



College of Engineering

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Date: 1 December 2010

To: Randy Smith
Vice Provost, Office of Academic Affairs

From: Ed McCaul 
Secretary, College of Engineering Committee on Academy Affairs (CCAA)

Subject: Semester Conversion Proposal for the MS degree in Mechanical Engineering along with information on their BS/MS program and withdrawal of their Mechanical Engineering Advanced Professional Program

Attached is a letter from K. (Cheena) Srinivasan, Department Chair of Mechanical and Aerospace Engineering, which discusses their MS degree in Mechanical Engineering along with information on their BS/MS program and withdrawal of their Mechanical Engineering Advanced Professional Program.

ME's MS proposal as well as their BS/MS proposal, and withdrawal of their Mechanical Engineering Advanced Professional Program were reviewed by a subcommittee of CCAA. After reviewing the proposals and having some changes made to the MS proposal the subcommittee recommended to the full committee that these proposals be approved. After a discussion, CCAA unanimously approved the proposals on the 22nd of November 2010 and requested that I forward the proposals to you for consideration by CAA. If you have any questions concerning these proposals please let me know.



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To: The Office of Academic Affairs

A handwritten signature in blue ink, appearing to read 'K. Srinivasan'.

From: K. (Cheena) Srinivasan, Chairperson, Department of Mechanical Engineering

Date: November 10, 2010

Re: Semester Program Proposal for *the Mechanical Engineering Degree Programs*

The proposed curricula for the Mechanical Engineering degrees offered by the Department have been developed following extensive consultation with our alumni and current students, our departmental external advisory board, and discussions among faculty members. Particular effort has been spent on the BSME program. In addition to the feedback that we get from senior exit surveys that have been required of all of our BSME graduates over the last ten years, we surveyed 300 selected alumni from the last 20 years and discussed the curriculum at an all-day meeting held on campus, July 31, 2009. The meeting was attended by 40 alumni, 15 faculty members, and some members of the department's external advisory board. Speakers from the faculty at Olin College, the University of Texas at Austin, and Massachusetts Institute of Technology described curriculum-related changes at their institutions to our faculty members as they discussed the proposed curriculum. Faculty members leading the curriculum effort also participated in national forums dedicated to discussions of trends and drivers of change in mechanical engineering education. The proposed curriculum was fashioned in response to the feedback and inputs obtained through these venues. Our proposed BSME curriculum has also been benchmarked against program curricula from peer institutions such as the University of Michigan, Purdue University, Georgia Institute of Technology, and MIT. We are confident that our proposed curriculum is responsive to the needs of our stakeholders, as well as to emerging trends and drivers of change in engineering education in general. We feel it will position our program at the leading edge of mechanical engineering undergraduate education.

All components of the proposed programs were discussed at a number of faculty meetings in the fall, winter, and spring quarters, and the Faculty Interest Groups worked internally to form the new curricula. All the committees charged with coordinating the semester conversions included student representatives. In addition, the proposed programs were discussed with current undergraduate and graduate students at open meetings. The faculty vote on the BSME curriculum, by secret paper ballot, was 36 in favor, one against, and one abstained (51 faculty were eligible to vote). The faculty vote on the ME graduate degree programs was unanimously in favor with 37 voting. The Nuclear Engineering undergraduate minor and graduate programs were unanimously approved by the program faculty.

I am therefore enthusiastically recommending approval of the enclosed proposals for the following programs

- BS in Mechanical Engineering
- MS in Mechanical Engineering
- PhD in Mechanical Engineering

There is a BS/MS option for the MS in Mechanical Engineering. This option will continue to be offered under the semester system subject to the rules of the Graduate School.

I am also recommending that the following programs be withdrawn, based on faculty discussions:

- Mechanical Engineer (Advanced Professional Program)
- MS in Engineering Mechanics
- PhD in Engineering Mechanics

MS in Mechanical Engineering (MS ME) Program

Primary Contact: Vish Subramaniam (subramaniam.1, 292-6096)

1. **Name of Program**

Mechanical Engineering

2. **Name of Degree**

Master of Science in Mechanical Engineering (MS ME)

3. **Responsible Academic Unit**

Department of Mechanical Engineering

4. **Type of Program**

d. Graduate degree program

5. **Semester Conversion Designation**

b. Converted with minimal changes to program goals and/or curricular requirements (e.g., name changes, changes in electives and/or prerequisites, minimal changes in overall structure of program, minimal or no changes in program goals or content)

6. **Program Learning Goals**

Not required at this time for graduate programs.

