Welcome to the Industrial Engineering and Operations Research Department at the University of California at Berkeley. In IEOR, we invent, analyze and teach tools and approaches for designing, understanding, managing risk, and making decisions in complex real-world systems like supply chains, energy systems, healthcare systems, and financial systems.
IEOR Department Chair
Here at Berkeley since 1997
Worked at Merck after undergrad
Undergraduate degree in Chemical Engineering

Research in supply chain and logistics
  -- Biopharma
  -- Collaboration
What is IEOR?

IEOR is Industrial Engineering, a branch of engineering which deals with the optimization of complex processes or systems. It is concerned with the development, improvement, and implementation of integrated systems of people, money, knowledge, information, equipment, energy, materials, analysis and synthesis, as well as the mathematical, physical and social sciences together with the principles and methods of engineering design to specify, predict, and evaluate the results to be obtained from such systems or processes.
What is IEOR?

IEOR is the design and operation of supply chains, logistics systems, healthcare systems, financial systems, and energy systems.

IEOR is management-level decision making.

IEOR is data-driven decision making.

IEOR is risk management.
What is IEOR?

IEOR is engineering analysis to improve quality, productivity and customer service of existing systems.

IEOR is Operations Research, a discipline that deals with the application of advanced analytical methods to help make better decisions.

IEOR is tools to solve problems and make decisions in business and industry, telecommunications and the internet, pricing strategies, grid computing, homeland security, public policy,...
What is IEOR?

IEOR is Management Science, the scientific and mathematical analysis of business processes and systems, aimed at making them more efficient and more profitable.

IEOR integrates marketing, finance, information systems and operations.

IEOR business analytics
What is IEOR?

IEOR is mathematical optimization
IEOR is stochastic modeling
IEOR is simulation
IEOR is statistics
IEOR is quality control
IEOR is inventory theory
IEOR Skills

- Mathematics ➔ as much as an applied math major
- Statistics and probability ➔ an understanding of risk, uncertainty, and data
- General engineering (physics, chemistry, materials, circuits, computer programming) ➔ work with and lead groups of engineers
- Computer and data science skills
- Communication and leadership skills
- Ability to rapidly comprehend real systems
Just about anywhere a decision needs to be made, a system needs to be operated, risk needs to be understood, or processes need to be designed or improved:

- Service industries like financial services, healthcare, transportation, logistics, theme parks, retail
- Manufacturing industries like microelectronics, aerospace, automotive, pharmaceutical
- Consulting companies
- Software companies
- Research and development
Large companies may have departments focusing on IEOR, statistics, and data science.

Other companies don’t have departments, but almost all companies have a need for quantitative decision-makers:

- Some grads work for these companies.
- Some grads work at consulting firms to help these companies.
- Some grads start companies, or join startups in a variety of areas.
On the factory floor or in the executive suite:
Many IEOR graduates zero in on analyzing their company's technology and production systems, and very quickly find themselves catapulted to positions of management responsibility. IE's can work as...

- Consultants
- Project Managers, Department Directors
- Company Presidents or CEOs
Careers: Recent Positions

Consultants: Accenture, Deloitte, and PricewaterhouseCoopers, ZS, independent, Bain Company, Deloitte Consulting, Microsoft, Metamarkets

Finance: Bank of America, Wells Fargo, Deutsche Bank, TIAA-CREF, Barra, Fair Isaac, Morgan Stanley

IE Groups: Bechtel, Boeing, Intel, Lockheed, Raytheon, City of SF, Disney, etc.

