MECHANICAL ENGINEERING DEPARTMENT'S

MASTER OF SCIENCE DEGREE

- REQUIREMENTS AND PROCEDURES -

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Admission requirements include:

Master's students in mechanical engineering earn 30 credits if thesis option, and 32 credits if non-thesis option. Those students receiving assistantships are expected to take the thesis option. Initially when the student enters the program, the Department Chair is the student's advisor up to nine credits of graduate study (not including Master's Research or Thesis-4600:698 & 699, respectively). The student is then encouraged to pair with a faculty advisor whose activities parallel their research interests. Students following the non-thesis option do not register for Master's Thesis (4600:699). They do, however, enroll in Engineering Report (4600:697), but only once, and usually at the culmination of their graduate study. Students receiving tuition scholarships may choose this option. All master's degree requirements must be completed within six years. Graduate students receiving an assistantship or tuition scholarship have a maximum of two years to complete their degree requirements.

The basic requirements for the Master of Science degree in Mechanical Engineering are as follows:

	(Thesis Option)	(Non-Thesis Option)
Mechanical Engineering course work	18 hours	21
Approved Mathematics (minimum)	3 hours H	3 H
Approved Electives (including thesis Or Engineering Report)	9 hours	8
	30 hours**	32 hours*

* For the non-thesis option, two hours of Engineering Report (4600:697) for a project accounts for 2 hours of approved electives.

** The Master's Thesis accounts for six hours of approved electives. (Graduate students with teaching assistantship are required to take thesis option).

H No Computer Physics, Fortran, C Programming, etc. are permitted for graduate credits. Engineering Analysis (4600:660) may replace approved mathematics. Courses in Statistics (3470:***) may also satisfy approved mathematics upon the approval of the student's advisor.

There are diverse areas of graduate study in the Mechanical Engineering Department. Every student in the Mechanical Engineering Department will be encouraged to take at least one Mechanical Engineering course outside of his main area of interest, with the purpose of developing some breadth in the student's graduate education.

All Master of Science candidates in Mechanical Engineering are limited to not more than three 500 level courses in Engineering (+) (*). Furthermore, not more than two of the 500 level courses can be applied to the required Mechanical Engineering course work (+) (*). Prior written approval from the student's advisor must be obtained.

(+) These requirements may be altered with prior written approval of the student's Advisor, Co-Advisor, and the Department Chair.

(*) Students taking 500 level courses with dual number (undergraduate and graduate) can only receive credit towards the graduate degree if the similar course was not taken for undergraduate credit.

International Students

Applicants whose native language is not English must have a TOEFL score of at least 550. Applicants not satisfying the requirements for full admission may be classified as either a Provisional Admission or Deferred Admission. International graduate assistants are encouraged to take the Test of Spoken English (TSE), and achieve a minimum score of 50.

Graduate Assistantships (TA)

Offers of graduate assistantships are made by early June for International students wishing to begin study in the fall semester, and by early October for International students wishing to begin study in the spring semester. A committee of faculty members rank the applicants. Depending upon the budget, offers are made to the top students in the fields of Mechanics & Materials, Thermal & Fluids, Controls & CAD/CAM, and Dynamics & Vibrations. Recipients of Graduate Assistantships shall maintain a courseload of 15 credit hours per semester (15 credits over the combined Summer I and II sessions), as well as maintain a 3.0 G.P.A or better, as specified in the contract. Graduate assistants are also assigned office space by the Department Chair.

Tuition Scholarships

Offers of graduate tuition scholarships are made to the top graduate candidates in the fields of Mechanics, Thermal, and Controls. Recipients of the Graduate Tuition Scholarship shall maintain a courseload of 10 credit hours per semester (10 credits over the combined Summer I and II sessions), as well as maintain a 3.0 G.P.A or better, as specified in the contract. Tuition Scholarship recipients may obtain a job on or off campus for no more than 20 hours a week for domestic students; 30 hours a week for international students. Tuition scholarship recipients may work part time or full time for 12 months if they have an “F” visa (Practical Training) or 18 months if they have a “J” visa (Academic Training).

Parking Permits

Effective fall semester 1999, Graduate Assistants will be responsible for partial parking fee charges. The department will continue to pay the base cost of the permit. Please note that a valid permit must be displayed at all times while parking on University premises.

PROCEDURE FOR ADVISING M.S. STUDENTS

The main reason for this procedure is to serve the graduate student by utilizing the faculty resources and expertise and student talents in a most efficient and mutually beneficial manner. The graduate students and the faculty are expected to observe the following guidelines as close as possible. In special circumstances the Department Chair may be referred to for clarification.

1. New M.S. students will initially be advised by the Department Chair or a faculty member designated by the Department Chair.

2. After the visit with the Department Chair and within the time frame of the first semester of graduate work the student should visit with the faculty doing work in the student's area of interest. Such visits should be explored with as many faculty members as possible.

3. The student should feel free to repeat such visits as necessary until a clear desire of mutual working relationships between faculty and student is established. After that, the student should select an Advisor for the M.S. thesis or for the Special Topics project. The selection of the advisor can take place anytime after the first visit <u>but no later than the accumulation of 9 credits of coursework.</u>

4. A second faculty member will be selected as the student's Co-Advisor by the mutual consent of the student and the Advisor.

5. The selection of Advisor and Co-Advisor must be approved by the Department Chair and must be recorded with the department. The student and the Advisor will work out a formal Plan of Study (without exception). The Plan of Study must be signed by the Co-Advisor and the Department Head and a copy kept in the student's file.

