MECHANICAL ENGINEERING
GRADUATE STUDENT HANDBOOK

NORTH CAROLINA AGRICULTURAL AND TECHNICAL STATE UNIVERSITY

DEPARTMENT OF MECHANICAL AND CHEMICAL ENGINEERING

COLLEGE OF ENGINEERING

GREENSBORO, NORTH CAROLINA 27411

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Notices

This handbook was prepared for use by graduate students in Mechanical Engineering at North Carolina A&T State University. It is designed to supplement existing policy and is intended as a guide. The Department of Mechanical and Chemical Engineering prepares revisions to its handbooks periodically and information contained herein is proofed for accuracy. However, students are asked to consult with academic advisors and with the appropriate University office for current information and policy. Important changes may occur without notice. The Department attempts to maintain an accurate Graduate Student Handbook at all times; however, errors may inadvertently occur. The Department reserves the right to correct such errors when they are found, without further notice. The presence of errors will not affect the application of rules and requirements to students.

Table of Contents

Master of Science in Mechanical Engineering

Program Description

The Master of Science in Mechanical Engineering (MSME) emphasizes advanced study in the areas of mechanical systems and materials, energy and thermal-fluid sciences, and aerospace. The program provides graduate level education designed to prepare the graduate for Ph.D. level studies or for advanced mechanical engineering practice in industry, consulting, or government service.

Admission

Applicants may be admitted to the MSME Program under Unconditional or Provisional Admission:

Unconditional Admission

An applicant may be given unconditional admission to the MSME Program if he/she possesses a BSME degree with an overall grade point average (GPA) of 3.0 or better, and the program is accredited by ABET (Accreditation Board for Engineering and Technology).

Provisional Admission

Applicants may be granted provisional admission if they do not qualify for unconditional admission due to one of the following reasons:

- The applicant has a baccalaureate mechanical engineering degree from a non-ABET accredited program. Undergraduate engineering degrees from foreign universities fall into this category.
- The applicant has a baccalaureate degree in engineering or a closely related field but is deficient in key background courses. These deficiencies must not exceed 12 credit hours.
- The applicant's undergraduate GPA is below that required for unconditional admission but there is also academic evidence that the student will successfully complete the degree.

Change of Admission Status

Provisional admission status will be changed to unconditional when the student has satisfied the following two conditions:

- All required course deficiencies have been completed with at least a “B” grade in each.
- The first three MEEN graduate level courses with letter grades (at least one in the 700 level or above) must have at least a “B” grade in each.

Failure to move to unconditional admission within two semesters will subject the student to dismissal.

International Students

All international applicants, except those from countries exempted, must provide proof of English language proficiency by obtaining acceptable scores on the Test of English as a Foreign Language (TOEFL). The minimum TOEFL score is 550 (213 in computer-based tests).

MSME Program Policies and Requirements

Transfer of Credit

Up to six (6) credit hours of graduate course work with a grade of "B" or better may be transferred from another graduate program at North Carolina A&T State University or from another university providing these courses, in the opinion of the advisor, can be part of a reasonable and cohesive graduate program.

Transfer of Undergraduate Credit

Up to six (6) credit hours of graduate course work with a grade of "B" or better taken at North Carolina A&T State University as a undergraduate student may be transferred to the MSME program provided it was not counted to fulfill undergraduate requirements, and these courses, in the opinion of the advisor, can be part of a reasonable and cohesive graduate program. No graduate credit will be allowed for excess credits completed in an undergraduate classification at another institution.

Time Limitation

The graduate program must be completed within six (6) consecutive calendar years. Programs remaining incomplete after this time interval are subject to cancellation, revision, or special examination for outdated work. In the event that studies are interrupted for the duty in the armed services, the time limit shall be extended for the length of time the student shall have been on active duty providing the candidate resumes graduate work no later than one year following release from military service.

Advisory Committee

All graduate students must select an Academic Advisor during their first semester. The Advisory Committee consists of at least three members, with the Academic Advisor serving as the chair. The Academic Advisor and the majority of the Committee members must be MEEN graduate faculty members. The Committee assists the student to define the thesis or project topic area and reviews the quality of the student's work. The Committee also conducts the student's oral defense of the student's project or thesis work.

Plan of Graduate Study

All graduate students must prepare a Plan of Graduate Study (See Page 20) during their first semester for approval by the Department and the Graduate School. The plan of course work must be unified, and all constituent parts must contribute to an organized program of study and research. The plan outlines courses, the program option, and the anticipated graduation date, among others. These plans should be updated every semester.

Course Work Requirements

Mathematics: One of any graduate level mathematics course (excluding MATH 625 and MATH 626) or an equivalent mathematics course specified by the Academic Advisor

Core Courses: Each MSME student must take three **core** courses from the following list:

MEEN-706 Theory of Vibrations
MEEN-716 Finite Element Methods
MEEN-731 Conduction (or MEEN-732 Convection/ MEEN-733 Radiation)
MEEN-743 Instrumentation

Program Options

Three options are available to MSME students: thesis option, project option, and course work option.

Thesis Option

Students in the Thesis Option must take six (6) credit hours of MEEN-797 Thesis in addition to twenty-four (24) credit hours of course work with letter grades. At least twelve (12) credit hours of those 24 credit hours must be at the 700 level and above. An original research topic must be chosen in conjunction with the student's advisor culminating in the preparation of a scholarly thesis. An oral thesis defense/examination is required. This option is intended for students with strong research interests who may desire to pursue further graduate studies towards a Ph.D. degree.

Thesis
The Thesis Option requires a formal thesis following the format specified by the School of Graduate Studies. Three (3) copies of the completed thesis must be submitted to the Dean of the School of Graduate Studies. Consult the calendar of the School of Graduate Studies for submission deadlines.

Oral Defense
A student in the Thesis Option must pass an oral examination which is scheduled by the advisor. The oral exam on the thesis is scheduled after the thesis has been reviewed by each member of the committee and approved with recommended changes. The exam is a public meeting; the committee deliberation following the meeting is open only to committee members. At the deliberation the committee will decide to pass or fail the student, or to continue the oral defense at another date. Notification of Oral Defense (See Page 25) should be submitted to the School of Graduate Studies within two working days of the oral exam.

Project Option

Students in the Project Option must take three (3) credit hours of MEEN-796 Master's Project in addition to thirty (30) credit hours of course work with letter grades. At least fifteen (15) credit hours of those 30 credit hours must be at the 700 level and above. The option is intended for students who have substantial engineering experience. An oral examination project defense/examination is required.

