Mechanical and Industrial Engineering (MIE) Graduate Programs

An Informational Session for New MIE Graduate Students

August 26, 2014

Nader Jalili, Professor and Associate Department Chair for Graduate Studies and Research
MIE Department Administrators

- **Professor Hanchen Huang**  
  *Department Chair*  
  Office: 334 Snell Engineering

- **Professor Emanuel Melachrinoudis**  
  *Associate Chair and Director of Industrial Engineering Program*  
  Office: 334 Snell Engineering

- **Professor Andrew Gouldstone**  
  *Associate Chair and Director of Mechanical Engineering Program*  
  Office: Homes Building

- **Professor Nader Jalili**  
  *Associate Chair for Graduate Studies and Research*  
  Office: 334 Snell Engineering
MIE Department At A Glance

- The MIE Department at Northeastern University (www.mie.neu.edu) is ranked among top 50 in the nation.
- 46+ full-time faculty among whom there are 2 National Academy of Engineering (NAE) members, 2 National Science Foundation (NSF) Center Directors, and many national/international society level fellows.
- Combined annual research funding of over $10 million.
- 150+ Ph.D. and 300+ MS students, and a total combined graduate/undergraduate student population of over 1500.
- Home to top-ranked cooperative education program.
- Home to multiple federally-funded research centers including:
  - The NSF Nanoscale Science and Engineering Center (NSEC) for High-rate Nanomanufacturing,
  - The NSF Center for Health Organization Transformation,
  - The NSF Center for Microcontamination Control
- Plans to dramatically expand the number of faculty hires across the University, including MIE Department.
MIE Graduate Affairs Committee Chair

Professor Nader Jalili, 334J SN
617-373-3629, n.jalili@neu.edu

- Office Hours: MW 5:00-6:00 PM

Examples of duties include:

- Overseeing all graduate affairs (admission, recruiting, TA assignments, awards, graduation, …)
- Reviewing all petition requests and approval
- Administering PhD Qualifying Exams
- ….
MIE Department Concentration Areas

- Materials Science & Engineering
- Mechanics & Design
- Mechatronics (started in Fall 2014)
- Thermofluids Engineering
- Industrial Engineering
  - Including Operation Research
Graduate (Concentration) Advisors

- Materials Science & Engineering
  Professor Teiichi Ando, 249 SN
  617-373-3811, tando@coe.neu.edu

- Mechanics & Design
  Professor Sinan Muftu, 359 SN
  617-373-4743, smuftu@coe.neu.edu

- Mechatronics
  Professor Nader Jalili, 334J SN
  617-373-3629, n.jalili@neu.edu
Graduate (Concentration) Advisors

- **Thermofluids Engineering**
  - Professor Mo Taslim, 371 SN
  - 617-373-5514, m.taslim@neu.edu

- **Industrial Engineering**
  - Professor Sagar Kamarthi, 301 SN
  - 617-373-3070, sagar@coe.neu.edu

- **Operation Research**
  - Professor Emanuel Melachrinoudis
  - Office: 334 Snell Engineering
  - email: emelas@coe.neu.edu
Master of Science in ME and IE

- **Thesis Option** (required for all TA/RA students):
  - Six 4-SH Courses (24 SH), with min. QPA of 3.000
  - MS Thesis (8 SH)
  - Total of 32 SH; ~2 years

- **Project Option**:
  - Seven 4-SH Courses (28 SH), with min. QPA of 3.000
  - MS Project or Approved (Independent) Course (4 SH)
  - Total of 32 SH; ~1.5-2 years

- **Course Work Option**:
  - Eight 4-SH Courses (32 SH), with min. QPA of 3.000
  - Total of 32 SH; ~1.5 years
Special Requirement for Both MS and PhD Programs in ME and IE

- All ME and IE graduate students must complete, during their first year of full-time study, the following two courses (each one with 0 SH):
  - Technical Writing Seminar (MEIE 6800), and
  - Research Seminar in Mechanical and Industrial Engineering (MEIE 6850).

- If appropriate, part-time students may petition the graduate committee to waive these requirements.
Department Seminar Series

- Department organizes seminar series every fall.
- Distinguished speakers are invited to give talks on a wide range of cutting edge research topics.
- Both PhD and MS students are required to attend the seminars (at least 70% participation is needed – attendance is taken!).
Plan of Study and Course Selection (MS Students Only)

- It is recommended that all new students attend orientation sessions held by MIE department and the Graduate School of Engineering to acquaint themselves with the course work requirements and research activities of the department as well as with general policies, procedures and expectations.

- In order to receive proper guidance with their coursework needs, all MS students are strongly encouraged to complete and submit a fully-signed Plan of Study (PS) to the Department before enrolling in second semester courses.
Plan of Study and Course Selection (MS Students Only) …

- The PS form will help the students in managing their coursework as well as the Department in planning for offering the requested courses.
- The PS form may be modified at any time as the students proceed in their degree programs. However, requests for changes in PS must be processed before the requested change actually takes place.
- A revised PS form must also be approved and signed.
- See PS form!
Academic and Research Advisors

- All non-thesis students are advised by the academic advisor designated for their respective concentration or program.

