Master of Engineering
Program Information

New deadline for fall admission is December 1st

Updated August 2011

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ORIE at Cornell

- In Ithaca: Rhodes Hall, 2nd & 4th floors
- In Manhattan (CFEM): 55 Broad St, 3rd floor
- 25 regular faculty members
- 35-40 PhD students
- **80-95 new MEng students each year**
- 160-200 undergraduate students
Overview
Fall 2011 MEng Class

- **92** new MEng students
- **48** universities
- **19** undergraduate majors
- **16** countries

**Median Statistics**

- Undergraduate GPA: *3.6 / 4.0*
- GRE - Q: **800**  GRE - V: **600**  GRE - A: **4.0**
- 73% Male, 27% Female
- 70% International, 30% US Citizens
- 61% have undergraduate degrees from US institutions
Program Framework

Practical Capstone
Engineering Design Project

Professional Development
Workshops, Seminars, Practitioner-led Courses, Internships

ORIE Core and Electives
Complemented by other Engineering, Business, Hotel Courses
Prerequisites

Before beginning the ORIE MEng program, each student must have successfully completed:

1. A standard **engineering calculus sequence**, including linear algebra and vector calculus

2. A **calculus-based probability and statistics course** equivalent to ENGRD 2700**

3. An **intermediate-level computer programming course** equivalent to ENGRD 2110**, conducted in a widely used language such as C, C++, Java, or MATLAB

4. Any concentration-specific prerequisites (see handbook)

**ENGRD 2700 and ENGRD 2110 are offered Fall, Spring, and Summer at Cornell**
MEng Requirements

- **30 credit hours** of Technical coursework
- **19 credit hours** of Technical Engineering coursework
- **12 credit hours** of ORIE coursework
- **ORIE Core Courses** (18 credit hours)
- Case Studies Course* (ORIE 5110)
- **MEng Project**
- Enterprise Engineering Colloquia* (ORIE 9100 and 9101)

* Some exceptions, see handbook

MEng Student Handbook:
http://www.orie.cornell.edu/orie/brochures/
## ORIE Core Courses

<table>
<thead>
<tr>
<th>Fall Semester</th>
<th>Spring Semester</th>
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</thead>
<tbody>
<tr>
<td>ORIE 5300: Optimization I (4 cr)</td>
<td>ORIE 5310: Optimization II (4 cr)</td>
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<tr>
<td></td>
<td>or ORIE 5311 (2 cr)</td>
</tr>
<tr>
<td></td>
<td>or ORIE 4300: Optimization Modeling (3 cr)</td>
</tr>
<tr>
<td>ORIE 5500: Prob and Stat II (4 cr) for non-FE students</td>
<td>ORIE 5510: Stochastic Processes (4 cr) for non-FE students</td>
</tr>
<tr>
<td>ORIE 5580: Simulation Modeling (4 cr) ORIE 5581 (2 cr) for FE students</td>
<td>ORIE 5582 (2 cr) for FE students</td>
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</tbody>
</table>
Concentration and Minor Options
MEng Concentrations and Minors

- Applied Operations Research
  ~35%
- Data Analytics
- Information Technology
  ~55%
- Financial Engineering
- Manufacturing and IE*
  ~10%
- Strategic Operations*
- Systems Engineering*

*Administered in conjunction with other programs
Applied Operations Research

- Most *flexible* concentration option
- No additional prerequisites
- No specific elective requirements
- MEng Project: ORIE 5980
  - Wide variety of project topics
  - ORIE faculty serve as project advisors
  - Project slate presented and teams assigned in mid-October
Data Analytics

• Additional Prerequisite: ORIE 5500 (or equivalent)

• Required Course Areas:
  - Statistical Data Analysis (2 courses)
  - Database/Spreadsheet Technology (1 course)
  - Marketing and Pricing Strategy (1 course)

• Course options in handbook

• Suitable courses may be substituted by petition

• MEng Project: ORIE 5980
  - At least one project will have a DA focus
Information Technology

- **Additional Prerequisite**: At least one ORIE core course
- **Required Course Areas**:
  - Technology and Infrastructure (1 course)
  - Information Economics and Strategy (1 course)
  - Managing IT Implementation (1 course)
  - Approved Elective Course
- **Course options in handbook**
- **Suitable courses may be substituted by petition**
- **MEng Project: ORIE 5980**
  - At least one project will have an IT focus
Financial Engineering

• **Additional Prerequisites**: ORIE 5500 and basic finance. ORIE 5510 and C++ are strongly recommended.

