

# UNIVERSITY FACULTY SENATE FORMS

## Academic Program Approval

**Submitted by:** Andras Szeri, Mechanical Engineering, phone number 831-2008

**Action:** Permanent approval of Master of Science in Mechanical Engineering (MSME) and Master of Engineering: Mechanical (MEM).

**Effective term** 06S

**Current degree** Master of Science in Mechanical Engineering (MSME) and Master of Engineering: Mechanical (MEM).

**Proposed change leads to the degree of:** Master of Science in Mechanical Engineering  
Master of Engineering: Mechanical

**Proposed name:** Master of Science in Mechanical Engineering  
Master of Engineering: Mechanical

**Revising or Deleting:** None, permanent approval requested

**Graduate Program Policy statement change:** Attached

**Graduate Program of Study:** Master's program in Mechanical Engineering

**List program changes for curriculum revisions:** None

**List new courses required for the new or revised curriculum:** None

**Other affected units:** None

### Rationale:

There are part time students already employed by industry or government, who wish to pursue advanced study in Mechanical Engineering without performing research and writing a thesis.

Recognizing this, the Department of Mechanical Engineering always had a thesis and non-thesis options at the Masters level. To make the distinction between these two options more visible, we petitioned, and obtained, provisional approval to disestablish the degree of "Master of Mechanical Engineering" with thesis and non-thesis options, and establish the "Master of Science in Mechanical Engineering" (MSME) as a degree requiring a written thesis, and the "Master of Engineering: Mechanical" (MEM) as the coursework-only degree.

Established in 1994 by the College of Engineering, the Engineering Outreach Program is designed to meet society's needs by educating the non-traditional student through professionally convenient, part-time, graduate-level educational opportunities. These include master's degree

programs and technical renewal opportunities in engineering that are provided in a variety of formats, thereby helping to meet the college's need to maintain/increase enrollments and enhance the reputation of the College of Engineering at the University of Delaware. The MEM degree is in line with, and adheres to, College of Engineering policy.

**Program Requirements:**

The Master of Science in Mechanical Engineering (MSME) degree requires a minimum of 24 credit hours of course work beyond the bachelor's degree and a thesis equivalent to 6 credit hours. The Master of Engineering: Mechanical (MEM) degree requires the completion of 30 credit hours of course work beyond the bachelor's degree, but does not require a thesis.

Required course for both degrees are MEEG 610 Intermediate Solid Mechanics, MEEG 620 Intermediate Dynamics, MEEG 630 Intermediate Fluid Mechanics, MEEG 640 Intermediate Heat Transfer, and MEEG 690 Intermediate Engineering Mathematics. In addition, a graduate level course in mathematics or numerical methods is required.

**Requirements for Admission:**

Applicants entering either degree programs are expected to have

1. A baccalaureate degree in mechanical engineering or in a closely allied field of science or mathematics.
2. An undergraduate grade point average in engineering, science and mathematics courses of at least 3.0 on a 4.0 scale.
3. A minimum of at least three strong letters of support from former teachers or supervisors.
4. A minimum of combined Quantitative and Verbal score of 1200 in the Graduate Record Examination Aptitude Test.
5. A minimum score of 600 in the Test of English as a Foreign Language for students whose first language is not English

**ROUTING AND AUTHORIZATION:** (Please do not remove supporting documentation.)

Department Chairperson \_\_\_\_\_ Date \_\_\_\_\_

Dean of College \_\_\_\_\_ Date \_\_\_\_\_

Chairperson, College Curriculum Committee \_\_\_\_\_ Date \_\_\_\_\_

Chairperson, Senate Com. on UG or GR Studies \_\_\_\_\_ Date \_\_\_\_\_

Chairperson, Senate Coordinating Com. \_\_\_\_\_ Date \_\_\_\_\_

Secretary, Faculty Senate \_\_\_\_\_ Date \_\_\_\_\_

Date of Senate Resolution \_\_\_\_\_ Date to be Effective \_\_\_\_\_

Registrar \_\_\_\_\_ Program Code \_\_\_\_\_ Date \_\_\_\_\_

Vice Provost for Academic Programs & Planning \_\_\_\_\_ Date \_\_\_\_\_

Provost \_\_\_\_\_ Date \_\_\_\_\_

Board of Trustee Notification \_\_\_\_\_ Date \_\_\_\_\_

Revised 11/03/04 /khs

## **MASTER of ENGINEERING: MECHANICAL (MEM)**

The Master of Engineering: Mechanical (MEM) program consists of 30 credit hours of graduate level coursework. Coursework must be completed with a grade point average of 3.0 or higher. The requirements are designed to provide a general program and to allow for some concentration of study within Mechanical Engineering. It will be possible to complete this program taking courses in the late afternoon, early evening, and/or in a distance format for part-time students. Engineering Outreach can help facilitate part-time graduate education.

### **Course Requirements**

A. The following five courses are required (15 credits):

- MEEG 610 Intermediate Solid Mechanics
- MEEG 620 Intermediate Dynamics
- MEEG 630 Intermediate Fluid Mechanics
- MEEG 640 Intermediate Heat Transfer
- MEEG 690 Intermediate Engineering Mathematics

Students may petition the Graduate Committee to substitute a more advanced (e.g., 800-level) course on the same topic for one of these required courses.

B. One additional graduate level course (3 credits) in mathematics or numerical methods. The student makes this selection with the documented approval of the Department's Graduate Committee which has the authority to decide on acceptable courses.

C. One additional graduate level course (3 credits) in Mechanical Engineering. Three credits of MEEG 868 Research can be used toward this requirement. The student makes this selection with the documented approval of the department's Graduate Committee which has the authority to decide on acceptable courses.

D. Three additional graduate level courses (9 credits) in engineering, mathematical, physical or biological sciences or business and economics. The student makes these selections with the documented approval of the department's Graduate Committee which has the authority to decide on acceptable courses.

## **MASTER of SCIENCE in MECHANICAL ENGINEERING (MSME)**

The Master of Science in Mechanical Engineering (MSME) program consists of 24 credit hours of graduate level coursework distributed in four general categories, plus six credits of Master's Thesis. Coursework must be completed with a grade point average of 3.0 or higher. The requirements are designed both to provide a balanced program in Mechanical Engineering and to allow for a degree of specialization. Students should be able to complete all degree requirements, including the thesis, in 18 to 24 months of full-time study.

### **I. Course Requirements**

A. The following five courses are required (15 credits):

- MEEG 610 Intermediate Solid Mechanics
- MEEG 620 Intermediate Dynamics
- MEEG 630 Intermediate Fluid Mechanics
- MEEG 640 Intermediate Heat Transfer
- MEEG 690 Intermediate Engineering Mathematics

Students may petition the Graduate Committee to substitute a more advanced (e.g., 800-level) course on the same topic for one of these required courses.

B. One additional graduate level course (3 credits) in mathematics or numerical methods. The student makes this selection with the documented approval of the Department's Graduate Committee which has the authority to decide on acceptable courses.

