GRADUATE STUDENT MANUAL

MECHANICAL ENGINEERING
DEGREE PROGRAMS

CLEMSON UNIVERSITY

Fluor Daniel Engineering Innovation Building
Clemson University
Clemson, SC 29634
864-656-0999
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INTRODUCTION

Welcome/Purpose of this Handbook

Welcome to the Department of Mechanical Engineering at Clemson University. We wish you success at every stage of your academic journey. All new students are required to read this document in its entirety and to then sign the Acknowledgement of Contents form on the last page. The signed form acknowledging that the Graduate Manual has been read should be turned into the Graduate Student Services Program Coordinator (see below). The form must be signed before enrolling in courses for a student’s second semester, and before a student’s GS2 form will be accepted by the department.

This handbook is intended to familiarize you, as a graduate student in the Department of Mechanical Engineering, with the requirements, policies and procedures involved throughout your graduate experience. The rules and regulations provided in this handbook govern our academic programs and describe the duties and responsibilities of graduate students in the department. These rules and regulations, developed through the years and in conjunction with the Graduate School, have proven to be beneficial for both students and faculty in the department. In addition, this handbook provides useful information and resources to ease and enhance your experience in the program. Each student is expected to be familiar with the contents of this handbook. Graduate students should become familiar with the information presented here, as well as with general Graduate School requirements outlined in the Graduate School Announcements (www.registrar.clemson.edu/html/catalogGrad.htm). If the answer to a question cannot be obtained from this manual or the GS Announcements, the answer should be sought by asking: the Graduate Student Services Program Coordinator, the Graduate Program Coordinator, or the Graduate School, preferably in that order.

Students must read this manual and return FORM 15 signed (see last page) to the Graduate Student Services Program Coordinator. Signing this form indicates that the Graduate Manual has been read in its entirety by the student.

Contact Information

Members of the Graduate Research Committee (GRC) are responsible for the graduate coordination in our Department. The Chair of the GRC serves as the Graduate Program Coordinator. The Graduate Student Services Program Coordinator is the initial contact for graduate students arriving on campus. The Graduate Program Coordinator and the Graduate Student Services Program Coordinator are the authorities on regulations and procedures pertinent to the graduate programs and should be contacted whenever questions or problems occur.

Graduate Program Coordinator:

Dr. Joshua Summers
Email: jsummer@clemson.edu
Room 203 Fluor Daniel Building
Phone: 864-656-3295
The Program Coordinator promotes the program, orchestrates recruiting activities and makes recommendations regarding graduate admissions offers. The Program Coordinator also oversees the regulations and procedures of the program, coordinates curriculum updates and interacts with the Graduate School on matters such as student status, assistantships and fellowships. The Program Coordinator is your first contact should any issue arise regarding your academic progress or the program curriculum.

**Graduate Student Services Program Coordinator:**

Ms. Tameka Boyce  
Email: tboyce@clemson.edu  
Room 127 Fluor Daniel Building  
864-656-0999
ENTERING THE GRADUATE PROGRAM

Admission Requirements

Minimum requirements to be considered for admission to graduate study in Department of Mechanical Engineering generally follow those of the Graduate School (see the Graduate School Announcements at www.registrar.clemson.edu/html/catalogGrad.htm). Minimum requirements include at least a four-year bachelor’s degree from an institution whose scholastic rating is satisfactory to the University, high quality of previous academic record, and satisfactory scores on the general portion of the Graduate Record Exam (GRE) or other applicable test. The GRE subject test is not required but recommended for admission.

Admission to the Department of Mechanical Engineering is restricted to applicants whose academic record indicates a high potential to be successful in graduate studies. This determination is made by the faculty of the Department of Mechanical Engineering and is affirmed by the Graduate School. The various indicators used to arrive at this determination may include, but are not limited to: previous academic performance, letters of recommendation, standardized test scores, personal interviews and statements of interest. In reviewing transcripts, both the difficulty of the courses taken and the grade point ratio are considered.

Acceptance categories

Students are accepted into the program as either full, provisional or conditional status. Each indicates a different level of performance on the admission criteria.

Full Status: Your credentials equal or exceed every minimum admission criterion prescribed for the applied-for degree.

Provisional Status: At least one admission criterion prescribed for the applied-for degree is marginal. You will be required to remove the provisional status with a satisfactory academic performance during your first semester. Doctoral degree applicants will not be admitted provisionally.