Project Report
The Project Option requires a formal project report which generally follows the format of a thesis. There is no requirement that the project report be lodged with the School of Graduate Studies.

Oral Defense
A student in the Project Option must pass an oral examination which is scheduled by the advisor. The oral exam on the project is scheduled after the project report has been reviewed by each member of the committee and approved with recommended changes. The exam is a public meeting; the committee deliberation following the meeting is open only to committee members. At the deliberation the committee will decide to pass or fail the student or to continue the oral defense at another date. Notification of Oral Defense (See Page 25) should be submitted to the School of Graduate Studies within two working days of the oral exam.

Course Work Option

Students in the Course Work Option must pass a comprehensive examination in addition to thirty-three (33) credit hours of course work with letter grades. At least eighteen (18) credit hours of those 33 credit hours must be at the 700 level and above. A student selecting the Course Work Option must receive approval from the Department Chair. A student in this option is not eligible to receive campus based scholarship, tuition waivers, or assistantships.

A student in the Course Work Option must select an academic advisor who will direct the course of study and who will plan the Final Comprehensive Examination. A student in this option does not have a formal advising committee.

Comprehensive Examination
A student in the Course Work Option must sit for a written comprehensive examination of six (6) hours duration, prepared as three (3) two-hour examinations. A student must have completed at least twenty-four (24) hours of course work to be eligible to take the comprehensive examination. The examination is based on material relating to the student's course work.

The Comprehensive Examination will be conducted each semester, at least forty-five (45) days prior to the end of the semester. Applications to take the examination must be submitted by the academic advisor to the Department Chair at least thirty (30) days prior to the scheduled date of the examination. The student must initiate this process by contacting his/her advisor with an examination request.

A student in the Course Work Option who fails to achieve a satisfactory score at the first attempt may sit again in the next regularly scheduled Comprehensive Examination in the following semester. A student who fails a second time must petition the Dean of the School of Graduate Studies for permission to sit again. An unfavorable decision will result in dismissal from the program. A third failure will result in dismissal.

Comparison of Requirements for Three Program Options

Option	Courses (cr.)	Thesis/Project/Exam	MEEN 792 Seminar
Thesis	8 (24 cr.)	MEEN 797 (6 cr.)	twice
Project	10 (30 cr.)	MEEN 796 (3 cr.)	twice
Course Work	11 (33 cr.)	MEEN 788 (0 cr.)	twice

Post-Baccalaureate Studies (PBS)

The Post-Baccalaureate Studies (PBS) classification is intended for U.S. citizens who wish to undertake academic work beyond the baccalaureate degree for self-improvement but who are not admitted to a degree program. This classification is not open to international students. The following policies apply to PBS students:

1. Registration of PBS is through the Graduate School.
2. All PBS students must have baccalaureate degrees from accredited institutions of higher education.
3. All classes taken for credit by PBS students will be graded in the usual manner that applies for the particular course (A through F or S, U). All courses taken will show on the student's transcript.
4. The PBS classification carries with it no implication that the student will be admitted to any degree program. If a student subsequently wishes to apply to a degree program, he/she must complete the full admission process: application form, official transcripts, letters of recommendation, GRE scores, application fees, and others.
5. If the student is admitted to the MSME program later, requests for degree credit for courses completed in the PBS classification can be considered. A maximum of nine (9) credit hours, including those in PBS classification and those approved for graduate credit while classified as a undergraduate, may apply toward the MSME degree requirement. All course work accepted for degree credit must be approved by the student's advisory committee and the Department Chair as being relevant to the program of research and study.
6. Since a student in the PBS classification is not in a degree program, he/she is not eligible to receive financial aid, tuition remissions, stipends, assistantship, and other financial awards intended for students in a degree program.

Doctor of Philosophy in Mechanical Engineering

Program Description

The Ph.D. degree in Mechanical Engineering provides both advanced instruction and independent research opportunities for students. The Ph.D. degree is the highest academic degree offered, and graduates typically are employed in research environments in government laboratories and industries, and as university faculty. The Ph.D. degree program is highly individualistic in nature, and the student is expected to make a significant contribution to the reservoir of human knowledge by investigating a significant topic within the domain of mechanical engineering.

The Ph.D. degree symbolizes the ability to undertake original research and scholarly work of the highest levels without supervision. The degree is therefore not granted simply upon completion of a stated amount of course work but rather upon demonstration by the student of a comprehensive knowledge and high attainment in scholarship in a specialized field of study.

The student must demonstrate both the attainment of scholarship and independent study in a specialized field of study by writing a dissertation reporting the results of an original investigation. The student must pass a series of comprehensive examinations in the field of specialization and related areas of knowledge and defend successfully the quality, methodology, findings, and significance of the dissertation.

Admission

Applications must include three letters of reference, at least two of which must be from faculty members, GRE scores, official transcripts, and a personal statement on career goals, research interests, and academic honors. All international applicants, except those from countries exempted, must provide proof of English language proficiency by a minimum TOEFL score of 550 (213 in computer-based tests).

To be considered for unconditional admission to the Ph.D. in Mechanical Engineering, an applicant must have the Master of Science degree in Mechanical Engineering or a closely related field with a minimum GPA of 3.3 and satisfactory GRE scores.

Ph.D. Program Policies and Requirements

Time Limits

Doctoral students are allowed a maximum of six calendar years from admission to the doctoral program to attain candidacy (See Page 7) for the degree, and a maximum of ten calendar years to complete all degree requirements. The Ph.D. dissertation must be completed in no more than five years after the student has been admitted to candidacy.

Course Work

This program requires 24 credit hours of course work. At least 12 credit hours (courses with letter grades only) must be at the 800 level, and no more than 6 credit hours can be at the 600 level. In addition, 12 credit hours of dissertation must be registered after the student has finished all the course work and the MEEN-995 Preliminary Examination (See Page 7) has been registered.

Advisory Committee

All graduate students must select an Academic Advisor during their first semester. The Advisory Committee consists of at least five members, with the Academic Advisor serving as the chair. The Academic Advisor and the majority of the Committee members must be MEEN graduate faculty

members. The major advisor must provide a short justification letter to the Department Chair on the selection of Committee members outside of Mechanical Engineering. For members outside of the University, a short bio-sketch should be included in the justification letter. The Committee assists the student in formulating a plan of study and in defining the dissertation topic. The Committee also conducts the student's Preliminary Examination and the oral defense of the dissertation.