C. Two additional elective graduate level courses (6 credits) in engineering or mathematical, physical or biological sciences. The student makes these selections with the documented approval of the department's Graduate Committee which has the authority to decide on acceptable courses.

D. 6 credits of MEEG 869 Master's Thesis.

### **II. Thesis Requirements**

A thesis is required which demonstrates the student's ability to conduct scholarly research. Entering graduate students are expected to choose a thesis advisor and research topic during their first semester in the Department so that they can initiate research and choose appropriate elective courses.

At the completion of the thesis research, candidates for the MSME degree must defend their thesis orally to a committee of at least three faculty members. The committee will be chaired by the thesis advisor who, along with at least one other committee member, must be regular full-time faculty in the Department of Mechanical Engineering. The thesis is to be submitted to committee members at least two weeks in advance of the defense and shall meet the academic and professional standards set forth by the University. Upon acceptance of the thesis, the Committee recommends approval to the Department Chairperson.

## MASTER OF MECHANICAL ENGINEERING PROGRAM (Prior to 1999)

The Master of Mechanical Engineering (MME) program consists of 30 credit hours of work distributed in four general categories. All coursework must be completed with a grade point average of 3.0 or higher. The requirements are designed to provide both a balanced program in the basic engineering sciences and some specialization. The Department offers both thesis – and coursework – option Master's degrees.

### Thesis Option

#### I. Course Requirements

- A. At least one course at the graduate level in each of the following four major areas (12 credits):
  - 1. Heat Transfer and Thermodynamics: Students usually choose among Mechanical Engineering (MEEG) 801 Advanced Thermodynamics, MEEG 802 Conduction Heat Transfer, or MEEG 803 Convection Heat Transfer.
  - 2. Solid Mechanics and Materials: Students should choose MEEG 813 Theory of Elasticity or other suitable MEEG or Materials Science (MASC) graduate courses in mechanical properties of materials.
  - 3. Dynamics and Vibrations: Either MEEG 821 Dynamics or MEEG 823 Vibrations.
  - 4. Fluid Mechanics and Gas Dynamics: MEEG 831 Fluid Mechanics I is the introductory course. MEEG 832 Fluid Mechanics II is also offered.
- B. At least two courses (6 credits) in Engineering Analysis. MEEG 863 and MEEG 864 are recommended.
- C. Two elective courses at the graduate level (6 credits) to provide some specialization within Mechanical Engineering. The student, in concert with the faculty advisor, makes this selection.
- D. 6 credits of MEEG 869, Master's Thesis.

#### II. Thesis Requirements

A thesis is required which demonstrates the student's ability to conduct scholarly research. Entering graduate students are expected to choose a topic during their first semester in the Department so that they can initiate research and choose appropriate elective courses. Students should be able to complete all degree requirements, including the thesis, in 18 to 24 months.

At the completion of the thesis research, candidates for the MME degree must defend their thesis orally to a committee of at least three faculty members, chaired by the thesis advisor who must be regular faculty in the Department of Mechanical Engineering. The thesis is to be submitted to committee members at least two weeks in advance of the defense and shall meet the

academic and professional standards set forth by the University. Upon acceptance of the thesis, the Committee recommends approval to the Department Chairperson.

### **Coursework Option**

This option is not available to students who have been enrolled in the thesis-option Master's program.

#### Course Requirements:

- A. 6 credits of Heat Transfer and Thermodynamics to be selected from MEEG 801, 802, 803.
- B. 6 credits of Solid Mechanics and Materials to be selected from MEEG 813, MEEG 615 or other suitable ME or Materials Science graduate courses.
- C. 6 credits of Engineering Analysis. MEEG 863 and 864 are recommended.
- D. 3 credits of Dynamics and Vibrations: MEEG 821 or 823.
- E. 3 credits of Fluid Mechanics: MEEG831 is the introductory course.
- F. 6 credits of approved graduate electives to be selected from course offerings in Mechanical Engineering, other Engineering or Science programs, Mathematical Sciences, or Business & Economics.

Typically, MEEG 801, 802, 813, 821, 831 and 863 are offered during the Fall Semester, while MEEG 803, 823, 832 and 864 are offered during the Spring Semester. Courses are usually offered in the late afternoon and early evening to accommodate part-time students.

Appendix IV

DEGREES AWARDED

YEAR	MME	MSME	MEM	
1993	5			
1994	6			
1995	11			
1996	15			
1997	5			
1998	9			
1999		5	2	
2000		6		
2001		9		
2002		13		
2003		4		
2004		6	3	
2005		6	1	
<b>Total</b>	<b>51</b>	<b>49</b>	<b>6</b>	

**PERMANENT STATUS PROGRAM REVIEW**

Submitted: November 23, 2005

**Master of Science in Mechanical Engineering (MSME)**

**Master of Engineering: Mechanical (MEM)**

Submitted by:

Andras Z. Szeri

Department of Mechanical Engineering

**Introduction:**

At its regular meeting of the University Faculty Senate on March 2, 1998 a resolution was presented for the disestablishment of the Master of Mechanical Engineering, and for the concurrent establishment of a new Master of Science in Mechanical Engineering (MSME) and a new Master of Engineering: Mechanical (MEM). The resolution was adopted.

There have been no concerns expressed, neither at the Senate meeting that adopted the above resolution nor since.

**Rationale:**

There are individuals, primarily part time students, who wish to pursue advanced study in Mechanical Engineering without performing research and writing a thesis. Recognizing this, the Department of Mechanical Engineering always had thesis and non-thesis options at the Masters level. To make the distinction between these two options more visible, we petitioned, and obtained, provisional approval to disestablish the degree of "Master of Mechanical Engineering" with thesis and non-thesis options, and establish a new "Master of Science in Mechanical Engineering" (MSME) as a degree requiring a written thesis, and a new "Master of Engineering: Mechanical" (MEM) as the coursework-only degree.

Established in 1994 by the College of Engineering, the Engineering Outreach Program is designed to meet society's needs by educating the non-traditional student through professionally convenient, part-time, graduate-level educational opportunities. These include master's degree programs and technical renewal opportunities in engineering that are provided in a variety of formats, thereby helping to meet the college's need to maintain/increase enrollments and enhance the reputation of the College of Engineering at the University of Delaware. The new MEM degree is in line with, and adheres to, College of Engineering policy.

At the same time, the Department of Mechanical Engineering is involved in contract research to a very high degree. To fulfill the research mission of the Department, it is essential to have a cadre of high quality research assistants working in our laboratories. When the research is short term, faculty preference is for Master's level research assistants. Having a research oriented Masters Program is therefore essential to the proper functioning of the department.

**Program Requirements:**

The Master of Science in Mechanical Engineering (MSME) degree requires a minimum of 24 credit hours of course work beyond the bachelor's degree and a thesis equivalent to 6 credit hours. The Master of Engineering: Mechanical (MEM) degree requires the completion of 30 credit hours of course work beyond the bachelor's degree, but does not require a thesis.