7. **Proposed Program Requirements**

There are two options for students who wish to pursue the M.S. degree. Students completing the research (thesis) option would be required to take a minimum of 21 semester-hrs of classes, including a minimum of 3 semester-hrs of graduate level mathematics, a minimum of 9 semester-hrs of ME courses 5000 level and above, and a minimum 9 semester-hrs of courses 6000 level and above. In addition, students in the thesis option are required to take a minimum of 9 semester-hrs of what is currently ME999 (Research).

Students in the non-thesis option are required to take a minimum of 3 semester-hrs of graduate level mathematics, a minimum of 12 semester-hrs of ME courses 5000 level and above, and a minimum of 12 semester-hrs of courses 6000 level and above. In addition, students in the non-thesis option are required to take a minimum of 3 semester-hrs of what is currently ME993 (Individual Studies).

Students taking ME 6000-level courses are able to use those hours to fulfill the ME course requirements and the 6000-level course requirements. In doing so, students have the flexibility of taking the remaining hours needed to complete the required 30 hours from other departments. Therefore, per Graduate School policy, any remaining semester hours of graded course work can be 4000-level or higher non-ME courses or 5000-level or higher ME courses

Graduate level mathematics refers to letter-graded Mathematics and Statistics courses 4000-level and above (i.e., not graded S/U).

MS ME PROGRAM PROPOSAL — REVISED 1/21/2011

8. Current and Proposed Advising Sheets

Current and Proposed Advising Sheets are attached. These current advising sheets are based upon the requirements as outlined in the ME Graduate Program Handbook.

9. Curriculum Map

Not required at this time for graduate programs.

10. Rationale for Program Changes and Description of Changes

The proposed changes to the MS program will follow the standard 2/3 rule.

11. Credit Hour Changes

	Number of qtr-cr-hrs in current program	Calculated result for 2/3 of current qtr-cr-hrs	Number of sem-cr-hrs required for proposed program
Total cr-hrs required for completion of program	45	30	30

12. Rationale for Significant Change in Credit Hours

Not applicable.

13. Transition Policy

No ME graduate student who began the degree program under quarters will have progress toward graduation impeded by the transition to semesters. Graduation requirements beginning Summer 2012 will be those in force for ME graduate students under semesters; but *every* quarter-credit-hour that would have counted toward an ME graduate degree under the quarter-based program will count (as 2/3 of a semester-credit-hour) toward the requirements for graduation under the corresponding semester-based program. Additional advising support will be provided for ME graduate students to assist in planning course schedules for the last year of quarters (2011-2012) and for the first year of semesters (2012-2013). If it is determined that the “normal” conditions covered by the ME transition policy would result in a particular student facing an unavoidable delay in graduation compared to quarters due to the change to semesters—rather than the student’s failure to meet with an advisor to complete a proposed plan of study or to make satisfactory progress through the mutually agreed program plan—then a revision of specific requirements will be worked out for that student by their faculty advisor, with approval by the ME Graduate Studies Committee.

14. Assessment Practices

Not required at this time for graduate programs.

15. Assessment Plan on File with OAA

Not required at this time for graduate programs.