Conditional Status: At least one piece of required application materials has not been received by the Graduate School. Notice of conditional acceptance may be given prior to receipt of a missing item (e.g., before the Graduate School receives your GRE scores or official transcripts), but any and all missing materials must be received prior to or during your first semester of enrollment. Upon receipt, you may be admitted to either full or provisional status.

Conditional status may also be granted to highly qualified applicants prior to receipt of the degree they are currently pursuing; however, all requirements for that degree must be completed prior to enrolling in the proposed graduate program at Clemson.

Prerequisites

Students must have an undergraduate degree in either Mechanical Engineering or other related engineering or science disciplines, and must present evidence of such competence via transcripts, etc. Many Mechanical Engineering graduate courses
presume a working knowledge of corresponding undergraduate material. In addition, you may be required to provide evidence of such knowledge during your final oral examination.

If course deficiencies are specified as a condition of your admission, it is important that you take the necessary courses early in your program in order to provide you with background for graduate-level courses. Normally, you remove these deficiencies by taking and passing the required courses during a regularly scheduled course offering. These courses do not count toward the total number of semester hours of graduate credit required for graduation.

**English language proficiency**

International students whose native language is not English are required to submit a satisfactory score on the Test of English as a Foreign Language (TOEFL) or to have completed approved English as a Second Language (ESL) course work from one of Clemson’s ESL affiliates. International students who are applying for a graduate assistantship are encouraged to submit scores from the Test of Written English (TWE), which is administered simultaneously with the TOEFL at most locations.

If you are a non-native English speaker and your graduate advisor feels you should improve your English skills, you must complete English 111: English as a Second Language or an approved course from one of Clemson’s ESL affiliates.

A graduate student whose native language is not English is required by South Carolina state law to pass an English speaking exam (the SPEAK test) before you can be certified to teach as a laboratory teaching assistant. The Clemson English Department administers the exam, which is similar in form to the Test of Spoken English administered by ETS. The exam is offered at the start of each semester and once in the summer, and students may take the exam anytime that it is offered. It is expected that you will pass this exam sometime during your first year of study. If you do not pass the exam by the end of the first year of study, you may be asked to leave the program.

When you do pass the English speaking exam, you will be eligible to serve as a teaching assistant. You would then receive the same stipend as all other students who are teaching assistants.

**Computer proficiency**

The Mechanical Engineering Department has no formal requirements for computer literacy or competency. However, each graduate student is expected to be proficient in the use of digital computers. Use of computers and competency in various software programs will be necessary in many graduate courses and, in most cases, in both your teaching and research, and it is expected that you will acquire whatever skills are needed to use these resources as they are required. Workshops provided by Clemson Computing and Information Technology (CCIT) {and on occasion by the department} are periodically made available to help students who need help to gain this competency.
Transfer credits

University policy does not allow automatic transfer of graduate credit. Students with graduate credit earned at another institution, in another department at Clemson University, or earned before admission to this program must have prior work evaluated for transfer credit. Requests for transfer credit to the program must be recommended by your Advisory Committee and approved by the Program Coordinator, the department chair and the dean of the Graduate School. You must make your request in writing for each course or credited activity to be transferred. Each request must be accompanied by an official transcript, catalog description and syllabus or other supporting documentation. Grades earned for courses taken at institutions other than Clemson University will not be included in the student’s academic average. All transfer credits must be verified by an official transcript from the institution at which the work was completed. It is your responsibility, not your Major Advisor’s or the department’s, to request a transcript of transfer credits be sent directly to the Graduate School.

A maximum of 12 credit hours of graduate course work may be transferred. Transfer credits must not have been used to satisfy the requirements of any other degree and must have been completed within the six-year period preceding the date the graduate degree will be awarded. There are no exceptions to these requirements. Credits to be transferred must be labeled by an asterisk in the list of required courses on the GS-2 form, and must bear the course number listed in the catalog of the institution(s) awarding the credits. The institution(s) and grade(s) should be identified along with the course(s) in the space provided below. The corresponding Clemson University course numbers should not be used on the front page or below.

Transfer credit will not be awarded for research, internships, courses graded pass/fail, or course work in which you received a grade lower than a B or its equivalent. No credit will be given for continuing education units, correspondence, extension or in-service courses or for concentrated courses and workshops that award credits at a rate exceeding one credit per week. See the Graduate School Announcements for more information regarding transfer credits (www.registrar.clemson.edu/html/catalogGrad.htm).