Required course for both degrees are MEEG 610 Intermediate Solid Mechanics, MEEG 620 Intermediate Dynamics, MEEG 630 Intermediate Fluid Mechanics, MEEG 640 Intermediate Heat Transfer, and MEEG 690 Intermediate Engineering Mathematics. In addition, a graduate level course in mathematics or numerical methods is required.

**Requirements for Admission:**

Applicants entering either degree programs are expected to have

1. A baccalaureate degree in mechanical engineering or in a closely allied field of science or mathematics.

2. An undergraduate grade point average in engineering, science and mathematics courses of at least 3.0 on a 4.0 scale.
3. A minimum of at least three strong letters of support from former teachers or supervisors.
4. A minimum of combined Quantitative and Verbal score of 1200 in the Graduate Record Examination Aptitude Test.
5. A minimum score of 600 in the Test of English as a Foreign Language for students whose first language is not English.

As stated above, no concerns have been expressed, either at the Senate meeting that adopted the above resolution or since. The programs have been functioning smoothly and without problems. The enrollment history, for the MME program prior to its disestablishment, and for the MSME and MEM programs since their provisional approval, are shown in the table below.

<b>YEAR</b>	<b>MME</b>	<b>MSME</b>	<b>MEM</b>
1993	5		
1994	6		
1995	11		
1996	15		
1997	5		
1998	9		
1999		5	2
2000		6	
2001		9	
2002		13	
2003		4	
2004		6	3
2005		6	1
<b>Total</b>	<b>51</b>	<b>49</b>	<b>6</b>
<b>ENROLLMENT IN 2005</b>		33	6

Appendix I contains particulars of the disestablished MME degree program. The new degree programs MSME and MEM are listed in Appendix II and Appendix III, respectively.

## Appendix I

### MASTER OF MECHANICAL ENGINEERING PROGRAM (Prior to 1999)

The Master of Mechanical Engineering (MME) program consists of 30 credit hours of work distributed in four general categories. All coursework must be completed with a grade point average of 3.0 or higher. The requirements are designed to provide both a balanced program in the basic engineering sciences and some specialization. The Department offers both thesis – and coursework – option Master's degrees.

#### Thesis Option

##### I. Course Requirements

- A. At least one course at the graduate level in each of the following four major areas (12 credits):
  - 1. Heat Transfer and Thermodynamics: Students usually choose among Mechanical Engineering (MEEG) 801 Advanced Thermodynamics, MEEG 802 Conduction Heat Transfer, or MEEG 803 Convection Heat Transfer.
  - 2. Solid Mechanics and Materials: Students should choose MEEG 813 Theory of Elasticity or other suitable MEEG or Materials Science (MASC) graduate courses in mechanical properties of materials.
  - 3. Dynamics and Vibrations: Either MEEG 821 Dynamics or MEEG 823 Vibrations.
  - 4. Fluid Mechanics and Gas Dynamics: MEEG 831 Fluid Mechanics I is the introductory course. MEEG 832 Fluid Mechanics II is also offered.
- B. At least two courses (6 credits) in Engineering Analysis. MEEG 863 and MEEG 864 are recommended.
- C. Two elective courses at the graduate level (6 credits) to provide some specialization within Mechanical Engineering. The student, in concert with the faculty advisor, makes this selection.
- D. 6 credits of MEEG 869, Master's Thesis.

##### II. Thesis Requirements

A thesis is required which demonstrates the student's ability to conduct scholarly research. Entering graduate students are expected to choose a topic during their first semester in the Department so that they can initiate research and choose appropriate elective courses. Students should be able to complete all degree requirements, including the thesis, in 18 to 24 months.

At the completion of the thesis research, candidates for the MME degree must defend their thesis orally to a committee of at least three faculty members, chaired by the thesis advisor who must be regular faculty in the Department of Mechanical Engineering. The thesis is to be submitted to committee members at least two weeks in advance of the defense and shall meet the academic and professional standards set forth by the University. Upon acceptance of the thesis, the Committee recommends approval to the Department Chairperson.

### **Coursework Option**

This option is not available to students who have been enrolled in the thesis-option Master's program.

#### **Course Requirements:**

- A. 6 credits of Heat Transfer and Thermodynamics to be selected from MEEG 801, 802, 803.
- B. 6 credits of Solid Mechanics and Materials to be selected from MEEG 813, MEEG 615 or other suitable ME or Materials Science graduate courses.
- C. 6 credits of Engineering Analysis. MEEG 863 and 864 are recommended.
- D. 3 credits of Dynamics and Vibrations: MEEG 821 or 823.
- E. 3 credits of Fluid Mechanics: MEEG831 is the introductory course.
- F. 6 credits of approved graduate electives to be selected from course offerings in Mechanical Engineering, other Engineering or Science programs, Mathematical Sciences, or Business & Economics.

Typically, MEEG 801, 802, 813, 821, 831 and 863 are offered during the Fall Semester, while MEEG 803, 823, 832 and 864 are offered during the Spring Semester. Courses are usually offered in the late afternoon and early evening to accommodate part-time students.

## **MASTER of SCIENCE in MECHANICAL ENGINEERING (MSME)**

The Master of Science in Mechanical Engineering (MSME) program consists of 24 credit hours of graduate level coursework distributed in four general categories, plus six credits of Master's Thesis. Coursework must be completed with a grade point average of 3.0 or higher. The requirements are designed both to provide a balanced program in Mechanical Engineering and to allow for a degree of specialization. Students should be able to complete all degree requirements, including the thesis, in 18 to 24 months of full-time study.

### **I. Course Requirements**

A. The following five courses are required (15 credits):

- MEEG 610 Intermediate Solid Mechanics
- MEEG 620 Intermediate Dynamics
- MEEG 630 Intermediate Fluid Mechanics
- MEEG 640 Intermediate Heat Transfer
- MEEG 690 Intermediate Engineering Mathematics

Students may petition the Graduate Committee to substitute a more advanced (e.g., 800-level) course on the same topic for one of these required courses.

B. One additional graduate level course (3 credits) in mathematics or numerical methods. The student makes this selection with the documented approval of the Department's Graduate Committee which has the authority to decide on acceptable courses.

C. Two additional elective graduate level courses (6 credits) in engineering or mathematical, physical or biological sciences. The student makes these selections with the documented approval of the department's Graduate Committee which has the authority to decide on acceptable courses.

D. 6 credits of MEEG 869 Master's Thesis.

### **II. Thesis Requirements**

A thesis is required which demonstrates the student's ability to conduct scholarly research. Entering graduate students are expected to choose a thesis advisor and research topic during their first semester in the Department so that they can initiate research and choose appropriate elective courses.

At the completion of the thesis research, candidates for the MSME degree must defend their thesis orally to a committee of at least three faculty members. The committee will be chaired by the thesis advisor who, along with at least one other committee member, must be regular full-time faculty in the Department of Mechanical Engineering. The thesis is to be submitted to committee members at least two weeks in advance of the defense and shall meet the academic and professional standards set forth by the University. Upon acceptance of the thesis, the Committee recommends approval to the Department Chairperson.