Project/group manager: eBay, Microsoft, Cisco, Intuit, Nike, Google, Macy’s

Grad Schools: Columbia, Cornell, Northwestern, Massachusetts Institute of Technology, Stanford, Berkeley
IEOR Careers: Job Prospects

Unique Job Postings vs. Hires for Engineering Occupations

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<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Civil Engineers</td>
<td>6,025</td>
<td>13,657</td>
</tr>
<tr>
<td>Mechanical Engineers</td>
<td>12,523</td>
<td>9,599</td>
</tr>
<tr>
<td>Engineers, All Other</td>
<td>2,197</td>
<td>7,857</td>
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<tr>
<td>Industrial Engineers</td>
<td>24,740</td>
<td>7,737</td>
</tr>
<tr>
<td>Electrical Engineers</td>
<td>8,898</td>
<td>6,200</td>
</tr>
<tr>
<td>Electronics Engineers, Except Computer</td>
<td>4,248</td>
<td>4,841</td>
</tr>
<tr>
<td>Computer Hardware Engineers</td>
<td>1,727</td>
<td>3,025</td>
</tr>
<tr>
<td>Aerospace Engineers</td>
<td>2,061</td>
<td>2,349</td>
</tr>
</tbody>
</table>

Source: EMSI Job Posting Analytics

Careers: Happiness

Where America's Happiest People Work

PayScale Jun 5th 2009 1:34PM

1. Clergy
2. Firefighters
   :
9. Industrial engineers

http://jobs.aol.com/articles/2009/06/05/where-americas-happiest-people-work/
Ranking: top three in the country

Faculty: 14 faculty focused on teaching, research, and leadership

Entrepreneurship: Home of CET

Size: Degrees per year:

- B.S. 50; B.A. 10; M.S. 10; M.Eng 50; Ph.D. 5-7

Salaries: Average starting:

- B.S./B.A. ~$70K; M.Eng ~$85-$120K; Ph.D. ~$120K
Freshman Year

Two reading and composition courses
Math 1A, 1B
Physics 7A
Chemistry or other science
E7 (Computer programming)
Engineering breadth course
Sophomore Year

Math 53, 54
Physics 7B
2 more Engineering breadth courses (see list)
2 Humanities/Social Studies
Computer programming in a high-level language (C, Java, Python, etc.)
E120 (Finance and Engineering Economics)
Junior Year

IEOR 131 Computer Simulation
IEOR 160 Basic Optimization
IEOR 161 Basic Probabilistic Analysis
IEOR 162 Linear Programming Optimization
IEOR 165 Eng Statistical Analysis (or Stat 135)
IEOR 172 Probability & Risk Analysis (or Stat 134)
2 IEOR electives
2 Humanities/Social Studies electives
Senior Year

4 more IEOR electives
5 Technical electives
IEOR 180 Senior Project
At least 6 courses from:

IEOR 130, Methods of Manufacturing Improvement
IEOR 166, Decision Analysis
IEOR 150, Production Systems Analysis
IEOR 151, Service Operations Design and Analysis
IEOR 153, Supply Chain Design and Management
IEOR 115, Databases
IEOR 140, Robotics
IEOR 170, Human Factors in Engineering Design
IEOR 171, Organizational Design
Electives

**Non-engineering:**

Two courses meeting Reading & Composition requirement (e.g., English R1A, R1B)

Four more humanities/social studies courses from an approved list

**Engineering:**

9 units from approved list (e.g., engineering graphics, properties of materials, electrical circuits, statics, etc.)

**Other Technical**

Entrepreneurship, Design and New Media, Supply Chain Logistics, Robotics and Automation, Business and Economics, Mathematics and Statistics, Computer Science, Behavioral Sciences
Math 1A:  Calculus (4 units)
Math 1B:  Calculus (4)
Math 53:  Multivariable Calculus (4)
Math 54:  Lin. Alg. and Diff’l Eqns (4)
Engin. 7:  Intro. to Comp. Prog. (4)
Econ 1, 2, or 3: Intro. To Economics (4)
Bus. Admin. 10: Principles of Business (3)
ORMS Upper Division

IEOR 172: Prob. and Risk Analysis (3)
Econ 101A: Microeconomic Theory (4)
IEOR 131: Simulation (3)
IEOR 160: Operations Research I (3)
IEOR 161: Operations Research II (3)

Four clustered electives

Decision Making in Economic Systems
Decision Making in Industrial and Service Systems
Decision Making in Societal Systems
Algorithmic Decision Making
Ask questions now!!

Send me an email:
Phil Kaminsky
kaminsky@berkeley.edu

Make an appointment to see me

Contact the Head Undergraduate Advisor:
Rob Leachman
leachman@ieor.berkeley.edu