- Thesis-option MS students must find a research advisor within their first year of study.

- Thesis-option MS students may have Thesis Reader(s) at the discretion of their research advisor. The research advisor must be a full-time faculty member of the MIE department; otherwise a petition must be filed.

- Thesis-option students are advised by the academic advisor of their concentration before they select their research advisor.
PhD Program in ME and IE

- **Coursework Requirements:**
  - **Entering with BS (Direct PhD)** (~5 years):
    - Twelve 4-SH Courses (48 SH), with min. QPA of 3.000
    - A minor comprising of at least 8 SH outside of concentration
  - **Entering with MS (Regular PhD)** (~4 years):
    - Six 4-SH Courses (24 SH), with min. QPA of 3.000
    - A minor comprising of at least 8 SH outside of concentration

- **PhD Qualifying Exam**
  - Preliminary Exam (6 hours of written exam on 4 different subjects)
  - Area Exam (oral presentation of research plan and oral area exam)

- **Dissertation Defense**
Academic and Research Advisors

- PhD students must find a research advisor within their first year of study.
- The research advisor must be a full-time faculty member of the MIE department; otherwise a petition must be filed and approved by MIE graduate committee.
- Students are advised by the academic advisor of their discipline before they select their research advisor.
The primary use of the Petition Form (http://www.coe.neu.edu/coe/pdfs/gse/PetitionForm.pdf) is to request and document advisor and GSE approval for elective courses outside the approved curriculum for your program.

This documentation is necessary to clear students to graduate at the end of their program.

Graduate School reviews all petitions and the petition is emailed back to the student with final decision.
Graduate School of Engineering Registration Override Request Form

- Registration Override Request Form (http://www.coe.neu.edu/coe/pdfs/gse/Course Override.pdf) needs to be completed and submitted to the Grad School when they encounter a “registration add error” when registering for a course using the Banner registration system (due to pre-req requirements or other restrictions placed on the course).

- Student is emailed when the registration request is complete.
PhD Preliminary Examination

- All Doctoral Students who hold a master’s degree must take the Preliminary Exam no later than the first time that it is offered after their first academic year of study.

- Those admitted directly with a bachelor’s degree must take the Preliminary Exam no later than the first time that it is offered after their first two years of study.

- The PhD Preliminary Examination is six hours in length and covers, with equal emphasis, four different subjects from among the twenty five subjects organized in the following nine groups (see table next).

- Students consult dissertation adviser to select these 4 subjects.
# Preliminary Examination Subjects

<table>
<thead>
<tr>
<th>Group</th>
<th>Subjects</th>
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| A     | Engineering Mathematics (A1)  
       | Engineering Computation (A2)  
       | Probability and Statistics (A3) |
| B     | Thermodynamics (B1)  
       | Fluid Mechanics (B2)  
       | Heat Transfer (B3) |
| C     | Dynamics and Vibrations (C1)  
       | Mechanics of Deformable Bodies (C2)  
       | Dynamic Systems and Control (C3)  
       | Finite Element Method (C4) |
| D     | Materials Science (D1)  
       | Mechanical Behavior of Materials (D2)  
       | Thermodynamics of Materials (D3)  
       | Kinetics of Phase Transformations (D4)  
       | Fundamentals of Polymer Science and Engineering (D5) |
## Preliminary Examination Subjects …

<table>
<thead>
<tr>
<th>Group</th>
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<tbody>
<tr>
<td>E</td>
<td>Design and CAD/CAM (E1)</td>
</tr>
<tr>
<td>F</td>
<td>Human-Machine Systems (F1)</td>
</tr>
</tbody>
</table>
| G     | Manufacturing Systems (G1)  
|       | Production and Logistics (G2) |
| H     | Operations Research (H1)  
|       | Reliability and Quality Assurance (H2)  
|       | Simulation (H3) |
| I     | Software Engineering (I1)  
|       | Computer Graphics (I2)  
|       | Artificial Intelligence in Engineering (I3) |
Possible Preliminary Exam Areas for PhD IE Students

- Engineering mathematics
- Probability and statistics
- Design and CAD/CAM
- Human-machine systems
- Manufacturing system
- Production and logistics
- Operation research
- Reliability and quality assurance
- Simulation Analysis
- Software engineering
- Computer graphics
- Artificial intelligence in engineering
Qualifying Exam Results

- **Pass**
  - Students move on with research plan to prepare for a proposal defense

- **Conditional**
  - If three out of four exams are passed in the first attempt, the student is invited to re-take, at the next offering, only the failed exam. Otherwise, the student has to retake the full examination (any four subjects) at the next offering.

- **Fail**
  - Students are not permitted to continue in any of the MIE PhD programs
Graduate School of Engineering
(www.coe.neu.edu/gse)

- Pls. visit Graduate School of Engineering (GSE) website at www.coe.neu.edu/gse for most up-to-date information including:
  - Academic Calendar
  - Course Schedule
  - Forms
  - And Many More