The Master of Industrial Engineering degree is a graduate degree program administered by the George R. Brown School of Engineering, with the participation of the Rice University Departments of Mechanical Engineering and Statistics, and the Rice Center for Operations Research.

The program is designed to explore modern industrial systems, which arise in fields such as manufacturing, services, supply chain management, energy, transportation and healthcare. Analyzing and optimizing their performance is very challenging; for example, the number of ways that Federal Express can route its vehicles vastly exceeds the number of atoms in the universe. These analyses are crucial; their financial impact typically exceeds the profit margins in many industries, such as transportation and retailing.

To meet these challenges, the Master of Industrial Engineering degree emphasizes improving the quality and reliability of complex systems. It provides students with a deep set of analytical and engineering skills to make data-driven decision needed in every major economic sector. Graduates will help industry, governments, and non-profits improve efficiency in changing and uncertain environments.

Industrial Engineering does not currently offer an academic program at the undergraduate level.

**Master's Program**

- Master of Industrial Engineering (MIE) Degree (ga.rice.edu/programs-study/departments-programs/engineering/industrial-engineering/industrial-engineering-mie/#outcomestext)

**Coordinated Program**

- Master of Industrial Engineering (MIE) Degree / Master of Business Administration (MBA) Degree (ga.rice.edu/programs-study/departments-programs/engineering/industrial-engineering/business-administration-mba-industrial-engineering-mie/#outcomestext)

**Director**

Andrew J. Schaefer

**Professors**

- Michael D. Byrne, Psychological Sciences
- Fathi Ghorbel, Mechanical Engineering
- Illya V. Hicks, Computational & Applied Mathematics
- C. Fred Higgs III, Mechanical Engineering
- Marcia K. O'Malley, Mechanical Engineering
- Amit Pazgal, Business
- Eduardo Salas, Psychological Sciences

Andrew J. Schaefer, Computational & Applied Mathematics
Laura Schaefer, Mechanical Engineering
Pol D. Spanos, Mechanical Engineering
Richard A. Tapia, Computational & Applied Mathematics
Yin Zhang, Computational & Applied Mathematics

**Associate Professors**

- Leonardo Dueñas-Osorio, Civil and Environmental Engineering
- Philip A. Ernst, Statistics
- Philip T. Kortum, Psychological Sciences

**Assistant Professors**

- Matthew Brake, Mechanical Engineering
- Pedram Hassanzadeh, Mechanical Engineering

**Assistant Teaching Professor**

- Eleazar Marquez, Mechanical Engineering

**Professor in the Practice**

- John Dobelman, Statistics

**Lecturer**

- Eylem Tekin, Industrial Engineering

For Rice University degree-granting programs:

To view the list of official course offerings, please see Rice's Course Catalog (https://courses.rice.edu/admweb/?p_action=cata)

To view the most recent semester's course schedule, please see Rice's Course Schedule (https://courses.rice.edu/admweb/)

**Industrial Engineering (INDE)**

**INDE 501 - FUNDAMENTALS OF INDUSTRIAL ENGINEERING**

- Short Title: FUND INDUSTRIAL ENGINEERING
- Department: Industrial Engineering
- Grade Mode: Standard Letter
- Course Type: Lecture
- Credit Hours: 3
- Restrictions: Enrollment is limited to Graduate level students.
- Course Level: Graduate
- Description: Introduction to fundamental tools in industrial engineering. Topics include productivity analysis, material handling, logistics, design of experiments, quality control, location theory, warehouse design, supply chain management and scheduling. Instructor Permission Required.

**INDE 509 - INTRODUCTION TO HUMAN FACTORS ENGINEERING**

- Short Title: INTRO TO HUMAN FACTORS ENG
- Department: Industrial Engineering
- Grade Mode: Standard Letter
- Course Type: Lecture
- Credit Hours: 3
- Restrictions: Enrollment is limited to Graduate level students.
- Course Level: Graduate
- Prerequisite(s): INDE 501
- Description: Analysis and design of engineering systems considering human characteristics and limitations. Design of control, displays, tools, workstations and groups. Human factors research methods. Instructor Permission Required.
INDE 543 - MANUFACTURING PROCESSES AND SYSTEMS
Short Title: MANUFACTURING PROC AND SYS
Department: Industrial Engineering
Grade Mode: Standard Letter
Course Type: Lecture
Credit Hours: 3
Restrictions: Enrollment is limited to Graduate level students.
Course Level: Graduate
Prerequisite(s): INDE 501
Description: Fundamentals of manufacturing processes and systems.
Topics include machining, casting, 2D printing, material flow, capacities,
bottlenecks, and just-in-time systems. Simulation and optimization of
various manufacturing systems. Trade-offs among various processes.
Instructor Permission Required.

INDE 545 - PRESCRIPTIVE ANALYTICS
Short Title: PRESCRIPTIVE ANALYTICS
Department: Industrial Engineering
Grade Mode: Standard Letter
Course Type: Lecture
Credit Hours: 3
Restrictions: Enrollment is limited to Graduate level students.
Course Level: Graduate
Description: A survey of methods for combining mathematical models
and large data sets to produce optimal decisions. Topics include decision
analysis, dynamic programs, mathematical programs and various
heuristics. Instructor Permission Required.