Plan of Graduate Study

All graduate students must prepare a Plan of Graduate Study (See Page 20) during their first semester for approval by the Department and the Graduate School. The plan of course work must be unified, and all constituent parts must contribute to an organized program of study and research. These plans should be updated every semester.

Doctoral Qualifying Exam (MEEN 991)

Objective

The Qualifying Examination provides an early assessment of a student's potential for satisfactory completion of the Doctoral degree. The exam tests a student's understanding of fundamental principles of mechanical engineering and his/her ability to apply these principles to solve mechanical engineering problems.

Schedule

A student admitted into the Ph.D. program must take the MEEN-991 Qualifying Examination in his/her first or second semester. The Ph.D. Qualifying Examination is given once each semester, and is held on two consecutive days, about two weeks before the final exam.

Students registered for the Qualifying Examination must notify the Graduate Program Coordinator by email, one month prior to the examination date, of the five Exam Areas they wish to take, with the approval of the major advisor. The areas chosen by each student must be related to his/her intended area of study.

Exam Areas

Each student must take an examination in five elective areas from the following ten areas:

1. Statics and strength of materials
2. Dynamics of particle and rigid bodies
3. System dynamics and vibrations
4. Mechanical design: static and fatigue failure, and the design of elements and components
5. Manufacturing
6. Materials science
7. Materials engineering
8. Fluid mechanics
9. Heat transfer
10. Thermodynamics

These ten areas are of undergraduate materials in most mechanical engineering curricula. The examination is closed books/notes except for the provided FE Reference Handbook (students are not allowed to bring their own copy of FE Reference Handbook). Other reference materials will be provided if deemed necessary by the faculty composing the exam. Programmable calculators are not allowed in the exam. Each test takes 90 minutes.

Notification of Results

Each student will be notified of his/her result (pass/fail in each area) in writing by the Department Chair within four weeks after the exam.

Pass: A student who receives a satisfactory grade is considered qualified to continue in the Ph.D. program.

Fail: A student who fails the exam the first time can retake it the following semester. In a retake of the Qualifying Exam, the student must take five areas and receive satisfactory grades in order to continue in the Ph.D. program. A student who fails on the second attempt will be dismissed from the Ph.D. program. Students who fail to take the exam at the scheduled time are considered as failing the exam.

Doctoral Preliminary Examination (MEEN 995)

Objective

The Preliminary Examination is an oral presentation and defense of the Dissertation Proposal (see Pages 21 and 22) by a student before the Advisory Committee. The objective is to determine if the student is prepared to undertake the proposed research.

Schedule

The Preliminary Examination must be passed at least six months before graduation. The Advisory Committee must receive a complete Dissertation Proposal one week prior to the date of the Preliminary Examination. The Exam lasts approximately two hours.

Results

The Advisory Committee determines whether or not the student has passed the Preliminary Examination. Approval may be conditioned, however, on the successful completion of additional work. The Advisory Committee may recommend one re-examination if the student fails at the first attempt and there is sufficient cause for re-examination. Failure to pass the Preliminary Examination terminates the student's work at this department. The Report of Doctoral Preliminary Examination (See Page 23) should be submitted to the School of Graduate Studies within two working days of the exam date.

Candidacy

A doctoral student is admitted to candidacy upon passing the Preliminary Examination without conditions or after fulfilling any conditions specified by the Advisory Committee.

Dissertation Credits

Dissertation credits may not be registered prior to the semester that the Preliminary Examination is scheduled.

Dissertation and Oral Defense

Dissertation

The dissertation generally follows the format and requirement of a thesis (See Page 3).

Oral Defense

The oral exam on the dissertation is scheduled after the dissertation has been reviewed by each member of the committee and approved with recommended changes. The Academic advisor will schedule the exam and inform the Dean of Graduate Studies two weeks before the exam to send a representative to the oral defense.

The exam is a public meeting; the committee deliberation following the meeting is open only to committee members. At the deliberation the committee will decide to pass or fail the student or to continue the oral defense at another date. Notification of Oral Defense (See Page 25) should be submitted to the School of Graduate Studies within two working days of the oral exam.

Integrated MS/Ph.D. Program

The Integrated MS/Ph.D. program is to attract outstanding and motivated students into the Ph.D. program. A student with a BSME degree from an ABET accredited program with superior credentials (high GPA, high GRE scores, and strong reference letters) may be admitted to this program. Students in this program are admitted to the Ph.D. program on a provisional basis, but will not be formally admitted to the Ph.D. program until completion of the requirements for a master's degree. The admission is therefore a dual admission such that students are accepted into master's program unconditionally to pursue a MS degree and accepted into Ph.D. program provisionally at the same time.

A student in this program must complete his/her MSME degree (thesis option) within 24 months with a minimum GPA of 3.3 and must pass the Ph.D. qualifier exam within this time frame to qualify for the unconditional admission to the Ph.D. program. Students who fail the qualifier exam will be dismissed from the Ph.D. program.

Up to two (2) Ph.D. level courses in the MEEN curriculum may be "double counted" to satisfy both requirements of the MS degree and the Ph.D. degree for students in this program. These courses should be at MEEN 800 level and a grade of "B" or better is required for the course to be counted toward both degrees.

Mechanical Engineering Course Listings

Masters Courses Also Open to Advanced Undergraduates

COURSE	TITLE
MEEN 602	Advanced Strength of Materials
MEEN 604	Intermediate Dynamics
MEEN 606	Mechanical Vibrations
MEEN 608	Experimental Stress Analysis
MEEN 610	Theory of Elasticity
MEEN 613	Composite Materials
MEEN 614	Mechanics of Engineering Modeling
MEEN 618	Numerical Analysis for Engineers
MEEN 626	Advanced Fluid Dynamics
MEEN 642	Materials Joining
MEEN 645	Aluminum Product Design and Manufacturing
MEEN 646	Advanced Manufacturing Processes
MEEN 647	Computer Integrated Mechanism Design
MEEN 649	Design of Robot Manipulators
MEEN 650	Mechanical Properties and Structure of Solids
MEEN 651	Aero Vehicle Structures II
MEEN 652	Aero Vehicle Stability and Control
MEEN 653	Aero Vehicle Flight Dynamics
MEEN 654	Advanced Propulsion
MEEN 655	Computational Fluid Dynamics
MEEN 656	Boundary Layer Theory
MEEN 657	Design of Thermal Systems
MEEN 660	Selected Topics in Engineering
MEEN 663	Energy Conversion Systems Design
MEEN 667	Environmental Control
MEEN 668	Gas Dynamics
MEEN 670	Internal Combustion Engines
MEEN 671	Turbomachinery
MEEN 675	Solar Energy Fundamentals and Design