Direct admission to the PhD program

Students having a BS degree in a field approved by the Graduate Research Committee, but not having an MS degree, may apply directly to the PhD program. These students must satisfy the MS core course requirements (Tables 2 and 3) in their subject area before degree completion, and may receive a one semester delay in all deadlines associated with the PhD qualifying examinations. If the student fails the PhD Qualifying exam, the student is permitted to continue as a Masters student but is ineligible to re-apply to any PhD program in ME. Students enrolled in the MS program will be accepted directly into the PhD program prior to the completion of an MS degree with the written consent of their advisor.
Duplication of degrees

The holder of a master’s degree in a given field, received at another institution, may not become a candidate for another master’s degree in the same field at Clemson.

Combined Bachelor’s/Master’s (BS/MS) program

Mechanical Engineering undergraduates at Clemson University may begin their Master of Science (MS) degree program in Mechanical Engineering while completing their Bachelor of Science (BS) degree and use a limited number of courses to satisfy the requirements of both their degrees. The following are required:

Undergraduates must have an overall 3.4 GPA or better and must have completed their junior year courses prior to taking graduate courses for the BS/MS program.

1. Graduate Record Examination (GRE) scores are not required as part of the initial application. However, upon final completion of the BS degree, satisfactory GRE scores are required for final acceptance into the graduate degree program. GRE scores help determine graduate assistantships and fellowships.

2. Up to 12 semester credit hours from any 600-800 level Mechanical Engineering courses may be used to satisfy the requirements of their BS degree and also be used for their MS degree. Technical electives may be used.

3. Since approval of the plan of study (GS2 form) by the student’s graduate advisory committee is required, students should consult with their academic advisors before selecting courses to be included in their graduate program.

4. Students in the combined degree program are conditionally accepted to the MS degree program until completion of their BS degree requirements. Students with this conditional acceptance are not eligible for a graduate assistantship until the conditional acceptance is removed.

Undergraduate students who are interested in the combined program should discuss it with their undergraduate academic advisor and the Chair of the Graduate and Research Committee. Applications for this program should be made during the junior academic year. Students should apply through the regular graduate school process. Currently, a paper application is required, with the following written at the top of the form: “Combined BS/MS Program”.

Combined MS/MBA program

Students may enroll in both the MS in Mechanical Engineering and the Masters of Business Administration (MBA) programs concurrently. Up to 1/6 of the total graded course credit hours may be counted towards both degree programs. The dual program is meant to be completed in 2.5 years.

South Carolina residency

Many students are interested in establishing residency in South Carolina for the purpose of paying in-state tuition. The South Carolina residency laws call for you to establish legal ties with the state; you must generally wait one year before establishing
legal ties. Thus, you should take steps near the beginning of your program to initiate the process of becoming a South Carolina resident.

The legislation defining residency sets forth a fairly strict set of criteria for the administrative approval of residency requests. The Office of Residency Classification handles all the information regarding domicile requirements for residency status. Due to the frequency of changes implemented by the state legislature in past years, those criteria are not elaborated here. If you are interested in establishing South Carolina residency, review the up-to-date information at www.clemson.edu/SCResident/. Questions should be addressed to the Office of Residency Classification (G-01 Sikes Hall, (864) 656-2281).

University employee enrollment

With the approval of the appropriate dean or director, a qualified employee of Clemson University may pursue graduate work for credit. However, no member of the faculty or staff who has a rank higher than instructor or its equivalent may be considered as a candidate for an advanced degree in the academic department where you are employed. Payment of the application fee is required.

Limitations on the number of hours taken per semester are explained under “Maximum Enrollment”. You must make up any time spent in class during normal working hours under a schedule acceptable to your employment supervisor. Flexibility will be given to accommodate class schedules, but you must work out conflicts with your supervisor. You must complete a master’s degree within six years of commencing the program; the PhD must be completed within five years of satisfactory completion of your preliminary examinations.

International Students

Student expenses

International students must certify access to a minimum of one year’s estimated expenses. See www.clemson.edu/IA/IntlServices/StudyAtClemson/StudentAdmission/Expenses.html for more details or contact the International Affairs Office (E-303 Martin Hall, (864) 656-3614).