• First Fall Term:
  - Derivatives Securities I and II (NBA 6730/NBA 6740)
  - Fixed-Income Securities & Interest Rate Options (NBA 5550)
  - FE with Stochastic Calculus I (ORIE 5600)
  - Monte Carlo Simulation (ORIE 5581)
  - Optimization I (ORIE 5300)
Financial Engineering

- Spring Term:
  - FE with Stochastic Calculus II (ORIE 5610)
    or Credit Risk (ORIE 5620)
    or Quantitative Methods in Risk Management (ORIE 5650)
  - Optimization II (ORIE 5310 or ORIE 5311)
    or Optimization Modeling (ORIE 4300)
  - Monte Carlo Methods in Financial Engineering (ORIE 5582)
  - Statistics for Financial Engineering (ORIE 5640)
    or Applied Time Series Analysis (ORIE 5550)
  - Investments and Portfolio Analysis (NBA 5420)
Financial Engineering

• Second Fall Term (at CFEM):
  - Financial Engineering Project (ORIE 5961)
  - Computational Methods in Finance (ORIE 5630)
  - Seminar in Financial Engineering (ORIE 9160*)
  - 2 CFEM elective credits**

*  At least one credit of ORIE 9160 must be taken. A second credit must be taken from among ORIE 9100, 9101, or 9160 (2-cr version).

** Students must complete at least 6 FE elective credits during program (course options in handbook)
Manufacturing & Industrial Engineering Concentration

John Callister
Director of the Harvey Kinzelberg Entrepreneurship in Engineering Program
M&AE/OR&IE Departments
291 Grumman Hall/426 Rhodes Hall
jc62@cornell.edu
Fall Semester – Required Courses

• OR&IE 5100
  Design of Manufacturing Systems

• OR&IE 5910
  Manufacturing & IE Project Course

• OR&IE 9100
  Enterprise Engineering Colloquium
Spring Semester – Required Courses

• NBA 5530
  Accounting and Financial Analysis for Engineers (or NBA 5020 Managerial Cost Accounting)

• OR&IE 5910
  Manufacturing & IE Project Course

• OR&IE 9101
  Enterprise Engineering Colloquium
Select Three or More

1. M&AE 5200 Dimensional Tolerancing (Fall, 2 credits)
2. ECE 4320 MicroElectro Mechanical Systems (MEMS) (Fall, 3 credits)
3. ECE 5360 Nanofabrication of Semiconductor Devices (Fall, 4 credits)
4. OR&IE 5126 Supply Chain Management (Spring, 3 credits)
5. A&EP 6620 Micro/Nano-fabrication and Processing (Spring, 3 credits)
6. A&EP 6630 Nanobiotechnology (Spring, 3 credits)
7. CEE 5900 Project Management (Fall and Spring, 4 credits)
8. M&AE 4550 Introduction to Composite Materials (Fall, 4 credits)
9. OR&IE 5140 Applied Systems Engineering (Fall, 3 credits)
10. OR&IE 5122 Inventory Management (Fall, 3 credits)
11. NBA 6120 Disruptive Technologies (Fall, 2 credits)

...and others by petition...just ask!
M&IE Projects

• Are always outside, off campus, with real companies in the area. Our current arrangement is to have projects with Pall Trinity Micro Inc. in Cortland, NY.

• Requires frequent travel to the project company (a free shuttle is available if you do not have a vehicle).

• Please keep a day or half-day open, as you will need time during the day to visit!

• Project reports and presentations in December (update) and May (complete).
Strategic Operations Immersion

Jan Suwinski
Suresh Muthulingam
Andrew Davis (Core Operations)

Johnson Graduate School of Management
Strategic Operations Immersion

• A coherent, integrated view of an entire industrial enterprise:
  - Overview of current issues and trends.
  - Practical understanding of operations.
  - Linkages between operations and other functions inside and outside the company.
  - Top-level through floor-level issues.
  - Classroom learning plus 15 site visits to see current practices in Operations.
Coursework

• Format:
  ➢ One of seven Johnson School “immersion” courses.
  ➢ Your only class.

<table>
<thead>
<tr>
<th>Required Courses</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operations Management Core</td>
<td>2.5</td>
</tr>
<tr>
<td>SSO Practicum</td>
<td>4.5</td>
</tr>
<tr>
<td>MLO</td>
<td>2.5</td>
</tr>
</tbody>
</table>

Two out of the following Three options

| Consulting Focus                        | 3.0     |
| Cost Accounting                         | 3.0     |
| Supply Chain Management                 | 3.0     |

➢ Starts January 16, one week earlier than normal classes.
Strategic Operations Immersion

• Features
  ➢ Johnson, Engineering, and I&LR Students
  ➢ Group Work
  ➢ International Issues
  ➢ Exposure to Johnson School
  ➢ Training for General Management/Consulting jobs
CORNELL SYSTEMS engineering