6. Revisions to the Plan of Study may be made at the request of the student and requires the same signing procedure as the original Plan of Study. The approval of minor revisions and course substitutions are left to the discretion of the Advisor.

7. At any time, the student may request the Department Chair, in writing (stating the justification), for a change in Advisor and/or Co-Advisor. Any change in advisorship must be authorized by the Department Chair.

8. The 2-credit project for non-thesis option will result in a typewritten report which will be:

    a) Neatly and thoroughly drafted.

    b) Read and signed by the Advisor and Co-Advisor and approved by the Department Chair on the Project Cover sheet.

    c) Filed with the Department in the student's file.

TABLE I

PLAN OF STUDY

M.S.M.E.

Objective/Specialty:_____ Name:

_____ Date:

_____ Advisor:

_____ Co-Advisor: _____

GRADUATE COURSES

Design & Robotics

4600:544 Robot Design, Control & Application (3)
4600:562 Pressure Vessel Design (3)
4600:563 CAD/CAM (3)
4600:631 Kinematic Design (3)
4600:632 Reliability in Design (3)

Dynamics, Vibrations, and Acoustics

4600:530 Machine Dynamics (3)
4600:532 Vehicle Dynamics (3)
4600:629 Non-Linear Engineering Problems (3)
4600:630 Vibrations of Discrete Systems (3)
4600:633 Computerized Modal Analysis of Structures (3)
4600:634 Advanced Dynamics of Rotating Machinery (3)
4600:635 Stress Waves in Solids and Fluids (3)
4600:730 Vibrations of Continuous Systems (3)
4600:731 Random Vibrations (3)
4600:732 Advanced Modal Analysis of Structures (3)

Mechanics and Materials

4300:551 Matrix Analysis of Structures (3)
4300:681 Advanced Engineering Materials (3)
4300:682 Elasticity (3)
4300:702 Plates and Shells (3)
4300:703 Applications in Plasticity and Viscoelasticity (3)
4600:522 Experimental Stress Analysis I (3)
4600:609 Finite Element Analysis I (3)
4600:620 Experimental Stress Analysis II (3)
4600:621 Introduction to Tire Mechanics (3)
4600:622 Continuum Mechanics (3)

Solid Mechanics (cont'd)

4600:623 Applied Stress Analysis I (3)
4600:624 Fundamentals of Fracture Mechanics (3)
4600:625 Analysis of Mechanical Components (3)
4600:626 Fatigue of Engineering Materials (3)
4600:627 Advanced Materials and Manufacturing Processes (3)
4600:628 Mechanical Behavior of Materials (3)
4600:629 Nonlinear Engineering Problems (3)
4600:704 Finite Element Analysis II (3)
4600:723 Applied Stress Analysis II (3)
4600:726 Non-Linear Continuum Mechanics (3)

Compressible and Incompressible Fluid Mechanics

4200:716 Non-Newtonian Fluid Mechanics (3)
4300:640 Advanced Fluid Mechanics (3)
4600:500 Thermal System Components (3)
4600:511 Compressible Fluid Mechanics (3)
4600:512 Fundamentals of Flight (3)
4600:513 Introduction to Aerodynamics (3)
4600:514 Introduction to Aerospace Propulsion (3)
4600:550 Introduction to Computational Fluid Flow and Convection (3)
4600:600 Gas Dynamics (3)
4600:610 Dynamics of Viscous Flow I (3)
4600:611 Computational Fluid Dynamics I (3)
4600:650 Tribology (3)
4600:710 Dynamics of Viscous Flow II (3)
4600:711 Computational Fluid Dynamics II
4600:715 Hydrodynamics Stability (3)

Heat Transfer and Energy Systems

4200:600 Transport Phenomena (3)
4200:701 Advanced Transport Phenomena (2)
4200:721 Topics in Energy Transport (2)
4600:510 Heating and Air Conditioning (3)
4600:515 Energy Conversion (3)
4600:516 Heat Transfer Processes (3)
4600:608 Thermodynamics (3)
4600:615 Conduction Heat Transfer (3)
4600:616 Convection Heat Transfer (3)
4600:617 Radiation Heat Transfer (3)
4600:618 Boiling Heat Transfer and Two-Phase Flow (3)
4600:693 Measurements Methods and Experimental Error in Thermofluid Sciences
4600:719 Advanced Heat Transfer

Systems and Controls

4400:676 Random Process Analysis (3)
4400:776 Optimal Control I (3)
4400:777 Optimal Control II (3)
4400:778 Adaptive Control (3)
4600:541 Control Systems Design (3)
4600:542 Industrial Automatic Control (3)
4600:543 Optimization Methods in Mech. Engrg. (3)
4600:642 System Analysis and Control Design (3)
4600:643 Distributed Process Control Design & Appli. (3)
4600:645 Process Identification/Computer Control (3)
4600:646 Expert Systems in Control Manufacturing (3)
4600:647 Neural and Fuzzy Control Systems (3)
4600:670 Integrated Flexible Cellular Mfg. Sys. (3) _____
4600:741 Optimization Theory and Appl. (3)

Engineering Analysis

4600:660 Engineering Analysis (3)
4600:763 Advanced Methods in Engineering Analysis (3)

Special Topics, Thesis and Seminar

4600:697 Special Topics (Engineering Report)
4600:699 Master's Thesis (6)
4600:790 Advanced Seminar in Mechanical Engrg. (1-4)

Mathematics and Others

_____ _____
_____ _____
_____ _____
_____ _____

APPROVAL

Student: _____ Advisor:

Co-Advisor: _____ Dept. Chair:

cc: Student's File
Advisor
Co-Advisor
Dept. Chair