Student visa

You are responsible for maintaining legal status with the US Department of Homeland Security during your studies. Form DS-2019 (J-1 exchange visitor visa certificate) is usually issued to students who are funded by their home government or by an international organization. If no organizational sponsor is involved, an I-20 (F-1 student visa certificate) will be issued.

When your application to the Graduate School has been accepted and your language and financial abilities are certified, Campus Immigration Services will issue you an I-20 or DS-2019. Take this document to the nearest US Consulate to apply for a nonimmigrant student visa.
For more information and details about applying for your visa, see the Campus Immigration Services website at [www.clemson.edu/IA/IntlServices/CampusImmigration/index.html](http://www.clemson.edu/IA/IntlServices/CampusImmigration/index.html) or contact them at (864) 656-3614.

**Social Security number**

If you are an international student receiving an assistantship, you must have your offer letter with you upon arrival. You should then go to the Social Security Administration in Anderson, S.C., for a Social Security Number or meet with the Social Security Administration representative in Martin Hall on the dates indicated by the Graduate School. You should then see Mechanical Engineering employment assistant who will provide you with the paperwork that you must take with your signed Social Security card to the Foreign National Payments Coordinator in E-208 Martin who will complete the necessary paperwork to assist you with getting on the payroll. Be sure to bring the following:

- U.S. Visa
- Unexpired foreign passport
- I94
- IAP-66/I-20

You must call for an appointment before going to the Foreign National Payments Coordinator’s office. The telephone number is (864) 656-5589.

**Costs**

For current tuition and fees, see [www.grad.clemson.edu/Financial.php](http://www.grad.clemson.edu/Financial.php).

Graduate assistants may choose to defer tuition and fees. This is accomplished easily on the day of registration. Persons in the fee assessment area will have a list of all graduate assistants. Anyone listed may sign a note to defer these costs and these costs will be deducted from the first six full paychecks of the semester.

For more information about academic costs, financial aid and making payments, contact the Office of Student Financial Aid (G-01 Sikes Hall, (864) 656-2280) or the Bursar’s Office (G-08 Sikes Hall, (864) 656-2321).

**CU Student ID, Username and Tiger 1 Card**

**CUID**

When you are accepted into the Graduate School, you will be issued a unique student identification number as part of your admissions acceptance packet. Your student ID is a 9-digit number you will use on forms and other official University business. It is often referred to as your “CUID”.

**Username**

Also upon acceptance, you will be assigned a Clemson University computer user identification. This is a permanent, unique-to-you identifier that you will use every time you access the Clemson computer network. You may see or hear it referred to as your
“username” or “USERID”. Your username is a 4-8 character identification that generally consists of some part of your first and/or last name and designates your official Clemson University email address (for example, Jones2@clemson.edu, where “Jones2” is the username). Your username gives you access to University systems such as Webmail, MyCLE/Blackboard, the Student Information System (SISWeb) and the online Web Registration. You may also need to use your student username to access department-specific networks and files.

Tiger 1 Card

Soon after you arrive, you will want to obtain your Tiger 1 Card. This is your official Clemson University photo ID card and gives you access to a variety of services throughout campus and around town, including:

- Library card
- Fike Recreation Center access card
- Athletic ticket privilege access
- Purchase discounted software through CCIT
- Personal debit card to access pre-deposited funds in a TigerStripe account (see tiger1.clemson.edu/content/tigerstripe_what.php for more information).

You must be registered for at least one class during the current semester to qualify for a Tiger 1 Card. Bring a photo ID (driver's license, state-issued ID card or passport) to the Tiger 1 Card office located in the lobby of Fike Recreation Center. There is no charge for your first ID card. Always remember to carry your Tiger 1 Card with you at all times.

Registration

Prior to registration for your first semester of study, you must report to your assigned advisor or the Program Coordinator. He/she will help you plan your initial program of study and identify a suitable Major Advisor.

Registration is conducted entirely online via TigerWeb. The Office of Registration Services provides a wealth of information that you may refer to regarding the steps to be taken in the registration process, including a demo of the online system at tigerwebdemo.clemson.edu/. See the Registration Services website at www.registrar.clemson.edu/portal/. If you have any further questions, please contact the Program Coordinator or the Student Services Coordinator.

