MIT System Design and Management Program

MIT System Design and Management

Information Session

Pat Hale, Executive Director

Joan Rubin, Industry Co-Director

Leadership, Innovation, Systems Thinking
SDM Mission

To educate future technical leaders in architecting, engineering, and designing complex products and systems, preparing them for careers as the technically grounded senior managers of their enterprises.

To set the standards for delivering career-compatible professional education using MIT’s most advanced information and communication technologies.

“This is a program for those who want to lead engineering, not leave engineering.”
— Prof. Tom Magnanti, SDM Founding Co-Director
SDM Program Overview

• Joint sponsorship by School of Engineering & Sloan School
• Single degree - S.M. Engineering & Management
  ▪ Minimum 92 MIT course credit units + 24 thesis units
  ▪ Begins August 24, 2015 (2 week orientation 8/24-9/3)
  ▪ 1 semester residency requirement (for MIT S.M. degree)
  ▪ August immersion and 1-week “business trips” build cohorts
• Theses typically link sponsored projects with faculty research
SDM Student Demographics (2010-2014)

Program Option
- Full Time
- Commuter
- Distance

Sponsorship
- Sponsored
- Partially Sponsored
- Self Supporting

Previous Degree
- Bachelors
- MS or MBA
- PhD or MD

Previous Major
- Engineering
- Science
- IT/Computer Science
- Other
SDM Student Demographics (continued)

International/Domestic

Years of Experience

Leadership, Innovation, Systems Thinking
# SDM and IDM Masters Degree

## Curriculum Detail

<table>
<thead>
<tr>
<th>Category</th>
<th>Rationale</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>SDM or IDM Core</td>
<td>Provide an integrated view of architecting, engineering and managing the development of systems. No Substitutions</td>
<td>38</td>
</tr>
<tr>
<td>Management Foundations</td>
<td>Effective knowledge to build upon your management foundation course(s). Can also be a second management or leadership specialty.</td>
<td>12 †</td>
</tr>
<tr>
<td>Management Electives</td>
<td>Provide the basic building blocks for engineering at the system level to prepare for application areas.</td>
<td>15 *</td>
</tr>
<tr>
<td>Engineering Foundations</td>
<td>Electives detailing how the basic math and engineering foundations are applied in a variety of application domains.</td>
<td>12 †</td>
</tr>
<tr>
<td>Engineering and Design Electives</td>
<td>Non-credit workshops/seminars covering applicable topics important to MIT and SDM.</td>
<td>15 *</td>
</tr>
<tr>
<td>Workshop Sessions</td>
<td>Non-credit workshops/seminars covering applicable topics important to MIT and SDM.</td>
<td>0</td>
</tr>
<tr>
<td>Masters Thesis</td>
<td>Thesis research and writing, normally spread over 2 semesters. Registration requires an approved thesis proposal.</td>
<td>24</td>
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</tbody>
</table>

### Core Requirements

- **ESD.411 Foundations of System Design and Management I (16)**
- **ESD.412 Foundations of System Design and Management II (6)**
- **ESD.413 Foundations of System Design and Management III (16)**

### Management Foundations

- **ESD.414 Strategic Management of Innovation and Entrepreneurship (6)**
- **ESD.415 Management Accounting and Control (9)**
- **ESD.416 Introduction to Operations Management (9)**
- **ESD.417 Marketing Management (9)**

### Management Electives

- **ESD.421 Leadership and Organizational Change (TBA)**
- **ESD.422 Discovering Your Leadership Signature (9)**
- **ESD.423 Marketing Strategy (9)**
- **ESD.424 Operations Strategy (9)**

### Engineering Foundations

- **ESD.431 Engineering Risk-Benefit Analysis (12)**
- **ESD.432 Engineering Systems Analysis for Design (12)**
- **ESD.433 Multidisciplinary Systems Design Optimization (12)**

### Engineering and Design Electives

- **ESD.441 System Safety Concepts (12)**
- **ESD.442 Concepts in the Engineering of Software (12)**
- **ESD.443 Architecting Engineering Software Systems (12)**

### Workshop Sessions

- **Leadership Workshop**
- **Thesis Seminar(s)**
- **Professional Communication**
- **Academic Standards**

### Masters Thesis

- **Master of Science Thesis in Engineering and Management (24)**

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Minimum of 92 subject units + 24 thesis units

† 12 or more units of fundamental subjects in both management and engineering

* 30 or more units of elective subjects, must be balanced (±3) engineering:management