Masters Courses Also Open to Doctoral Students

MEEN 702	Continuum Mechanics
MEEN 706	Theory of Vibrations
MEEN 707	Real Time Analysis of Dynamic Systems
MEEN 716	Finite Element Methods
MEEN 719	Advanced Computer-Aided Design
MEEN 731	Conduction Heat Transfer
MEEN 732	Convection Heat Transfer
MEEN 733	Radiation Heat Transfer
MEEN 742	Tools, Jigs, and Fixtures
MEEN 743	Instrumentation
MEEN 785	Special Topics

Masters Courses (on Pass/Fail basis)

MEEN 788	Master's Comprehensive Exam
MEEN 792	Master's Seminar
MEEN 793	Master's Supervised Teaching
MEEN 794	Master's Supervised Research
MEEN 796	Master's Project
MEEN 797	Master's Thesis

Doctoral Courses Also Open to Masters Students

MEEN 804	Advanced Dynamics
MEEN 808	Energy Methods in Applied Mechanics
MEEN 810	Advanced Theory of Elasticity
MEEN 813	Composite Structures
MEEN 814	Mathematical Theory of Plasticity
MEEN 820	Advanced Classical Thermodynamics
MEEN 822	Statistical Thermodynamics
MEEN 824	Irreversible Thermodynamics
MEEN 834	Special Topics in Applied Heat Transfer
MEEN 838	Solar Thermal Energy Systems
MEEN 840	Machine Tool Design
MEEN 846	Stochastic Modeling of Mechanical Systems
MEEN 847	Computational Engineering Dynamics
MEEN 848	Digital Control of Machines and Processes
MEEN 849	Computer Control of Robot Manipulators
MEEN 850	Phase Equilibria
MEEN 858	Mechanical Metallurgy
MEEN 860	Fracture Mechanics
MEEN 885	Special Topics

Doctoral Courses (on Pass/Fail basis)

MEEN 991	Doctoral Qualifying Examination
MEEN 992	Doctoral Seminar
MEEN 993	Doctoral Supervised Teaching
MEEN 994	Doctoral Supervised Research
MEEN 995	Doctoral Preliminary Examination
MEEN 997	Doctoral Dissertation
MEEN 999	Continuation of Thesis/Dissertation for Mechanical Engineering

Incomplete "I" Grade on Courses with Pass/Fail Grades

Students will receive an "I" grade in MEEN 797 Master's Thesis and MEEN 997 Doctoral Dissertation until the thesis/dissertation is accepted by the Graduate School. Similarly, MEEN 796 Master's Project will be changed from "I" to "S" when the oral defense is passed and the written report is submitted. Students will receive an "I" grade in MEEN 995 Doctoral Preliminary Examination if the course is registered but the exam has not been administered. The grade will be changed to "P" when the oral defense is passed, and an approved dissertation proposal is submitted.

Course Descriptions

MEEN-602. Advanced Strength of Materials **Credit 3 (3-0)**
This course covers stress-strain relations as applied to statically indeterminate structures, bending in curved bars, plates, shells, and beams on elastic foundations. Topics include: strain energy concepts for formulation of flexibility matrix on finite elements, bending in beams and plates, Cartesian tensor notation, and matrix structural analysis. Prerequisites: MEEN 336, MATH 432 or equivalent.

MEEN-604. Intermediate Dynamics **Credit 3 (3-0)**
This course reviews particle and system dynamics, and introduces rigid body dynamics with solution techniques for the non-linear systems of ordinary differential equations as initial value problems. Other topics covered include: angular and linear momentum, energy and Langrangian methods of body problems, generalized variables, small vibrations, and gyroscopic effects and stability. Prerequisites: MEEN 337, MATH 432 or equivalent.

MEEN 606. Mechanical Vibrations **Credit 3(3-0)**
This is a course in modeling, analysis and simulation of free and forced vibrations of damped and undamped, single and multi-degree of freedom systems. Prerequisites: MEEN 440 and MATH 431.

MEEN-608. Experimental Stress Analysis **Credit 3 (3-0)**
Principles and methods of experimental stress analysis are covered in this course. Photo-elastic and micromeasurement techniques applied to structural models are also addressed. Prerequisites: AREN 457 or MEEN 602 or equivalent.

MEEN-610. Theory of Elasticity **Credit 3 (3-0)**
This course introduces stress, strain-strain relations, energy principles, and other related topics. Prerequisites: MATH 432, MEEN 336 or equivalent.

MEEN-613. Composite Materials **Credit 3 (2-2)**
This course introduces the processing of fiber-reinforced composite materials, anisotropic theory, and test methods for composites. Topics include different methods of processing polymeric composites, process control parameters, anisotropic constitutive equations, classes of anisotropy and associated elastic constants, micromechanics models, theories of failure, test methods, classical laminate theory, and special types of laminates. The concepts are applied to the design of simple composite structural components. This course includes a laboratory component for students to learn processing and testing of composite materials. Prerequisites: MEEN 260 and MEEN 336 or their equivalents.

MEEN-614. Mechanics of Engineering Modeling **Credit 3 (3-0)**
This course introduces engineering modeling techniques including time dependent integration simulation models of systems, and finite difference and finite element methods in mechanics. Prerequisites: MEEN 210, MEEN 336, MATH 432 or equivalent.

MEEN-618. Numerical Analysis for Engineers **Credit 3 (3-0)**
This course is a study of scientific programming, error analysis, matrix algebra, eigenvalue problems, curve-fitting approximations, interpolation, numerical differentiation and integration, solutions to simultaneous equations, and numerical solutions of differential equations. Prerequisite: MEEN 210 or equivalent.

MEEN-626. Advanced Fluid Dynamics **Credit 3 (3-0)**

This course presents an overview of Navier-Stokes Equations, continuity equation, energy equation, inviscid flow, potential theory, complex potentials, and conformal mapping. Prerequisite: MEEN 416 or equivalent.

MEEN-642. Materials Joining **Credit 3 (3-0)**
This course covers theories and applications of joining of metals, ceramics, and plastics by the standard industrial techniques: arc, gas, electron beam, laser, ultrasonic, and diffusion bonding. Additional topics covered include: phase diagrams, diffusion equations, and physical/chemical properties in joining considerations. Prerequisites: MEEN 446 and MATH 432 or equivalent.