Particular attention should be paid to the requirements for registration. Any student pursuing any phase of his or her graduate program must be registered. Students are expected to make continuous progress toward their degrees and, therefore, to be enrolled for graduate credits each semester during the academic year until requirements are completed.

Full-time student status is at least 9 hours, although students should normally enroll in 12 hours during the academic year and 6 hours during each summer session. Graduate research assistants and graduate teaching assistants are required to register for a
minimum of 9 and a maximum of 12 credit hours during the academic year. Students falling below 9 credit hours may lose their assistantship (for example by dropping a class). Therefore, students on assistantships are strongly encouraged to enroll in 12 credit hours (including 3 credits hours of research). The minimum registration for unsupported students is 1 credit hour.

Near the middle of each semester, students will be notified of the time and procedure for on-line registration by the University. By that time, students should have prepared a program of study with the counsel of their major advisor. This is accomplished by completing form GS-2 Graduate Degree Curriculum. The **GS-2 form must be submitted and approved prior to registration for the second semester of enrollment.** Students will be required to register for next semester's courses on the computer at this time. Students will not be allowed to enroll for any 600 level course without either a GS-2 on file or with the consent of the instructor. Any deviation from courses listed on form GS-2 must be approved by the student’s advisor and a new GS-2 must be resubmitted and approved. The GS2 form can be found at [http://www.grad.clemson.edu/forms/GeneralForms.php](http://www.grad.clemson.edu/forms/GeneralForms.php). The Department requires an earlier deadline for the GS2 form than the Graduate School.

*Note: Registration will be blocked if the GS2 form is not completed. Also, funding may be delayed if the GS2 form is not completed.*

If you are not enrolled for more than one semester, the Registrar’s office requires a re-entry form (Graduate Application for Re-Entrance form). You must complete this form and return it to the Graduate School prior to registration. You may download this form at [http://www.grad.clemson.edu/forms/GeneralForms.php](http://www.grad.clemson.edu/forms/GeneralForms.php)

### Housing and Area Information

#### Housing

New graduate students are housed on campus as space permits, after all continuing student and freshman assignments are completed. The University has a small community of two-person apartments in Thornhill Village for single (unmarried) graduate students. In addition, single graduate students may request to live in other areas on campus, as space permits. Graduate students should call the Housing Office at (864) 656-2295.

The Clemson area offers students a host of off-campus housing choices in a wide range of prices. Consult a local realtor for options or more information. Some apartments do not include utilities (electric, water, phone, cable) as part of your lease agreement. You may need to make arrangements to have services connected by contacting the utility companies directly; your property manager/landlord should be able to provide you with the appropriate contact information.

#### CAT Bus

The Clemson Area Transit Service, known as the CAT Bus, is a free bus service provided by the City of Clemson. It offers fare-free shuttles around campus and around
the Upstate, including service to Anderson, Central and Seneca. For route information, visit their website at www.catbus.com.

**Groceries, services, shopping**

The Clemson area offers a variety of shopping opportunities. There are several grocery stores, banks, commercial laundries and drug stores within just a few miles of campus, many of which are accessible by foot, bicycle or CAT Bus. A wide range of restaurants are also available downtown and along Tiger Boulevard. The greater Upstate area, including Central, Seneca, Easley and Anderson, provides even more products and services along CAT Bus routes or for those students with private transportation. Contact the Clemson Chamber of Commerce for more information (www.clemsonchamber.org).

**Orientation**

All graduate students are required to attend the Graduate School orientation held on the Sunday before classes start in the fall. Prior to registration for the first semester of study, beginning graduate students must ALSO attend the Departmental graduate orientation. The Graduate Program Coordinator will help them plan their initial program of study and identify a suitable major advisor(s), if an advisor has not been previously agreed upon.
RESPONSIBLE RESEARCH CONDUCT

Student Responsibilities

The Department of Mechanical Engineering expects each graduate student to approach their graduate study in a professional manner. We expect all graduate students to put in at least five eight-hour workdays per week, and graduate students may not be allowed all breaks/holidays afforded to undergraduate students.

Academic Integrity

A university is a community of scholars dedicated to the inquiry into knowledge. It follows as a basic tenet that students will conduct themselves with integrity in academic pursuits. In instances where the academic standards may have been compromised, Clemson University has a responsibility to protect this process and to respond appropriately and expeditiously to charges of academic misconduct.

