Graduate Education:
Integrating Research, Curriculum and Practice

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Elements of Graduate Education

• Curriculum
  • Subjects focused on Lean
  • Subjects incorporating Lean in context of other topics
  • Schools of Engineering and Management

• Research
  • Masters and Doctors thesis projects
  • Schools of Engineering and Management

• Practice
  • Research involves industry or government: “The Laboratory”
    • Work-study
    • Internships
    • LAI

Elements are not MIT specific.
Integrating the Lean Enterprise: A Core Graduate Subject

- People, technology, process & information dimensions of an effective lean company addressed in a unified framework.
- Emphasis place on integration across the enterprise
- MIT and guest speakers
- 20-40 students per semester
  - Mix of in-class and distance learning
- Team project involving evaluation of actual enterprise-level value stream
Integrating the Lean Enterprise:
Lecture Topics

- Lean Fundamentals
- Lean Enterprises
- Value and Enterprise Stakeholders
- Lean Manufacturing
- Lean Engineering
- Integrated Concurrent Engineering
- Lean Supply Chain Management
- Integrated Supply Chains
- Enterprise Information Flow
- Enterprise Information Systems
- Enterprise Tools & Technologies
- People & Organizational Issues in the Lean Enterprise
- Knowledge Management Principles and Process
- Strategy & Measurement in the Lean Enterprise
- Integrated Lean Enterprise Tool Set - TTL & LESAT
- Transformational Leadership
- Industry Case Study
- Improvement Initiative Comparison (6 σ, TQM, Agile, Lean, etc.)
- Enterprise Integration
- Fundamentals of Enterprise Integration
Subjects Incorporating Lean: A Sampling from MIT

Engineering
- Aircraft Systems Engineering
  - Value Framework
  - Lean engineering
- Space Systems Engineering
  - Design for value approaches
- Manufacturing Processes and Systems
  - Elements of Toyota Production System

Joint Management/Eng’g
- Organizational Processes
  - Modules on lean transformation, socio-technical systems, JIT, lean implementation
- Systems Architecture
  - Value framework
- ESD Doctoral Seminar
  - Lean included in modules on the aerospace industry and socio-technical systems.
The “engine” for student education, curriculum content and faculty knowledge.

In total, there have been over 200 MIT master and doctoral theses addressing lean enterprise topics

- Leaders for Manufacturing Program
- Systems Design and Management Program
- Technology and Policy Program
- Technology, Management and Policy Program
- Departments of Aeronautics & Astronautics, and Mechanical Eng’g
- Sloan School of Management
Symbiotic Interaction: An Emergent Finding

Research

Tools and Frameworks

Data and Validation

Tools and Frameworks

Testing and Tuning

Curriculum

People and Participation

Impact on Practice

Practice

Tools and Frameworks