MEEN-645. Aluminum Product Design and Manufacturing **Credit 3 (3-0)**
This course introduces students to the principles of product and manufacturing process design specifically applicable to aluminum-based materials. Material properties of aluminum are compared with those of other commercial materials. Raw material fabrication and product manufacturing processes are presented. The interactions between processes and material properties are described. Case studies are presented to guide the student in successful completion of design projects. Prerequisites: MEEN 260 and MEEN 474.

MEEN-646. Advanced Manufacturing Processes **Credit 3 (3-0)**
Theory, application, and design considerations for forming and machining are covered in this course. Additional topics covered include: machines and tooling in modern manufacturing processes, dimensional and tolerance analysis, and control of work piece and tool. Design projects of molds, dies, presses, jigs and fixtures or automated machinery are required. Prerequisites: MEEN 446, MEEN 474, MATH 231, or equivalent.

MEEN-647. Computer Integrated Mechanism Design **Credit 3 (3-0)**
This is a course in modern computer simulation tools and the underlying theories for synthesis and analysis of mechanical systems consisting of linkages, cams, and gears. Prerequisite: MEEN 440.

MEEN-648. Computer Controlled Manufacturing **Credit 3 (3-0)**
This course introduces students to computer integrated manufacturing, numerical control and group technology. Topics include: manufacturing process interfacing, discrete process modeling, analysis and control techniques and algorithms, characteristics and software of control computers, sensors for computer control, programmable controllers, and sequential control. Prerequisites: MEEN 446, MATH 331, or consent of the instructor.

MEEN-649. Design of Robot Manipulators **Credit 3 (3-0)**
This course covers fundamentals of kinematics, dynamics, computer graphics, sensing devices, measurements and control in robot manipulators. Prerequisites: MEEN 440 or equivalent.

MEEN-650. Mechanical Properties and Structure of Solids **Credit 3 (3-0)**
This course examines the elastic and plastic behavior of matter in relation to its structure, both macroscopic and microscopic. Major representative classes of materials to be examined are thermoplastic materials, elastomers, glasses, ceramics, metals, and composites. Prerequisite: MEEN 460 or equivalent.

MEEN-651. Aero Vehicle Structures II **Credit 3 (3-0)**
This course covers deflection of structures, indeterminate structures, fatigue analysis, and minimum weight design. Finite element methods and software are utilized. Prerequisite: MEEN 422.

MEEN-652. Aero Vehicle Stability and Control **Credit 3 (3-0)**

This course covers longitudinal, directional, and lateral static stability and control of aerospace vehicles. It also covers linearized dynamics analysis of the motion of a six degree-of-freedom flight vehicle in response to control inputs and disturbance through the use of the transfer function concept, plus control of static and dynamics behavior by vehicle design (stability derivatives) and/or flight control systems. Prerequisites: MEEN 415, MEEN 422, and ELEN 410.

MEEN-653. Aero Vehicle Flight Dynamics **Credit 3 (3-0)**
This course covers the basic dynamics of aerospace flight vehicles including orbital mechanics, interplanetary and ballistic trajectories, powered flight maneuvers and spacecraft stabilization. Prerequisites: MATH 432, MEEN 337, and MEEN 422.

MEEN-654. Advanced Propulsion **Credit 3 (3-0)**
This course is a second course in propulsion. It covers the analysis and design of individual components and complete air-breathing propulsion systems including turbo fans, turbo jets, ram jets, and chemical rockets. Prerequisite: MEEN 576.

MEEN-655. Computational Fluid Dynamics **Credit 3 (3-0)**
This course provides an introduction to numerical methods for solving the exact equations of fluid dynamics. Finite difference methods are emphasized as applied to viscous and inviscid flows over bodies. Students are introduced to a modern computational fluid dynamics computer code. Prerequisites: MATH 432 and MEEN 415 or MEEN 416.

MEEN-656. Boundary Layer Theory **Credit 3 (3-0)**
This course covers the fundamental laws governing flow of viscous fluids over solid boundaries. Exact and approximate solutions are studied for various cases of boundary layer flow including laminar, transitional and turbulent flow. Prerequisite: MEEN 415 or 416.

MEEN-657. Design of Thermal Systems **Credit 3 (3-0)**
This is a course in the selection of components for fluid and energy processing systems to meet system performance requirements. Computer-aided thermal design, simulation and optimization techniques, and investment economics are discussed. Design projects are assigned to demonstrate application of these topics. Prerequisites: MEEN 562 and INEN 260.

MEEN 663. Energy Conversion Systems Design **Credit 3 (3-0)**
This course covers the design of steam power systems, internal combustion power systems, refrigeration and heat pump systems, and an overview of direct energy conversion devices. Power system design projects are assigned. Prerequisites: MEEN 416 and MEEN 442.

MEEN 667. Environmental Control **Credit 3 (3-0)**
This course deals with the principles of heating and air conditioning and their applications to design of environmental control systems and determination of building heating and cooling loads. Principal equipment, layout and control are discussed for various types of systems. Prerequisites: MEEN 442 and MEEN 562.

MEEN 668. Gas Dynamics **Credit 3 (3-0)**
The course covers the principles of one-dimensional compressible fluid flow, normal shocks, and flow with friction, heating, and cooling. Two-dimensional flows are also introduced. Prerequisites: MEEN 415 or MEEN 416 and MEEN 441.

MEEN 670. Internal Combustion Engines **Credit 3 (3-0)**

This course deals with the fundamental principles of spark-ignition and compression ignition engines, combustion phenomena, the effect of fuel-air mixture, design of components of an internal combustion engine, and testing and performance curves. Design projects are assigned. Prerequisite: MEEN 442.

MEEN 671. Turbomachinery **Credit 3 (3-0)**
This course covers the application of the cascade method to turbomachines, impulse and reaction turbines, compressible fluid dynamics, gas turbine principles, pumps, compressors and blowers, and the design of turbine elements. Project work is assigned. Prerequisites: MEEN 415 or MEEN 416 and MEEN 442.

MEEN 675. Solar Energy Fundamentals and Design **Credit 3 (3-0)**
This course deals with the characterization of solar radiation at the earth's surface. Solar collectors of both flat and concentrating types, and storage and distribution systems are discussed and analyzed. System sizing, design and economic analysis for space heating, water heating and industrial process are covered. Prerequisite: MEEN 562.