## **Appendix III**

## MASTER of ENGINEERING: MECHANICAL (MEM)

The Master of Engineering: Mechanical (MEM) program consists of 30 credit hours of graduate level coursework. Coursework must be completed with a grade point average of 3.0 or higher. The requirements are designed to provide a general program and to allow for some concentration of study within Mechanical Engineering. It will be possible to complete this program taking courses in the late afternoon, early evening, and/or in a distance format for part-time students. Engineering Outreach can help facilitate part-time graduate education.

### Course Requirements

A. The following five courses are required (15 credits):

- MEEG 610 Intermediate Solid Mechanics
- MEEG 620 Intermediate Dynamics
- MEEG 630 Intermediate Fluid Mechanics
- MEEG 640 Intermediate Heat Transfer
- MEEG 690 Intermediate Engineering Mathematics

Students may petition the Graduate Committee to substitute a more advanced (e.g., 800-level) course on the same topic for one of these required courses.

B. One additional graduate level course (3 credits) in mathematics or numerical methods. The student makes this selection with the documented approval of the Department's Graduate Committee which has the authority to decide on acceptable courses.

C. One additional graduate level course (3 credits) in Mechanical Engineering. Three credits of MEEG 868 Research can be used toward this requirement. The student makes this selection with the documented approval of the department's Graduate Committee which has the authority to decide on acceptable courses.

D. Three additional graduate level courses (9 credits) in engineering, mathematical, physical or biological sciences or business and economics. The student makes these selections with the documented approval of the department's Graduate Committee which has the authority to decide on acceptable courses.

November 30, 2005

TO: University Faculty Senate

VIA: Graduate Studies Committee

SUBJECT: Permanent Status Program Review  
Master of Science in Mechanical Engineering (MSME)  
Master of Engineering: Mechanical (MEM)

In 1998 our department changed its long established Master of Mechanical Engineering (MME) degree program to two separate programs: a Master of Science in Mechanical Engineering (MSME) program that requires a thesis (very similar to the previous MME program), and a Master of Engineering: Mechanical (MEM) program that does not. This separation was done to draw clear lines between those who did a thesis and are potentially ready for doctoral work and those seeking a terminal master's degree. Those in the first group are the larger group, generally full-time students, and those in the later group are generally part-time students, employed in local industry.

These programs have been very successful in attracting and graduating masters degree students. In 2004 and 2005 we graduated 4 students in the MEM program—students we otherwise would not have attracted without this program.

The MEM program has added a source of revenue to the college and provides an outreach to the local Delaware engineering industry—good PR for the department, college and the university. There are no downsides to this program of which I am aware. Furthermore, I am not aware of any complaints. The program adds no strain to our existing graduate program (i.e., it requires no additional courses) and runs very smoothly.

I request that the MSME and MEM degree programs be granted permanent status.

Sincerely,

Thomas S. Buchanan, PhD  
Professor and Chair



**MEMORANDUM**

November 30, 2005

TO: University Faculty Senate

VIA: Graduate Studies Committee

RE: Permanent Status Program Review  
Master of Science in Mechanical Engineering (MSME)  
Master of Engineering: Mechanical (MEM)

I support the request of Thomas S. Buchanan, Chair of the Mechanical Engineering Department, that the MSME and MEM degree programs be granted permanent status.

Sincerely,

A handwritten signature in black ink that reads 'E. Kaler'.

Eric W. Kaler  
Elizabeth Inez Kelley Professor  
and Dean

**An Evaluation of  
the Permanent Status Program Review  
for the MS in Mechanical Engineering (MSME)  
and the Master of Engineering: Mechanical (MEM)**

As a member of the Graduate Studies Committee of the University Faculty Senate I am grateful to Drs. A.Z. Szeri and T.S. Buchanan for the submissions of materials of 11/23/05 and 11/30/05.

A resolution for the establishment of two new degrees in Mechanical Engineering- MSME and MEM- was presented to the University Faculty Senate on March 2, 1998. The motivation for the new degrees- MSME and MEM- is to distinguish between Masters degrees with and without theses. The MSME degree requires a thesis and 24 credit hours of coursework, whereas the MEM degree requires 30 credit hours of coursework.

The two new degrees have successfully met their originally stated goals and objectives. A principal goal is to meet the educational requirements of non-traditional students (eg. part time students) who aspire to pursue graduate level studies without performing research or writing a thesis. A total of 49 MSME and 6 MEM degrees have been completed since 1998. While the numbers of MEM students have been small, MEM enrollment has increased in 2005. The two degrees certainly help to augment the numbers of graduate students at the University.

The admission criteria for the MSME/MEM degrees are clearly stated. The course requirements for both degrees take advantage of existing 600 and 800 level classes; assessment of the learning of students are undertaken in the usual way via examinations and thesis defense, and so do not burden the Department's resources additionally. "The programs have been functioning smoothly and without problems" so that it can be assumed that students receive satisfactory advising and mentoring. "Courses are usually offered in the late afternoon and early evening to accommodate part-time students." The choice and composition of the coursework is typical of dynamic Mechanical Engineering departments.

It would have been helpful to have had information from students who have completed the MSME/MEM degrees and graduated from the University in order to comment on job placement of students.

I.P. Huq

This external review of the Master of Science in Mechanical Engineering (MSME) and Master of Engineering: Mechanical (MEM) programs in the Department of Mechanical Engineering is to determine if these programs merit elevation to permanent status in the University of Delaware curriculum. Historically, the Department of Mechanical Engineering had offered a degree of Master of Mechanical Engineering with a thesis or a non-thesis option. To better distinguish between the thesis and non-thesis option of this degree, the department sought and received provisional approval to establish two degree programs to replace the Master of Mechanical Engineering degree; the MSME degree which required a written thesis and the MEM degree which was course work only. By establishing two distinct programs, the Department of Mechanical Engineering is able to not only distinguish between the two degrees, but can better delineate the requirements for each program.

The original objective of the establishment of these programs was to 1) better distinguish between the thesis and non-thesis Master degrees that could be obtained in the Department of Mechanical Engineering and 2) to provide a more defined avenue for the working professional to obtain a Master degree in Mechanical Engineering, yet still maintain the high quality of the traditional, research thesis Master program. The Department has met the objectives and goals it set in the establishment of these programs. By providing individual designations for each Masters program, the delineation between the degrees is apparent, although an employer would have to research the difference between the two if examining a potential employee's curriculum vitae. The Department has also encouraged working professionals to return for their Masters by offering courses in the late afternoon or early evening, as well as providing a part-time, distance format. This approach to aiding working students provides strong incentive for the returning student.