List of Semester Courses

MECHENG 5234:	Vehicle Dynamics
MECHENG 5240:	Vibration and Acoustic Design
MECHENG 5320H:	Digital Data Acquisition and Signal Processing
MECHENG 5372:	Design and Control of Mechatronic Systems
MECHENG 5374:	Smart Materials and Intelligent Systems
MECHENG 5514:	Optical Techniques in Fluid Flows
MECHENG 5610H:	Direct Energy Conversion
MECHENG 6501:	Gas Dynamics
MECHENG 6505:	Intermediate Fluid Dynamics
MECHENG/NUCLREN 6507:	Intermediate Numerical Methods
MECHENG 6515:	Introduction to Microfluidics and Nanofluidics
MECHENG 6526:	Combustion
MECHENG 7230:	Advanced Dynamics
MECHENG 7236:	Powertrain Dynamics
MECHENG 7250:	Vibrations of Discrete Systems
MECHENG 7260:	Automotive NVH I
MECHENG 7261:	Automotive NVH II
MECHENG 7290:	Digital Control Engineering
MECHENG 7292:	Control Systems Laboratory
MECHENG 7380:	Lumped Parameter System Analysis
MECHENG 7384:	Energy Modeling, Simulation, and Control of Hybrid-Electric Vehicles
MECHENG 7385:	Advanced Topics in the Dynamics and Control of Human and Animal Movement
MECHENG 7506:	Advanced Fluid Dynamics
MECHENG 7510:	Advanced Heat Transfer
MECHENG 7511:	Computational Fluid Dynamics
MECHENG 7513:	Turbulence
MECHENG 7518:	Advanced Mathematical Methods in Mechanical Engineering
MECHENG 7520:	Wave Dynamics in Fluids
MECHENG 7526:	Advanced Combustion
MECHENG 7727:	Advanced Propulsion
MECHENG 7770:	Measurement Systems and Experimental Techniques
MECHENG 8230:	Nonlinear Dynamics
MECHENG 8250:	Vibrations of Continuous Systems
MECHENG 8260:	Advanced Engineering Acoustics
MECHENG 8280:	Sliding Mode Control in Electromechanical Systems
MECHENG 8312:	Diesel Engine Systems Control
MECHENG 8320:	Digital Signal and Random Data Analysis
MECHENG 8372:	Fault Diagnosis in Dynamic Systems
MECHENG 8503:	Statistical Thermodynamics
MECHENG 8504:	Physical Gas Dynamics
MECHENG 8827:	Advanced Propulsion Problems

Current MS Advising Sheet

Quarter and Year	Mechanical Engineering (1)			Mathematics			Other Engineering and Science			Background and Non-technical (2)			Total for Quarter
	Course	Hours	Grade	Course	Hours	Grade	Course	Hours	Grade	Course	Hours	Grade	
SUB TOTAL HOURS:													

SUB TOTAL ME 888 HOURS:

SUB TOTAL ME 999 OR ME 993 HOURS:

TOTAL # OF HOURS:

Possible Master's Committee Member's Names

**Note to Faculty: By signing below you are approving this course plan and the proposed Thesis topic or Non-Thesis project.*

Advisor's Signature

Date

Graduate Studies Committee Chair's Signature

Date

Note: The Graduate Studies Chair's signature will be acquired by the MAE Advising Office if the plan is approved.

MS Course Requirements

Thesis Option

- A **minimum** of 30 hours of letter-graded course credit* is required and it must meet the following requirements:
 - 6 hours of graduate level Math[†]
 - A minimum of 12 hours of ME courses 600-level and above
 - A minimum of 12 hours of courses 700-level and above‡
- In addition to the minimum 30 hours of letter-graded course credit, a **minimum** of 15 credits ME 999 or a combination of level-approved coursework and ME 999 is also required

Total: 45 credits + ME 888 in every quarter

Non-Thesis Option

- A **minimum** of 42 hours of letter-graded course credit* is required and it must meet the following requirements:
 - 6 hours of graduate level Math[†]
 - A minimum of 18 hours of ME courses 600-level and above
 - A minimum of 18 hours of courses 700-level and above‡
- In addition to the minimum 42 hours of letter-graded course credit, 3 hours of ME 993 is also required

Total: 45 credits + ME 888 in every quarter

* It is suggested that courses be CoE, Bio-MAPS, or College of Medicine courses
 † All letter-graded Mathematics and Statistics courses 600-level and above (i.e., not graded S/U) will count for mathematics credit. Courses taken to fulfill the 6 credit hours Mathematics requirement cannot be double counted to meet other requirements. MS students may take up to two 500-level Mathematics Department courses - except Math 504 and 568.
 ‡ Unless used for mathematics credit, 700-level and above ME courses can be used to meet both the ME and 700-level requirements