MEEN 680. Applied Statistics in Mechanical System Design **Credit 3(3-0)**
This course deals with the statistical nature of design and performance of mechanical systems. This includes statistical methods for evaluation of safety margin and factor of safety for static and fatigue loading, accuracy, precision, life and reliability of mechanical components and systems. Team projects are assigned. Prerequisite: MEEN 210, MEEN 474, or Consent of Instructor. (DEMAND)

MEEN 685. Special Topics Credit 3(3-0)
This course is designed to allow the introduction of potential new courses on a trial basis or special content courses on a once only basis. The topic of the course and title are determined prior to registration. Prerequisite: Consent of instructor. (DEMAND)

MEEN-702. Continuum Mechanics **Credit 3 (3-0)**
This course covers the applications of the laws of mechanics and thermodynamics to the continuum. Topics include a rigorous development of the general equations applied to a continuum and the application and reduction of the general equations for specific cases of both solids and fluids. Prerequisite: MEEN 336 or equivalent.

MEEN-706. Theory of Vibrations **Credit 3 (3-0)**
Vibration analysis of systems with one-, two- or multi-degrees of freedom are introduced in this course. Topics include instrumentation, continuous systems, and computer techniques. Prerequisites: MEEN 440, MATH 432, and MEEN 606.

MEEN-707. Real Time Analysis of Dynamic Systems **Credit 3 (3-0)**
This course covers the theory and application of real time analysis (RTA) used in system identification and machinery fault detection. RTA applications in production engineering and product development are addressed to study short-lived events or to analyze system operation in time domain or frequency domain to identify system characteristics or possible problems. Prerequisite: Consent of instructor.

MEEN-716. Finite Element Methods **Credit 3 (3-0)**
This course covers fundamental concepts of the finite element method for linear stress and deformation analysis of mechanical components. Topics include the development of truss, beam, frame, plane stress, plane strain, axisymmetric isoparametric, solid, thermal, and fluid elements. ANSYS and NASTRAN software will be used for solving practical stress analysis problems. Prerequisite: Consent of instructor.

MEEN-719. Advanced Computer-Aided Design **Credit 3 (3-0)**
This course covers important methods and techniques for using the computer to aid the design process. Simulation and optimization methods are applied to the design of mechanical systems. Prerequisite: Consent of instructor.

MEEN-731. Conduction Heat Transfer **Credit 3 (3-0)**
This course presents the development of the general heat conduction equation and its applications to one-, two-, and three-dimensional steady and unsteady boundary value problems. Closed form and numerical solution techniques are addressed. Prerequisite: MEEN 562 or equivalent.

MEEN-732. Convection Heat Transfer **Credit 3 (3-0)**
This course presents the analysis of heat convection in laminar and turbulent boundary layer and pipe flow. Topics include: dimensional analysis, free convection, condensation, and boiling. Prerequisite: MEEN 562 or equivalent.

MEEN-733. Radiation Heat Transfer **Credit 3 (3-0)**
A comprehensive treatment of basic theories is reviewed in this course. Topics include: radiation characteristics of surfaces, radiation properties taking account of wave length and direction, and analysis of radiation exchange between idealized and real surfaces. The course also addresses fundamentals of radiation transfer in absorbing, emitting, and scattering media. The interaction of radiation with conduction and convection is discussed. Prerequisite: MEEN 562 or equivalent.

MEEN-742. Tools, Jigs, and Fixtures **Credit 3 (3-0)**
This course covers tool design methods, tool-making practices, tool materials and heat treatments, and plastics for tool materials. Additional topics covered include: design of cutting tools for N/C machine tools, design of size and fixture, basics of clamping, and chucking and indexing for various machining processes. Prerequisites: MEEN 460, MATH 432 or equivalent.

MEEN-743. Instrumentation **Credit 3 (3-0)**
Principles and practices of industrial measurement are presented in this course. Topics include: instrument dynamics and response characteristics; theory of transducers for temperature, pressure, flow, motion, force; and other physical phenomena. Special topics in instrumentation, data acquisition and data reduction are covered. A project is assigned in an instrumentation application. Prerequisites: Consent of instructor.

MEEN-785. Special Topics **Credit 3 (3-0)**
This course is designed to allow the introduction of potential new courses on a trial basis or special content courses on a once only basis at the Master's level. The topic of the course and title are determined prior to registration. Prerequisite: Consent of instructor.

MEEN-788 Master's Comprehensive Exam **Credit 0 (0-0)**
This course is the recording mechanism for students to meet the Comprehensive Examination requirement. The student must register for this course the semester he/she will take the Comprehensive Examination and the student must earn a P for pass. Prerequisite: Consent of instructor.

MEEN-792. Master's Seminar **Credit 1 (1-0)**
This course provides a forum for discussions and reports of subjects in mechanical engineering and allied fields. Prerequisite: Master's level standing.

MEEN-793. Master's Supervised Teaching **Credit 3 (3-0)**

Students will gain teaching experience under the mentorship of faculty who assist the student in planning for the teaching assignment, observe and provide feedback to the student during the teaching assignment, and evaluate the student upon completion of the assignment. Prerequisite: Master's level standing.

MEEN-794. Master's Supervised Research **Credit 3 (3-0)**
This course is supervised research under the mentorship of a faculty member. It is not intended to serve as the project nor thesis topic of the master's student. Prerequisite: Consent of instructor.

MEEN-796. Master's Project **Credit 3 (3-0)**
The student will conduct advanced research of interest to the student and the instructor. A written proposal, which outlines the nature of the project must be submitted for approval. This course is only available to project option students. Prerequisite: Master's level standing.

MEEN-797. Master's Thesis **Credit 3 (3-0)**
Master of Science thesis research will be conducted under the supervision of the thesis committee chairperson leading to the completion of the Master's thesis. This course is only available to thesis option students. Prerequisite: Consent of advisor.

MEEN-804. Advanced Dynamics **Credit 3 (3-0)**
This course covers Lagrange's equations of motion as applied to rigid body dynamics. Topics include: generalized coordinates, generalized conservative and dissipative forces, degrees of freedom, holonomic constraints as related to rigid body motion, calculus of variations, and Hamilton's equations of motion. Prerequisite: MEEN 604 or equivalent.

MEEN-808. Energy Methods in Applied Mechanics **Credit 3 (3-0)**
The use of energy methods in solving applied mechanics problems is presented in this course. Applications in beams and frames, deformable bodies, plates and shells, and buckling are addressed. Variational methods are also discussed. Prerequisite: MEEN 610 or equivalent.