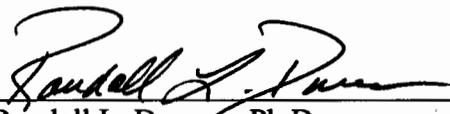
Aside from the different designations for the two Masters programs and the improved scheduling of the MEM program for the working student, few changes in the curriculum or the requirements for admission and graduation have been implemented from the original program. This is not a criticism, since this program was working very well before the degree designation change was put in place and it continues to work well under the new format. Thus, the programs are compatible with the Academic Priorities of the University of Delaware, as was the original program. A strength of these two programs results in completion of the original intent in setting up these two programs: that there is now a distinct difference in the two Master degree titles which will aid in distinguishing between the two degrees. Another strength is that the MEM program is now more accessible to the working student and can be advertised to various companies in the area as a means to obtain a higher degree without the level of commitment required by the MSME program. The only perceived weakness is that an advanced degree without a thesis is not as significant as one with a thesis required, yet both carry the same degree designation. However, this practice is common in the scientific field for Masters degrees and should not be considered a fatal flaw for the program.

The impact of this change in the distinction between the two degree programs is slight, but this is not surprising since the change in the actual curriculum for each degree has not changed significantly. There remains significant demand for both types of Master degree programs, as is evidenced by the consistent, and slightly increased, number of students in the programs (51 in the MME program prior to 1998 and 55 enrolled in both the MSME and the MEM programs

combined since 1998). Last year, the Department of Mechanical Engineering had 33 students enrolled in the MSME program and 6 students enrolled in the MEM program. Clearly the demand for these programs is evident and perhaps the most significant impact of the designation between the two programs is that the MEM program can be promoted alone among industry. Therefore, the service to the industrial community is high. By continuing to offer the MSME thesis driven program, the Department of Mechanical Engineering is also impacting other programs and departments within the university. For example, Biomedical and Biomechanical Engineering is a rapidly growing field and student collaboration with Biology, Physical Therapy and Material Sciences will bring insights of engineering principles to these other disciplines.

As stated above, little has changed for the Masters student in either the MSME or the MEM program other than the designation in degree titles. The admissions requirements for the two programs are clearly defined and appear to be fairly implemented. The students enrolled in each program continue to receive appropriate mentoring and advisement. There are no changes in the student expenses or the departmental and faculty support for these two programs compared to the previous Master degree program.

In summary, support of approval to permanent status of these two Master degree programs in the Department of Engineering is strong. The program clearly defines the requirements in knowledge required to graduate for each degree and each program has evaluation plans in place to assess the success of the student. The success of each program can only be assessed by the number of degrees awarded, since there was no data accompanying the description of the program indicating job placement of graduates of each program. However, the graduation rate is high, indicating a successful program. I recommend that these two Master degree programs in the Department of Mechanical Engineering be elevated to permanent status at the University of Delaware.

Submitted by:   
Randall L. Duncan, Ph.D.  
Associate Professor of Biological Sciences

Date: Jan. 18, 2004



DEPARTMENT OF  
MECHANICAL ENGINEERING

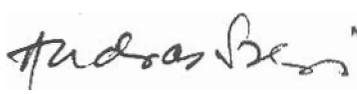
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**MEMORANDUM**

TO: Conrado M. Gempesaw  
Vice Provost for Academic and International Programs

Eric W. Kaler, Dean  
College of Engineering

Thomas S Buchanan, Chair  
Mechanical Engineering

FROM: Andras Z. Szeri, Professor  
Mechanical Engineering 

DATE: February 10, 2006

SUBJECT: Response to Permanent Status Program Review

There are two comments in the "Evaluation of the Permanent Status Program Review for the MS in Mechanical Engineering (MSME) and the Master of Engineering (MEM)" we wish to respond to.

(1) "It would have been helpful ... to comment on job placement of students"

In the attachment we list 69 students who completed their masters in recent years; 55 of these graduated with either the MSME or the MEM degrees, the other 14 obtained the MEM degree prior to 1999. The latter are listed for the sake of completeness.

Of the 69 students listed, 18 continued for the Ph.D. degree, 2 went to study for a second Masters degree in a different discipline, 7 found employments with the US Government (mostly the Military), and 41 went to industry. We are unable to account for 8 students; their thesis advisors moved from UD years ago and left no record behind.

(2) The review brings up the question that "an advanced degree without a thesis is not as significant as one with a thesis required", but then it adds that "this practice is common in the scientific field".

While it is true that the requirement of the two degrees, MSME and MEM, are different in detail, all students enrolled for the MEM degree are already full time employed in industry. They usually hold positions requiring significant technical know-how, and this experience can often be comparable with Masters level research.

<b>MSME Graduate Student</b>	<b>Graduated</b>	<b>Advisor</b>	<b>JOB PLACEMENT</b>
Alexander Tan Dee	1998	JR Vinson	Fujikura Corp., Calif.
Emanuele F. Gillio	1998	SG Advani	Cytec Corporation
Rishikesh B. Bhalerao	1998	JM Lambros	ABAQUS Inc., Pawtucket, RI
Hongwei Li	1998	JM Lambros	Philips Technologies, AirPax Group, Cambridge, MD
Ali Gokce	1998	SK Agrawal	Continued to Ph.D. - UOD
Ryuta Kamiya	1998	TW Chou	Industrial Company - Japan
Hans Stephan Laudorn	1998	SG Advani	ATK Composites and now at CCM
Rahul S. Rao	1998	SK Agrawal	Microsoft Corporation
Erik T. Thostenson	1998	TW Chou	Ph.D. Materials, UOD
Adrian Gorea	1999	LP Wang	Masters, Dept. of Physics & Astronomy, UOD
Jeremiah Robert Slade	1999	SG Advani	Nfoscitex Corporation
Berna Berker	1999	JQ Sun	Symtac Software Company
Brent L. King	1999	SK Agrawal	ILC, Dover
Manu Krishnan	1999	JQ Sun	MathWorks
Matthew T. McGarry	1999	H Wang	
Nihar R. Satapathy	1999	JR Vinson	Michigan
Rajitha Alura	1999	M Keefe	WaveSplitter Technologies
William O. Ballata	1999	SG Advani	Cessna Aircraft
Prabir Barooah	1999	TW Chou	Unknown
Shourov Bhattacharya	1999	SK Agrawal	Honeywell Tech, Sydney
Sunil B. Earath	1999	AK Prasad/SG Advani	GE (India)
Zhixu Guan	1999	TS Buchanan	Exponent, Philadelphia, PA
James T. Kelly	1999	AS Wexler	Ph.D. at Univ. of Calif.-Davis
Arvind Narayanaswamy	1999	JM Lambros	
Mohan Krishna Kompella	2000	JM Lambros	
Daniel B. Heisig	2000	JM Lambros	
Sontipee Aimmanee	2000	JR Vinson	Ph.D., Virginia Polytechnic Inst. & St. University
Gunnar Frederik Finberg	2000	RV Roy	Ph.D. in ME at Rutgers
Hubert C. Stadtfeld	2000	SG Advani	BMW, Germany
Thomas Carl Koehler	2001	TS Buchanan	ARL, Aberdeen, MD
Xiaopeng Lu	2001	TS Buchanan	Verizon, Alexandria, VA
Eric Dayrit Ramos	2001	TS Buchanan	Pharmaceutical, New Jersey
Shawn Patrick Riley	2001	MH Santare SG Advani	AstroPower Inc., Newark, DE
Benjamin E. Forbes	2000	JR Vinson	Business, Spotsylvania, VA
Abdullah Basar Alp	2001	SK Agrawal	General Motors
Orlando Manuel Ayala	2001	LP Wang	Ph.D., Univ. of Delaware
Shashin Bhalendra Patel	2001	SK Agrawal	Corning, Wilmington, NC
Lin Wang	2001	TS Buchanan	Vrendenburg, Greenbelt, MD
Amy Lynn Ventresca	2002	AK Prasad	Working for Sargent and Lundy
Jeffrey A. Acheson	2002	SG Advani	ARL, Aberdeen, MD
Pavel Bogdanov Nedanov	2002	SG Advani	Masters in Operation Research, UOD
Shengkuan Xiao	2002	JR Vinson	Ph.D., Elec. & Comp. Science, UOD
Glenn Gardner	2002	JQ Sun	PSEG Nuclear, New Jersey
Richard W. Heine	2002	TS Buchanan	ARL, Aberdeen, MD
Shunjun Song	2002	JR Vinson	Ph.D. student, Univ. of Michigan
Jingbo Wang	2002	JR Vinson	Ph.D.-Cornell Univ., NY
Mylene Deleglise	2002	SG Advani	Ph.D. , Univ. of Douai, France