MASTERING COMPLEXITY

Professor Linda Nozick, Program Director

Cornell Systems Engineering
202 Rhodes Hall
Cornell University
Ithaca, New York 14853
Telephone: 607.254.8998
Email: systemseng@cornell.edu
www.systemseng.cornell.edu
Systems Engineering Minor
Course Requirements

• Applied Systems Engineering (ORIE 5140)
• Systems Arch., Behavior, Optimization (ORIE 5142)
• Project Management (CEE 5800)
• Systems Engineering Project (ORIE 5940)
• Systems Elective (any MEng course with substantial systems content: see pre-approved list)
Projects
Engineering Design Project

• ORIE MEng students tackle real problems for real companies that bring real value
• Wide variety of client organizations, industries, project topics, and needed ORIE skill sets
• ORIE faculty members serve as project advisors
• Timeline and format of projects vary by MEng concentration, all are ≥5 credit hours
• Deliverables include a professional quality project report and presentation to client
• See the April 6, 2011 news article on MEng projects: http://www.orie.cornell.edu/orie/news/
ORIE 5980 Project Timeline
(AOR, DA, IT concentrations)

• **Mid-October:** Project Slate Introduction
  - Faculty advisors and/or sponsors describe projects
  - Students submit preferences and are assigned to teams

• **October-December**
  - Initial visits, fact-finding, detailed project proposal

• **Early January until classes start (2-3 weeks)**
  - Intensive project work, possible follow-up visit

• **January-April**
  - Project work continues throughout spring semester

• **Late April**
  - Prepare presentation and final report

• **May**
  - Deliver presentation and final report
Recent ORIE 5980 Projects

- Determination of Optimal Planning Horizon Length for CN Rail (Canadian National Railway)
- Forecasting and Optimization for Airline Revenue Management (Hitit Consulting)
- Investigation of NSAT and Performance Metrics for Microsoft Corporation (Microsoft Licensing)
- Deployment of Small Unmanned Aerial Systems for Local Law Enforcement (Mitre Corporation)
- Aircraft Route Scheduling for Fixed Wing Operations (Ornge)
- Reverse Supply Chain Prediction & Optimization (Walmart.com)
- Allocating Customer Service Engineer Workforce at the Xerox Corporation: A Rule Based Heuristic (Xerox)
ORIE 5961 Project Timeline
(FE concentration)

• **April-May:** Projects Introduced
  - Faculty advisors and/or sponsors describe projects
  - Students submit preferences and are assigned to teams

• **June-August**
  - Background reading and preparation

• **September-November**
  - Project work continues throughout fall semester

• **Late November**
  - Prepare presentation and final report

• **December**
  - Deliver presentation and final report
Recent ORIE 5961 Projects

- Algorithmic Trading – Measuring Execution (Alliance Bernstein)
- Hedging Strategy for Short Gamma Position of Swaption (Deutsche Bank)
- Mutual Fund Replication (Goldman Sachs)
- Implied Volatility Curve Sketching and Input Optimization (HETCO)
- UK Non-Conforming Mortgage Modeling (Morgan Stanley)
- Long/Short US Healthcare Trading Strategy (Royal Bank of Canada)
- Regime-Switching Factor Model (Sanford Bernstein)
Professional Development
Professional Development

- ORIE *MEng Connect* Program
- ORIE Online Profiles
- Career Services
- Workshops and Seminars
- Alumni Connections
MEng CONNECT Program

• 5-Day Workshop for ORIE MEng students focused on essential skills for success. Topics include:
  - American Business Culture
  - Communication Essentials
  - Working in Teams
  - Selling Ideas and Selling Yourself
  - Workplace Communications
  - Professional Ethics

• Held in August the week before fall classes begin

• **Mandatory** for all incoming students
ORIE Online Profiles

http://www.orie.cornell.edu/orie/academics/meng/our-students.cfm

- Potential employers will be able to view your:
  - Name and Cornell email
  - Degree and concentration
  - Expected graduation date
  - Photograph
  - Professional statement
  - Resume
Career Services

Engineering Co-op & Career Services
201 Carpenter Hall, 607-255-5006
http://www.engineering.cornell.edu/resources/career_services/
eng-career@cornell.edu

http://www.engineering.cornell.edu/resources/career_services/events.cfm

Cornell Career Services
103 Barnes Hall, 607-255-5221
http://www.career.cornell.edu/
career@cornell.edu

http://ccs.career.cornell.edu/Calendar/Browse.php
Career Services

- ECS and CCS offer a full range of workshops on resume writing, cover letters, networking, interviewing, job search strategies, etc.
- On-campus career fairs (Sept, Feb)
- On-campus recruiting
- Online resume submission (Cornell CareerNet)
- Resume and cover letter review
- Mock interviews
Workshops and Seminars