MEEN-810. Advanced Theory of Elasticity **Credit 3 (3-0)**
This is a course in strains, stresses, and the equations of elasticity. Topics include general formulation of the 2-D boundary value problems and the formulation of certain three-dimensional problems with symmetry. Prerequisite: MEEN 610 or equivalent.

MEEN-813. Composite Structures **Credit 3 (3-0)**
This course focuses on the application of composite materials to the design and analysis of structures. The topics covered are two- and three-dimensional hydrothermal anisotropic elastic constitutive equations; classical laminate theory; static stress, vibration, and buckling analysis of laminated beams and plates; environmental effects; and fatigue and fracture of laminated composites. Prerequisite: MEEN 613 or equivalent.

MEEN-814. Mathematical Theory of Plasticity **Credit 3 (3-0)**
This course covers stress and strain tensors, transformations and equilibrium, and elastic behavior. Topics include: theories of strength, plastic stress/strain, classical problems of plasticity, including thick-walled pressure vessels and rotating cylinders in elastic-plastic conditions, and slip line theory with applications. Prerequisite: MEEN 610 or equivalent.

MEEN-820. Advanced Classical Thermodynamics **Credit 3 (3-0)**
This course covers conditions of equilibrium, processes and thermodynamic systems, first and second order phase transitions, and Nernst Postulate. Prerequisite: MEEN 442 or equivalent.

MEEN-822. Statistical Thermodynamics **Credit 3 (3-0)**
Statistical mechanics and macroscopic properties from statistical methods are presented in this course. Topics include: equilibrium information, generalized coordinates, and general variables. Prerequisite: MEEN 442 or equivalent.

MEEN-824. Irreversible Thermodynamics **Credit 3 (3-0)**
This course is a study of processes which are inherently entropy producing. Topics include: development of general equations for the theory of minimum rate of entropy production, mechanical processes, life processes, and astronomical processes. Prerequisite: MEEN 820 or equivalent.

MEEN-834. Special Topics in Applied Heat Transfer **Credit 3 (3-0)**
Selected special topics in applied heat transfer are presented in this course. Topics include: heat exchanger design and performance, cooling of electronic equipment, and advanced thermal insulation systems. Prerequisite: MEEN 562 or equivalent.

MEEN-838. Solar Thermal Energy Systems **Credit 3 (3-0)**
Characteristic of extraterrestrial and terrestrial solar radiation transfer are presented in this course. Topics include: analysis of thermal performance of concentrating and non-concentrating solar collectors, thermal energy storage systems and energy transport systems, and life cycle cost analysis of solar energy systems. Computer simulation software is introduced. Prerequisites: MEEN 731 and MEEN 732 or equivalent.

MEEN-840. Machine Tool Design **Credit 3 (3-0)**
This course presents general features and requirements of machine tools and design principles. Topics include: static and dynamic stiffness and rigidity, cutting forces, machine tool vibrations, stability against chatter, damping and dampers, transmission of motion, and standardization of speed change gears. This course will cover the design of constructional elements: bearings, electrical components, pneumatics, hydraulics, material selection, and main spindle layouts. Prerequisites: MEEN 565 and MEEN 646 or equivalent.

MEEN-846. Stochastic Modeling of Mechanical Systems **Credit 3 (3-0)**
This course introduces an engineering approach to the analysis of time series and discrete linear transfer function models. Applications include the analysis of experimental data for system modeling, identification, forecasting, and control. Prerequisite: Consent of advisor.

MEEN-847. Computational Engineering Dynamics **Credit 3 (3-0)**
This course introduces computer-oriented methods for the analysis and design of engineering dynamic systems. Topics include: analytical and experimental techniques for model development, design refinement of components in flexible dynamics systems (machine tools, robots, moving vehicles, etc), and optimization techniques for transient response analysis on both constrained and unconstrained systems. Prerequisite: Consent of instructor.

MEEN-848. Digital Control of Machines and Processes **Credit 3 (3-0)**
This course covers control algorithms and design of discrete controllers. Interfaces and command generation for machines and process control are treated. Applications in numerically controlled machines and industrial robots are covered. Prerequisite: MEEN 648.

MEEN-849. Computer Control of Robot Manipulators **Credit 3 (3-0)**
This course covers basic and adaptive robot control systems, sensory requirements and capabilities, and robotic system diagnosis and applications. Prerequisite: MEEN 649 or Consent of instructor.

MEEN-850. Phase Equilibria **Credit 3 (3-0)**
This course presents interpretation and mathematical analysis of unary, binary and ternary, inorganic, phase equilibria systems with examples for solving practical materials science problems. Topics include: isoplethal and isothermal sections, crystallization paths, and thermodynamic fundamentals. Prerequisite: Consent of instructor.

MEEN-858. Mechanical Metallurgy **Credit 3 (3-0)**
This course covers continuum mechanics and the microscopic basis of plastic behavior. Emphasis is on the development and use of dislocation theory. Prerequisite: Consent of instructor.

MEEN-860. Fracture Mechanics **Credit 3 (3-0)**
This course introduces the student to the concept of stress and strain singularities and their effect on fracture strength and fatigue life of isotropic and anisotropic materials. Topics covered include: computation of the stress-strain field around a crack-tip, stress-intensity-factor, strain energy release rate, J-integral, fracture toughness, residual strength, and fatigue crack propagation life. The course concepts are applied to the design of damage tolerant structures. Prerequisite: MEEN-460 or equivalent.

MEEN-885. Special Topics **Credit 3 (3-0)**
This course is designed to allow the introduction of potential new courses on a trial basis or special content courses on a once only basis at the doctorate level. The topic of the course and title are determined prior to registration. Prerequisite: Consent of instructor.

MEEN 991 Doctoral Qualifying Examination **Credit 3 (3-0)**
This supervised program is for students who are taking the department Qualifying Examination to demonstrate their understanding of the fundamental principles of mechanical engineering and their ability to apply these principles to solve mechanical engineering problems. It culminates in a scheduled written exam administered on a Pass/Fail basis and must be passed prior to the end of the third semester. Prerequisites Doctoral student in Mechanical Engineering with unconditional admission status and consent of academic advisor

MEEN-992. Doctoral Seminar **Credit 1 (1-0)**
In this course, doctoral students attend colloquia or seminars. They consist of presentations by doctoral students on dissertation topics and works-in-progress and by guests on important classical, contemporary, or research problems in mechanical engineering. Prerequisite: Doctoral level standing.