Jeffrey W. Doody	2002	LP Wang	Industry, New York
Gonzalo A. Estrada	2002	SG Advani	Oil Company, Houston, TX
Frank E. Fresconi	2002	AK Prasad	Working - Aberdeen PG and doing part-time Ph.D.
Wenzhong Tang	2002	M. Keefe	Ph.D. Univ. of Delaware
Sarvana Kumar	2003	SK Agrawal	General Electric, Bangalore
Mathieu Devillard	2003	SG Advani	FAURECIA Interior Systme, Renault/Nissan Division, France
Yingxin Gao	2003	JE Novotny	Ph.D. student, Univ. of Michigan
Dhiren K. Modi	2003	SG Advani	Ph.D., Univ. of Nottingham, UK
Brian Johnson	2004	Santare/Novotny	ARL, Aberdeen, MD
Prankul Middha	2004	H Wang	GexCon AS, Norway
Melissa Anne Rhoads	2004	JQ Sun	US Army Material Systems, APG, MD
Sudhaker Chhabra	2004	AK Prasad	Ph.D. Univ. of Delaware
Shay Cohen	2004	TS Buchanan	Israeli Army Research Labs, Israel
Oluseyi O. Onawola	2004	JR Vinson	Ph.D., ME., Auburn University, Alabama
Matas Smakotinas	2004	TS Buchanan	Unknown
James T. Arters	2005	JR Vinson	USARL Dev. & Engr. APG, MD
Zaeem Ashraf Khan	2005	SK Agrawal	Ph.D. Biomechanics, UOD
Rajkiran Madangopal	2005	SK Agrawal	Unknown
Abhishek Agrawal	2005	SK Agrawal	Unknown
Joseph P. Feser	2005	AK Prasad	Ph.D. at Univ. of Calif-Berkeley
Christina Mae Turka	2005	JE Novotny	Rohm-Haas, Newark, DE
Gregory Wolos	2005	JE Novotny	Gore, Newark, DE

## UNIVERSITY FACULTY SENATE FORMS

### Academic Program Approval

**Submitted by:** Andras Szeri, Mechanical Engineering, phone number 831-2008

**Action:** Permanent approval of Master of Science in Mechanical Engineering (MSME) and Master of Engineering: Mechanical (MEM).

**Effective term** 06S

**Current degree** Master of Science in Mechanical Engineering (MSME) and Master of Engineering: Mechanical (MEM).

**Proposed change leads to the degree of:** Master of Science in Mechanical Engineering  
Master of Engineering: Mechanical

**Proposed name:** Master of Science in Mechanical Engineering  
Master of Engineering: Mechanical

**Revising or Deleting:** None, permanent approval requested

**Graduate Program Policy statement change:** Attached

**Graduate Program of Study:** Master's program in Mechanical Engineering

**List program changes for curriculum revisions:** None

**List new courses required for the new or revised curriculum:** None

**Other affected units:** None

#### **Rationale:**

There are part time students already employed by industry or government, who wish to pursue advanced study in Mechanical Engineering without performing research and writing a thesis.

Recognizing this, the Department of Mechanical Engineering always had a thesis and non-thesis options at the Masters level. To make the distinction between these two options more visible, we petitioned, and obtained, provisional approval to disestablish the degree of "Master of Mechanical Engineering" with thesis and non-thesis options, and establish the "Master of Science in Mechanical Engineering" (MSME) as a degree requiring a written thesis, and the "Master of Engineering: Mechanical" (MEM) as the coursework-only degree.

Established in 1994 by the College of Engineering, the Engineering Outreach Program is designed to meet society's needs by educating the non-traditional student through professionally convenient, part-time, graduate-level educational opportunities. These include master's degree

programs and technical renewal opportunities in engineering that are provided in a variety of formats, thereby helping to meet the college's need to maintain/increase enrollments and enhance the reputation of the College of Engineering at the University of Delaware. The MEM degree is in line with, and adheres to, College of Engineering policy.

**Program Requirements:**

The Master of Science in Mechanical Engineering (MSME) degree requires a minimum of 24 credit hours of course work beyond the bachelor's degree and a thesis equivalent to 6 credit hours. The Master of Engineering: Mechanical (MEM) degree requires the completion of 30 credit hours of course work beyond the bachelor's degree, but does not require a thesis.

Required course for both degrees are MEEG 610 Intermediate Solid Mechanics, MEEG 620 Intermediate Dynamics, MEEG 630 Intermediate Fluid Mechanics, MEEG 640 Intermediate Heat Transfer, and MEEG 690 Intermediate Engineering Mathematics. In addition, a graduate level course in mathematics or numerical methods is required.