• College of Engineering Orientation for New MEng Students
  ➢ [http://www.engineering.cornell.edu/academics/graduate/graduate_student_life/College-Of-Engineering-Orientation.cfm](http://www.engineering.cornell.edu/academics/graduate/graduate_student_life/College-Of-Engineering-Orientation.cfm)
  ➢ Includes MEng Career Workshops and Networking Reception

• ORIE 9100/9101: Enterprise Engineering Colloquium
  ➢ [http://www.engineering.cornell.edu/alumni/association/seminar/](http://www.engineering.cornell.edu/alumni/association/seminar/)
  ➢ Alumni speakers discuss their experiences across a wide spectrum of industries, functions, and ventures

• Engineering Management Ethics Workshop
  ➢ Held annually in October – open to all MEng students
  ➢ Cross-disciplinary facilitators and participants
Alumni Connections

- ORIE 9100/9101: Enterprise Engineering Colloquium
  - [http://www.engineering.cornell.edu/alumni/association/seminar/](http://www.engineering.cornell.edu/alumni/association/seminar/)
  - During the fall semester, CEAA sponsors post-seminar gatherings for speakers and small groups of students (6-8 students each week).

- CCNet Mentor Database
  - [http://www.career.cornell.edu/CCNet.html](http://www.career.cornell.edu/CCNet.html)
  - Includes over 1,000 alumni from Cornell and some employers who are willing to provide advice to students. Once you log into CCNet, under “Networking” in the middle of the tool bar at the top, click “CCNet Mentors”.

- ORIE Mentor Database
  - [http://www.orie.cornell.edu/orie/students/search-for-a-mentor.cfm](http://www.orie.cornell.edu/orie/students/search-for-a-mentor.cfm)
  - ORIE’s own mentor database – use it to connect with alumni in your field of interest for career advice and professional networking.
Placement
ORIE MEng Placement

• May 2010 Graduates
  - At graduation: ~65%
  - After six months: >85%

• Summer 2010 Internships (FE students): >90%

• December 2010 Graduates
  - At graduation: ~70%
  - After six months: >90%

• May 2011 Graduates
  - At graduation: >95%

• Summer 2011 Internships (FE students): 100%

• Median starting salary range for recent ORIE MEng graduates
  (Dec 2010 & May 2011): $75,000 - $80,000
Where do ORIE students get jobs?

• **Consulting:** Accenture, BCG, Deloitte, Ernst & Young, Gotham, First Manhattan, IBM, KPMG, Kurt Salmon Associates, McKinsey, Mercer Oliver Wyman, MicroStrategy, Rosetta Marketing Strategies, ZS Associates, …

• **Financial Services:** Archelon, Bank of America, Barclays Capital, BlackRock, Capital One, Citi, Credit Suisse, Goldman Sachs, HSBC, Jane Street Capital, JP Morgan, Morgan Stanley, Sanford Bernstein, UBS, …

• **Technology:** Bloomberg, Capgemini, D.E. Shaw, Facebook, Gemini Systems, Google, Microsoft, Misys, Oracle, Palantir, Yahoo!, …

• **Manufacturing/Logistics:** Boeing, GE, L’Oreal, Johnson & Johnson, P&G, Schlumberger, VistaPrint, UPS, …

• **Government Related:** Lockheed Martin, Logistics Management Institute, Mitre Corporation, Northrop Grumman, Raytheon, Sandia National Labs, …
Applying and Financial Aid
Applying to the MEng Program

http://www.orie.cornell.edu/orie/academics/meng/programdescription/apply.cfm

Deadline for fall admission is December 1st
ORIE Financial Aid

• Like most graduate professional degree programs, financial aid is extremely limited.

• All financial aid awarded by the School of ORIE is merit-based. Check the appropriate box on the admission application, and you will automatically be considered for financial aid.

• MEng students may be awarded partial tuition fellowships or Graduate Teaching Specialist (GTS) positions from the School of ORIE.

• MEng students are not eligible for ORIE research assistantships.
Other Financial Aid

- Other Financial Aid resources:
  - http://www.gradschool.cornell.edu/costs-and-funding/fellowships

- Loan Information:
  - http://www.gradschool.cornell.edu/costs-and-funding/loans
  - http://www.globalslccom.com/
Additional Information

• MEng Program Information, Students, and FAQs
  ➢ http://www.orie.cornell.edu/orie/brochures/index.cfm
  ➢ http://www.orie.cornell.edu/orie/academics/meng/faq/
  ➢ http://www.orie.cornell.edu/orie/academics/meng/our-students.cfm

• CFEM
  ➢ http://www.orie.cornell.edu/manhattan/cfem/

• Latest ORIE News
  ➢ http://www.orie.cornell.edu/orie/news

• International Student and Scholars Office
  ➢ http://www.isso.cornell.edu

• Graduate School
  ➢ http://www.gradschool.cornell.edu
ORIE Contacts

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