MEEN-993. Doctoral Supervised Teaching **Credit 3 (3-0)**
This course is designed to introduce the doctoral student to classroom or laboratory teaching under the supervision of a faculty mentor. Doctoral students who serve as teaching assistants or as instructors are required to take this course during the first semester they teach. Others planning to undertake a teaching career are also strongly encouraged to take it. Topics covered include: course planning, classroom teaching, lecture preparation, student evaluation, and grading. The supervisor(s) will observe and provide feedback to the student and evaluate the student's performance. Prerequisite: Doctoral level standing.

MEEN-994. Doctoral Supervised Research **Credit 3 (3-0)**
This is supervised research under the mentorship of a member of the graduate faculty. It is not intended to serve as the dissertation topic of the doctoral student. Prerequisite: Consent of instructor.

MEEN-995. Doctoral Preliminary Examination **Credit 3 (3-0)**

This is required of students who have completed the qualifier examination and who are taking the preliminary examination during the semester. This is a supervised program to help prepare the student for the preliminary examination under the mentorship of the academic advisor. It is a pass/fail course and no letter grade will be given. Upon passing without conditions or after fulfilling any conditions specified by the advisory committee, the doctoral student is admitted to candidacy. Prerequisite: MEEN 991 and consent of advisor.

MEEN-997. Doctoral Dissertation **Credit 3 (3-0)**
This supervised research serves as the dissertation of the doctoral student. Twelve credits of dissertation are required for graduation. Four sections each of three credits are offered each semester and summer. The student progresses from section 1 through 4 as part of a plan of study under the supervision of the academic advisor. Prerequisites: Doctoral standing and consent of advisor.

MEEN-999. Continuation of Thesis/Dissertation for Mechanical Engineering **Credit 1 (1-0)**
The course is for master's and doctoral students who have completed all required credit hour requirements. Prerequisite: Completion of all Thesis/Dissertation Credits.

Plan of Graduate Study

Name: _____ SSN: _____

Phone: _____ email: _____

Semester/Year the Current Graduate Program Started: _____/_____

Semester/Year Expected to Graduate: _____/_____ Full-time? (Y/N):_____

Admission Status: ☐ Unconditional ☐ Provisional

Graduate Program: ☐ MSME ☐ Ph.D.

If MSME, Check Option: ☐ Thesis ☐ Project ☐ Course Work

Student _____
(Type or print) Signature and Date

Academic Advisor _____
(Type or print) Signature and Date

Department Chair _____
(Type or print) Signature and Date

Course #	Course Name	Semester	Year	Cr. Hrs.	Grade

This form is to be completed by ALL graduate students in the first semester of study and updated each semester.

Thesis/Dissertation Proposal

Program: ☐ M.S. ☐ Ph.D.

Thesis/Dissertation Title:_____

Student _____
(Type or print) Signature and Date

Academic Advisor _____
(Type or print) Signature and Date

Graduate Program Coordinator _____
(Type or print) Signature and Date

Components of Thesis/Dissertation Proposal

Title
The title should be brief, scientifically and technically valid, understandable to a scientifically or technically literate reader, and suitable for use in the public press.

Abstract
The 300-word abstract should include a statement of objectives, methods to be employed, and the significance of the proposed activity to the advancement of knowledge. It should be informative to other persons working in the same or related fields.

Problem Statement
This section should be a clear statement of the work to be undertaken stating the purpose, scope, and limitations of the proposed study. It should state the relevance and important of the problem and the significance, originality, and generality of the research results.

Background
This section should summarize relevant issues and previous work. Relation of the proposed research to the present state of knowledge in the field and to work in progress elsewhere should be described.

Methodology
This section should describe the methods and experimental procedures to be used in addressing the problem statement.

Expected Results
This section should describe the major expected results and the anticipated contribution of the research.

Bibliography
Citations must be complete (including full name of the authors, title and location in the literature).

Benefits of the Proposal
A well-conceived Proposal should:

- ensure that the student has the approval of the topic at an early date
- provide a safeguard against duplication of research effort
- serve to minimize disasters of misunderstanding later
- help the student to develop critical questions
- help the student to isolate pending problems and suggest actions
- help the student to serve as a "map" for the research

The research should provide a useful educational experience for the student emphasizing creativity, independent action and learning, research methodology, and scholarly approach.

Department of Mechanical and Chemical Engineering
North Carolina Agricultural and Technical State University

Report of Doctoral Preliminary Examination

_____was administered the Doctoral Preliminary Examination on

_____. He/She was judged to have
(mm/dd/yy)

☐ **PASSED**
☐ **FAILED**
☐ **PASSED CONDITIONALLY -** The condition(s) being the following:

_____

_____

_____

Committee Chair

_____	_____	_____	
(Type or Print)	Dept.	Title	Signature Date

Committee Members

_____	_____	_____	
(Type or Print)	Dept.	Title	Signature Date
_____	_____	_____	
(Type or Print)	Dept.	Title	Signature Date
_____	_____	_____	
(Type or Print)	Dept.	Title	Signature Date
_____	_____	_____	
(Type or Print)	Dept.	Title	Signature Date

Department Chair _____
(Type or Print) Signature Date

NOTE:

1. The Committee Chairman must file this Report with the School of Graduate Studies within two working days of the exam date.
2. A copy of the approved dissertation proposal must be submitted with this form.

Request for Change of Academic Advisor

This form must be prepared by the student prior to change of academic advisor. This form is not executable without all appropriate signatures.

Program: ☐ M.S. ☐ Ph.D.

Reason for this request:

_____

_____

_____

_____

Student _____

Signature _____ Date _____

Current Academic Advisor _____

Signature _____ Date _____

Proposed New Academic Advisor _____

Signature _____ Date _____

Department Chair _____

Signature _____ Date _____

Notification of Oral Defense

Program: ☐ M.S.M.E

. ☐ Thesis Option ☐ Project Option

☐ Ph.D.

Department: _____

Student Name:_____ SSN:_____

Dissertation/Thesis/Project Title:

_____

_____

Defense Date: ____/____/_____ Time: _____ Location:_____

Certification of Results

☐ ☐ ☐

Pass Fail Other (see Remarks)

Academic Advisor:

_____/_____/_____

Full Name / *Signature* /*Date*

Committee Members:

_____/_____/_____

_____/_____/_____

_____/_____/_____

Graduate School Representative (Required for Ph.D. Dissertation Defense)

_____/_____/_____

Remarks:_____

_____

_____

_____

Department Chair

_____/_____/_____

Full Name / *Signature* /*Date*

Faculty Profile

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