**Requirements for Admission:**

Applicants entering either degree programs are expected to have

1. A baccalaureate degree in mechanical engineering or in a closely allied field of science or mathematics.
2. An undergraduate grade point average in engineering, science and mathematics courses of at least 3.0 on a 4.0 scale.
3. A minimum of at least three strong letters of support from former teachers or supervisors.
4. A minimum of combined Quantitative and Verbal score of 1200 in the Graduate Record Examination Aptitude Test.
5. A minimum score of 600 in the Test of English as a Foreign Language for students whose first language is not English

**ROUTING AND AUTHORIZATION:** (Please do not remove supporting documentation.)

Department Chairperson J. B. R. Date 2-13-06

Dean of College Z. Felu Date 2-13/06

Chairperson, College Curriculum Committee \_\_\_\_\_ Date \_\_\_\_\_

Chairperson, Senate Com. on UG or GR Studies \_\_\_\_\_ Date \_\_\_\_\_

Chairperson, Senate Coordinating Com. \_\_\_\_\_ Date \_\_\_\_\_

Secretary, Faculty Senate \_\_\_\_\_ Date \_\_\_\_\_

Date of Senate Resolution \_\_\_\_\_ **Date to be Effective** \_\_\_\_\_

Registrar \_\_\_\_\_ Program Code \_\_\_\_\_ Date \_\_\_\_\_

Vice Provost for Academic Programs & Planning \_\_\_\_\_ Date \_\_\_\_\_

Provost \_\_\_\_\_ Date \_\_\_\_\_

Board of Trustee Notification \_\_\_\_\_ Date \_\_\_\_\_

## **MASTER of ENGINEERING: MECHANICAL (MEM)**

The Master of Engineering: Mechanical (MEM) program consists of 30 credit hours of graduate level coursework. Coursework must be completed with a grade point average of 3.0 or higher. The requirements are designed to provide a general program and to allow for some concentration of study within Mechanical Engineering. It will be possible to complete this program taking courses in the late afternoon, early evening, and/or in a distance format for part-time students. Engineering Outreach can help facilitate part-time graduate education.

### Course Requirements

A. The following five courses are required (15 credits):

- MEEG 610 Intermediate Solid Mechanics
- MEEG 620 Intermediate Dynamics
- MEEG 630 Intermediate Fluid Mechanics
- MEEG 640 Intermediate Heat Transfer
- MEEG 690 Intermediate Engineering Mathematics

Students may petition the Graduate Committee to substitute a more advanced (e.g., 800-level) course on the same topic for one of these required courses.

B. One additional graduate level course (3 credits) in mathematics or numerical methods. The student makes this selection with the documented approval of the Department's Graduate Committee which has the authority to decide on acceptable courses.

C. One additional graduate level course (3 credits) in Mechanical Engineering. Three credits of MEEG 868 Research can be used toward this requirement. The student makes this selection with the documented approval of the department's Graduate Committee which has the authority to decide on acceptable courses.

D. Three additional graduate level courses (9 credits) in engineering, mathematical, physical or biological sciences or business and economics. The student makes these selections with the documented approval of the department's Graduate Committee which has the authority to decide on acceptable courses.

## **MASTER of SCIENCE in MECHANICAL ENGINEERING (MSME)**

The Master of Science in Mechanical Engineering (MSME) program consists of 24 credit hours of graduate level coursework distributed in four general categories, plus six credits of Master's Thesis. Coursework must be completed with a grade point average of 3.0 or higher. The requirements are designed both to provide a balanced program in Mechanical Engineering and to allow for a degree of specialization. Students should be able to complete all degree requirements, including the thesis, in 18 to 24 months of full-time study.

### **I. Course Requirements**

A. The following five courses are required (15 credits):

- MEEG 610 Intermediate Solid Mechanics
- MEEG 620 Intermediate Dynamics
- MEEG 630 Intermediate Fluid Mechanics
- MEEG 640 Intermediate Heat Transfer
- MEEG 690 Intermediate Engineering Mathematics

Students may petition the Graduate Committee to substitute a more advanced (e.g., 800-level) course on the same topic for one of these required courses.

B. One additional graduate level course (3 credits) in mathematics or numerical methods. The student makes this selection with the documented approval of the Department's Graduate Committee which has the authority to decide on acceptable courses.

C. Two additional elective graduate level courses (6 credits) in engineering or mathematical, physical or biological sciences. The student makes these selections with the documented approval of the department's Graduate Committee which has the authority to decide on acceptable courses.

D. 6 credits of MEEG 869 Master's Thesis.

### **II. Thesis Requirements**

A thesis is required which demonstrates the student's ability to conduct scholarly research. Entering graduate students are expected to choose a thesis advisor and research topic during their first semester in the Department so that they can initiate research and choose appropriate elective courses.

At the completion of the thesis research, candidates for the MSME degree must defend their thesis orally to a committee of at least three faculty members. The committee will be chaired by the thesis advisor who, along with at least one other committee member, must be regular full-time faculty in the Department of Mechanical Engineering. The thesis is to be submitted to committee members at least two weeks in advance of the defense and shall meet the academic and professional standards set forth by the University. Upon acceptance of the thesis, the Committee recommends approval to the Department Chairperson.

## MASTER OF MECHANICAL ENGINEERING PROGRAM (Prior to 1999)

The Master of Mechanical Engineering (MME) program consists of 30 credit hours of work distributed in four general categories. All coursework must be completed with a grade point average of 3.0 or higher. The requirements are designed to provide both a balanced program in the basic engineering sciences and some specialization. The Department offers both thesis – and coursework – option Master's degrees.

### Thesis Option

#### I. Course Requirements

- A. At least one course at the graduate level in each of the following four major areas (12 credits):
  1. Heat Transfer and Thermodynamics: Students usually choose among Mechanical Engineering (MEEG) 801 Advanced Thermodynamics, MEEG 802 Conduction Heat Transfer, or MEEG 803 Convection Heat Transfer.
  2. Solid Mechanics and Materials: Students should choose MEEG 813 Theory of Elasticity or other suitable MEEG or Materials Science (MASC) graduate courses in mechanical properties of materials.
  3. Dynamics and Vibrations: Either MEEG 821 Dynamics or MEEG 823 Vibrations.
  4. Fluid Mechanics and Gas Dynamics: MEEG 831 Fluid Mechanics I is the introductory course. MEEG 832 Fluid Mechanics II is also offered.
- B. At least two courses (6 credits) in Engineering Analysis. MEEG 863 and MEEG 864 are recommended.
- C. Two elective courses at the graduate level (6 credits) to provide some specialization within Mechanical Engineering. The student, in concert with the faculty advisor, makes this selection.
- D. 6 credits of MEEG 869, Master's Thesis.

#### II. Thesis Requirements

A thesis is required which demonstrates the student's ability to conduct scholarly research. Entering graduate students are expected to choose a topic during their first semester in the Department so that they can initiate research and choose appropriate elective courses. Students should be able to complete all degree requirements, including the thesis, in 18 to 24 months.

At the completion of the thesis research, candidates for the MME degree must defend their thesis orally to a committee of at least three faculty members, chaired by the thesis advisor who must be regular faculty in the Department of Mechanical Engineering. The thesis is to be submitted to committee members at least two weeks in advance of the defense and shall meet the

academic and professional standards set forth by the University. Upon acceptance of the thesis, the Committee recommends approval to the Department Chairperson.

### **Coursework Option**

This option is not available to students who have been enrolled in the thesis-option Master's program.

#### Course Requirements:

- A. 6 credits of Heat Transfer and Thermodynamics to be selected from MEEG 801, 802, 803.
- B. 6 credits of Solid Mechanics and Materials to be selected from MEEG 813, MEEG 615 or other suitable ME or Materials Science graduate courses.
- C. 6 credits of Engineering Analysis. MEEG 863 and 864 are recommended.
- D. 3 credits of Dynamics and Vibrations: MEEG 821 or 823.
- E. 3 credits of Fluid Mechanics: MEEG831 is the introductory course.
- F. 6 credits of approved graduate electives to be selected from course offerings in Mechanical Engineering, other Engineering or Science programs, Mathematical Sciences, or Business & Economics.

