Originally, an industrial engineer worked in a manufacturing plant and was involved only with the operating efficiency of workers and machines. Today, industrial engineers are more broadly concerned with productivity and all of the technical problems of production management and control. They may be found in every kind of organization: manufacturing, distribution, transportation, mercantile, and service. IEORE4004 Optimization Models and Methods IEORE4108 Supply Chain Management and Design IEORE4150 Introduction to Probability and Statistics IEORE4106 Stochastic Models ENGIE4000 Professional Development and Leadership

Operations Research M.S.

concerned with quantitative decision problems, generally involving the allocation and control of limited resources. Such problems arise, for example, in the operations of industrial firms, financial institutions, health care organizations, transportation systems, and government. The operations research analyst develops and uses mathematical and statistical models to help solve these decision problems. Like engineers, they are problem formulators and solvers. IEORE4004 Optimization Models and Methods (First term) IEORE4150 Introduction to Probability and Statistics (First term) IEORE4106 Stochastic Models IEORE4404 Simulation ENGIE4000 Professional Development and Leadership

Management Science and Engineering M.S.

(also known as Engineering Management Systems) is a multidisciplinary field in industrial engineering, operations research, contemporary technology, business, economics, and management. It provides a foundation for decision making and managing risks in complex systems. IEORE E4004 Optimization Models and Methods IEORE E4101 Probability, Statistics and Simulation IEORE E4111 Operations Consulting (all year course) ENGI E4000 Professional Development Leadership

IEORE4520 Applied Systems Engineering
IEORE4523 Data Analytics
IEORE4507 Healthcare Operations Management
IEORE4525 Machine Learning for Financial Engineering & Operations Research

Financial Engineering M.S.

a multidisciplinary field integrating financial theory with economics, methods of engineering, tools of mathematics, and practice of programming. The field provides training in the application of engineering methodologies and quantitative methods of finance.

IEORE4721 Mathematics for Financial Engineering Bootcamp (0-credit)
IEORE4724 Python for Financial Engineering Bootcamp (0-credit)
IEORE4007 Optimization Models and Methods (FE)
IEORE4701 Stochastic Models (FE)
IEORE4706 Foundations of Financial Engineering
ENGIE4000 Professional Development and Leadership (0-credit)
FE Elective (1 minimum, 3 credits)
Financial Engineering Seminar Series
IEORE4703 Monte Carlo Simulation
IEORE4707 Financial Engineering: Continuous Time Models
IEORE4709 Statistical Analysis and Time Series

Business Analytics M.S.

involves the use of data science tools for solving operational and marketing problems. Students learn to leverage advanced quantitative models, algorithms, and data for making actionable decisions to improve business operations.

IEOR E4575 Mathematics for Business Analytics
IEOR E4004 Optimization Models and Methods
IEOR E4101 Probability, Statistics and Simulation
IEOR E4501 Tools for Analytics
IEOR E4523 Data Analytics
ENGI E4000 Professional Development Leadership
IEOR E4525 Machine Learning for Financial Engineering



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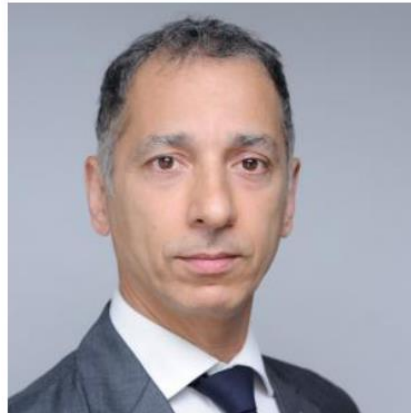
The Fu Foundation School of Engineering and Applied Science

Industrial Engineering and Operations Research Faculty



JAY SETHURAMAN

PROFESSOR AND CHAIR OF INDUSTRIAL ENGINEERING AND OPERATIONS RESEARCH



ALI HIRSA

PROFESSOR OF PROFESSIONAL PRACTICE; CO-DIRECTOR OF FINANCIAL ENGINEERING



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ELENI DRINEA

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