Leadership, Innovation, Systems Thinking
# Career Compatible Program Options

## 12-21 months

<table>
<thead>
<tr>
<th>Period</th>
<th>Orientation</th>
<th>Core Courses</th>
<th>Thesis Duration</th>
<th>Degree List</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Full Time On Campus 12m</strong></td>
<td>Orientation 16 Core + 27 units, 6 Core 16 Core + 27 units, Thesis Degree List</td>
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</tr>
<tr>
<td><strong>SDM Distance Degree Program 21m</strong></td>
<td>Orientation 16 Core (distance), 6 Core 16 Core (distance), Thesis 54 units (on campus)</td>
<td>Thesis</td>
<td>Thesis 54 units (on campus)</td>
<td>Degree List</td>
</tr>
<tr>
<td><strong>Commuter or RA/TA Full Time On Campus + Internship 21m</strong></td>
<td>Orientation 16 Core + 12 units + RA/TA/Work 16 Core + 12 units + RA/TA/Work, Internship / Work 15 units + RA/TA/Work Thesis 15 units + RA/TA/Work</td>
<td></td>
<td>Thesis 54 units (on campus)</td>
<td>Degree List</td>
</tr>
<tr>
<td><strong>Full Time On Campus + Internship 16m</strong></td>
<td>Orientation 16 Core + 18 units, 6 Core 16 Core + 18 units, Internship / Work 18 units Thesis Thesis Degree List</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Military July to July 12m</strong></td>
<td>Thesis Orientation 16 Core + 27 units 6 Core 16 Core + 27 units, Thesis Degree List</td>
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<tr>
<td><strong>SUTD Fellow Full Time On Campus 12m</strong></td>
<td>Orientation 16 Core + 27 units, 6 Core 16 Core + 27 units, Thesis Degree List</td>
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<tr>
<td><strong>Certificate Program 12m</strong></td>
<td>Orientation 16 Core (distance), 6 Core 16 Core (distance), Transition to degree program Thesis Degree List</td>
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</tr>
<tr>
<td><strong>Certificate Transition to Distance 21m</strong></td>
<td>Orientation 16 Core (distance), 6 Core 16 Core (distance), Transition to degree program 54 units (on campus) Thesis Thesis Degree List</td>
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Leadership, Innovation, Systems Thinking
Industry Engagement

Joan Rubin
Industry Co-Director, SDM Program
jsrubin@mit.edu
Industry Involvement in SDM

• Industry engagement is a driving force behind the System Design and Management Program

• SDM affiliation helps companies address the ever-increasing need for systems thinking across organizations concerned with new strategic approaches to innovation in:
  + technology
  + product development
  + supply chain
  + global operations

• Benefits from affiliation with SDM include:
  + Sponsoring employees
  + Sponsoring internships and thesis research
  + Hiring SDM Fellows
Ongoing Connections to Industry

• Guest lecturers at SDM events
  + Educates students on new industries and opportunities
  + Allows companies to solicit feedback on real day-to-day challenges

• Sponsorship of class projects, internships and thesis research

• Participate in annual Systems Thinking conference
  + Industry leaders and MIT faculty share best practices

• Judge product design and development projects
  + Learn and share “tool box” of approaches to systems design

• Host plant tours

• Sponsorship of students to enhance systems thinking capabilities within an organization
  + Masters of Science program
  + Certificate program
SDM Alumni: Industry Breakdown

- **Design (Products, Systems):** 149 (24%)
- **Software/Programming:** 50 (8%)
- **Hardware/Electronics:** 32 (5%)
- **Government/Public Service:** 3 (0%)
- **System Security:** 5 (1%)
- **Research:** 22 (4%)
- **Real Estate:** 1 (0%)
- **Telecommunications:** 10 (2%)
- **Manufacturing:** 17 (3%)
- **Healthcare:** 13 (2%)
- **Energy & Power:** 25 (4%)
- **Financial Services:** 40 (6%)
- **Military:** 35 (6%)
- **Defence:** 18 (3%)
- **Consulting:** 9 (1%)
- **Automation/Robotics:** 32 (5%)
- **Bio/Pharma:** 6 (1%)
- **Energy & Power:** 25 (4%)
- **Academic:** 10 (2%)
- **Academic - MIT:** 15 (2%)
- **Unknown:** 77 (12%)
- **Unknown International:** 1 (0%)

No other categories have any entries.
Alumni Impact...

Hans D Schumacher, SDM 00
Senior Vice President,
Business Technology Group
Bank of America

Freddie Douglas, SDM 00
Manager, Office of Safety & Mission Assurance, NASA

Bruce Hoopes, SDM 98
VP Engineering
UTC Fire & Security

Bob Smith, SDM97
VP, Advanced Technology
Honeywell International Corp.

Howard Gerwin, SDM98
Manager, Advanced Systems Engineering, John Deere

Agus Sudjianto, SDM 99
Director, Analytics & Modeling
Lloyd’s Banking Group
Dennis Evans, CAPT, US Coast Guard, SDM10
Commander, Rescue 21 Project
Department of Homeland Security

Leandre Adifon, Cert01
VP Engineering
Ingersoll Rand

Mona Masghati Vernon, SDM 09
Director, Technology Strategy
Thomson Reuters

Lisa Cratty, SDM 01
Director, R&D
Becton, Dickinson

Varun Parmar, SDM 04
Senior Manager, Corporate Strategy
Adobe Systems

Rehan Asad, SDM 07
Associate Director, Corporate Strategy
AT&T