INDE 546 - COMPUTATIONAL PRESCRIPTIVE ANALYTICS
Short Title: COMP PRESCRIPTIVE ANALYTICS
Department: Industrial Engineering
Grade Mode: Standard Letter
Course Type: Lecture
Credit Hours: 3
Restrictions: Enrollment is limited to Graduate level students.
Course Level: Graduate
Prerequisite(s): INDE 545
Description: A continuation of INDE 545 that focuses on computational
approaches to prescriptive analytics. Topics include decomposition
approaches to large-scale optimization, modeling languages, decision
analysis and discrete-event simulation software. Emphasis will be placed
on using relevant software on practical problems. Instructor Permission
Required.

INDE 561 - SUPPLY CHAIN MANAGEMENT
Short Title: SUPPLY CHAIN MANAGEMENT
Department: Industrial Engineering
Grade Mode: Standard Letter
Course Type: Lecture
Credit Hours: 3
Restrictions: Enrollment is limited to Graduate level students.
Course Level: Graduate
Prerequisite(s): INDE 545
Description: Supply chain management is the integrated management
of the flow of materials, products, services, and cash from the suppliers
all the way to the customers and from the customers back to the
suppliers. Due to the complex nature of today's supply chains, effective
management of these flows is a challenging task. This course aims to
familiarize students with the concepts and models that are useful in
designing and managing effective and efficient supply chains. Topics
include facility location and distribution models, forecasting, sales &
operations planning, supply chain coordination, inventory management,
transportation, supplier selection, pricing & revenue management, and
sustainability in supply chains. Instructor Permission Required.

INDE 571 - PROBABILITY AND STATISTICAL INFERENCE
Short Title: PROB & STATISTICAL INFERENCE
Department: Industrial Engineering
Grade Mode: Standard Letter
Course Type: Lecture
Credit Hours: 3
Restrictions: Enrollment is limited to Graduate level students.
Course Level: Graduate
Description: Topics include probability, random variables, probability
distributions, transformations, moment generating functions, common
families of distributions, independence, sampling and convergence,
basics of estimation theory, hypothesis testing, Bayesian inference,
ANOVA, regression. Introduction to statistical software.

INDE 572 - STOCHASTIC PROCESSES AND SIMULATION
Short Title: STOCH PROCESSES & SIMULATION
Department: Industrial Engineering
Grade Mode: Standard Letter
Course Type: Lecture
Credit Hours: 3
Restrictions: Enrollment is limited to Graduate level students.
Course Level: Graduate
Prerequisite(s): INDE 571
Description: Topics include Markov chains, renewal processes, queueing
theory, statistical quality control, discrete-event simulation, random
number generators, Monte Carlo methods, resampling methods,
Markov Chain Monte Carlo, importance sampling and simulation based
estimation for stochastic processes.
INDE 590 - MASTER'S IN INDUSTRIAL ENGINEERING CAPSTONE EXPERIENCE
Short Title: MIE CAPSTONE EXPERIENCE
Department: Industrial Engineering
Grade Mode: Standard Letter
Course Type: Research
Credit Hour: 1
Restrictions: Enrollment is limited to Graduate level students.
Course Level: Graduate
Description: MIE students are required to write a field report related to
one of the required core courses in the curriculum. Students should
coordinate this with the INDE 590 instructor/capstone director, prepare a
report relevant to the course material, and present it in class. Instructor
Permission Required. Recommended Prerequisite(s): INDE 501 and
INDE 545 and INDE 571.

INDE 597 - TOPICS IN INDUSTRIAL ENGINEERING
Short Title: TOPICS IN INDUSTRIAL ENG
Department: Industrial Engineering
Grade Mode: Standard Letter
Course Type: Lecture
Credit Hours: 3
Restrictions: Enrollment is limited to Graduate level students.
Course Level: Graduate
Description: Topics and credit hours may vary each semester. Instructor
Permission Required. Repeatable for Credit.

INDE 677 - SPECIAL TOPICS
Short Title: SPECIAL TOPICS
Department: Industrial Engineering
Grade Mode: Standard Letter
Course Type: Seminar, Lecture, Laboratory, Internship/Practicum
Credit Hours: 1-4
Restrictions: Enrollment is limited to Graduate or Visiting Graduate level
students.
Course Level: Graduate
Description: Topics and credit hours vary each semester. Contact
department for current semester's topic(s). Repeatable for Credit.

Description and Code Legend
Note: Internally, the university uses the following descriptions, codes, and
abbreviations for this academic program. The following is a quick reference:

Course Catalog/Schedule
• Course offerings/subject code: INDE

Program Description and Code
• Industrial Engineering: INDE

Graduate Degree Description and Code
• Master of Industrial Engineering: MIE

Graduate Degree Program Description and Code
• Degree Program in Industrial Engineering: INDE

CIP Code and Description
• INDE Major/Program: CIP Code/Title: 14.3701 - Operations Research

1 Classification of Instructional Programs (CIP) 2010 Codes
and Descriptions from the National Center for Education
Statistics: https://nces.ed.gov/ipeds/cipcode/