Typically, MEEG 801, 802, 813, 821, 831 and 863 are offered during the Fall Semester, while MEEG 803, 823, 832 and 864 are offered during the Spring Semester. Courses are usually offered in the late afternoon and early evening to accommodate part-time students.

Appendix IV

DEGREES AWARDED

YEAR	MME	MSME	MEM	
1993	5			
1994	6			
1995	11			
1996	15			
1997	5			
1998	9			
1999		5	2	
2000		6		
2001		9		
2002		13		
2003		4		
2004		6	3	
2005		6	1	
<b>Total</b>	<b>51</b>	<b>49</b>	<b>6</b>	

<b>MSME Graduate Student</b>	<b>Graduated</b>	<b>Advisor</b>	<b>JOB PLACEMENT</b>
Alexander Tan Dee	1998	JR Vinson	Fujikura Corp., Calif.
Emanuele F. Gillio	1998	SG Advani	Cytec Corporation
Rishikesh B. Bhalerao	1998	JM Lambros	ABAQUS Inc., Pawtucket, RI
Hongwei Li	1998	JM Lambros	Philips Technologies, AirPax Group, Cambridge, MD
Ali Gokce	1998	SK Agrawal	Continued to Ph.D. - UOD
Ryuta Kamiya	1998	TW Chou	Industrial Company - Japan
Hans Stephan Laudorn	1998	SG Advani	ATK Composites and now at CCM
Rahul S. Rao	1998	SK Agrawal	Microsoft Corporation
Erik T. Thostenson	1998	TW Chou	Ph.D. Materials, UOD
Adrian Gorea	1999	LP Wang	Masters, Dept. of Physics & Astronomy, UOD
Jeremiah Robert Slade	1999	SG Advani	Nfoscitex Corporation
Berna Berker	1999	JQ Sun	Symtac Software Company
Brent L. King	1999	SK Agrawal	ILC, Dover
Manu Krishnan	1999	JQ Sun	MathWorks
Matthew T. McGarry	1999	H Wang	
Nihar R. Satapathy	1999	JR Vinson	Michigan
Rajitha Alura	1999	M Keefe	WaveSplitter Technologies
William O. Ballata	1999	SG Advani	Cessna Aircraft
Prabir Barooah	1999	TW Chou	Unknown
Shourov Bhattacharya	1999	SK Agrawal	Honeywell Tech, Sydney
Sunil B. Earath	1999	AK Prasad/SG Advani	GE (India)
Zhixu Guan	1999	TS Buchanan	Exponent, Philadelphia, PA
James T. Kelly	1999	AS Wexler	Ph.D. at Univ. of Calif.-Davis
Arvind Narayanaswamy	1999	JM Lambros	
Mohan Krishna Kompella	2000	JM Lambros	
Daniel B. Heisig	2000	JM Lambros	
Sontipee Aimmanee	2000	JR Vinson	Ph.D., Virginia Polytechnic Inst. & St. University
Gunnar Frederik Finberg	2000	RV Roy	Ph.D. in ME at Rutgers
Hubert C. Stadtfeld	2000	SG Advani	BMW, Germany
Thomas Carl Koehler	2001	TS Buchanan	ARL, Aberdeen, MD
Xiaopeng Lu	2001	TS Buchanan	Verizon, Alexandria, VA
Eric Dayrit Ramos	2001	TS Buchanan	Pharmaceutical, New Jersey
Shawn Patrick Riley	2001	MH Santare SG Advani	AstroPower Inc., Newark, DE
Benjamin E. Forbes	2000	JR Vinson	Business, Spotsylvania, VA
Abdullah Basar Alp	2001	SK Agrawal	General Motors
Orlando Manuel Ayala	2001	LP Wang	Ph.D., Univ. of Delaware
Shashin Bhalendra Patel	2001	SK Agrawal	Corning, Wilmington, NC
Lin Wang	2001	TS Buchanan	Vrendenburg, Greenbelt, MD
Amy Lynn Ventresca	2002	AK Prasad	Working for Sargent and Lundy
Jeffrey A. Acheson	2002	SG Advani	ARL, Aberdeen, MD
Pavel Bogdanov Nedanov	2002	SG Advani	Masters in Operation Research, UOD
Shengkuan Xiao	2002	JR Vinson	Ph.D., Elec. & Comp. Science, UOD
Glenn Gardner	2002	JQ Sun	PSEG Nuclear, New Jersey
Richard W. Heine	2002	TS Buchanan	ARL, Aberdeen, MD
Shunjun Song	2002	JR Vinson	Ph.D. student, Univ. of Michigan
Jingbo Wang	2002	JR Vinson	Ph.D.-Cornell Univ., NY
Mylene Deleglise	2002	SG Advani	Ph.D., Univ. of Douai, France

Jeffrey W. Doody	2002	LP Wang	Industry, New York
Gonzalo A. Estrada	2002	SG Advani	Oil Company, Houston, TX
Frank E. Fresconi	2002	AK Prasad	Working - Aberdeen PG and doing part-time Ph.D.
Wenzhong Tang	2002	M. Keefe	Ph.D. Univ. of Delaware
Sarvana Kumar	2003	SK Agrawal	General Electric, Bangalore
Mathieu Devillard	2003	SG Advani	FAURECIA Interior Systeme, Renault/Nissan Division, France
Yingxin Gao	2003	JE Novotny	Ph.D. student, Univ. of Michigan
Dhiren K. Modi	2003	SG Advani	Ph.D., Univ. of Nottingham, UK
Brian Johnson	2004	Santare/Novotny	ARL, Aberdeen, MD
Prankul Middha	2004	H Wang	GexCon AS, Norway
Melissa Anne Rhoads	2004	JQ Sun	US Army Material Systems, APG, MD
Sudhaker Chhabra	2004	AK Prasad	Ph.D. Univ. of Delaware
Shay Cohen	2004	TS Buchanan	Israeli Army Research Labs, Israel
Oluseyi O. Onawola	2004	JR Vinson	Ph.D., ME., Auburn University, Alabama
Matas Smakotinas	2004	TS Buchanan	Unknown
James T. Arters	2005	JR Vinson	USARL Dev. & Engr. APG, MD
Zaeem Ashraf Khan	2005	SK Agrawal	Ph.D. Biomechanics, UOD
Rajkiran Madangopal	2005	SK Agrawal	Unknown
Abhishek Agrawal	2005	SK Agrawal	Unknown
Joseph P. Feser	2005	AK Prasad	Ph.D. at Univ. of Calif-Berkeley
Christina Mae Turka	2005	JE Novotny	Rohm-Haas, Newark, DE
Gregory Wolos	2005	JE Novotny	Gore, Newark, DE