A summary of the Graduate School's policy on academic integrity follows. For a complete text of the policy, including rules and procedures, and specifics related to former students, academic research and revocation of academic degrees, see the “Appeals and Grievances” section of the Graduate School website at www.grad.clemson.edu/policies/Appeals.php#misconduct and the Graduate School Announcements at www.registrar.clemson.edu/html/catalogGrad.htm.

I. Definitions, explanations and examples of violations of academic integrity

A. Cheating. Cheating involves giving, receiving or using unauthorized aid on any academic work submitted for grading including coursework, laboratory assignments, research projects, comprehensive and qualifying examinations, theses and dissertations or using computer center account numbers that belong to another person without the permission of the account owner. Unauthorized aid includes collaborating with classmates or others when explicitly prohibited, using online paper mills or paying individuals to prepare research papers, reports or projects, submitting identical work to satisfy the requirements of more than one class without the approval of the faculty, or using textbooks, notes, the web and other sources when instructed to work alone.

B. Fabricating/false information. Fabricating or falsifying information involves actions such as making up data that were not collected, stating that studies were conducted that were not, indicating that original source material was read when information was obtained from secondary or tertiary sources, making up references not used or identifying sources that were not consulted.

C. Facilitating violations of academic integrity. Facilitating violations of academic integrity involves students intentionally assisting others to violate the principles of academic integrity (for example, allowing friends access to their work, or instructing students on ways to solicit aid on papers, projects, take home exams, tests for state and national licenses, etc).

D. Failing to cite contributors. Failing to cite an author or multiple authors involves not giving credit to individuals who have contributed significantly to a work
(paper, research project, poster, etc.) and claiming the final product as one’s own.

E. Plagiarizing. Plagiarizing is theft of the work accomplished by someone else. It includes copying words, phrases, sentence structure, computer code or files, images, or ideas from any source and attributing the work to one’s own efforts. Blatant examples of plagiarism include failure to use quotation marks, to indent text of more than three lines and failure to cite consulted sources either in footnotes, endnotes or within the body of the text of a document. More subtle examples of plagiarism include paraphrasing or using others’ conceptual frameworks for developing creative works without acknowledgement or permission or citing a source within the text but then directly quoting the materials without the use of quotations marks or text indentation. For more information about and examples of plagiarism visit [www.plagiarism.org/learning_center/what_is_plagiarism.html](http://www.plagiarism.org/learning_center/what_is_plagiarism.html).

F. Thwarting others’ progress. Thwarting others’ progress involves editing, deleting or otherwise destroying computer files that belong to another person or intentionally stealing or destroying property which prevents others from using it to gain needed information to complete assignments, for example, library materials on reserve, materials on loan by a faculty member or reports and documents made available for student use by external companies, state and federal agencies, etc.

II. Levels of seriousness of violation

At the graduate level, it is expected that students exhibit sophistication in understanding the tenets of academic integrity. Even so, it is clear that some types of violations are more serious in nature than others and that some types of violations require deliberate, calculated actions on the part of the student. The Graduate School’s policy categorizes academic integrity violations into four levels, ranging from an unawareness or minor misunderstanding, to an intention to defraud or otherwise engage in criminal-type activity. Each level of violation carries one or more sanctions, from verbal reprimand to permanent dismissal from the University; repeated violations, irrespective of the level, may result in more severe sanctions as well.

III. Graduate Academic Integrity Committee

The authority to resolve cases of violations of academic integrity by enrolled graduate students is vested in the Graduate Academic Integrity Committee (GAIC). The GAIC consists of four tenured faculty members from each of the five colleges, one graduate student from each college. An associate dean of the Graduate School serves as the non-voting administrative coordinator for the GAIC.

IV. Procedures

It is the responsibility of every member of Clemson University to enforce the academic integrity policy. Students and staff members should report violations of this policy to the faculty member for the affected course (including the research advisor or internship/practicum/co-op supervisor). When, in the opinion of anyone outside the
University, there is evidence that a student has committed a violation of academic integrity, that person should bring the allegation to the attention of the associate dean of the Graduate School. The associate dean will contact the appropriate faculty representative of the student’s program (consistent with the alleged violation).

When, in the opinion of the faculty member, a student has committed a violation of academic integrity, the faculty member will fully document the charge in writing in a statement delivered in a sealed envelope to the associate dean of the Graduate School. At the same time, at his or her discretion, the alleging faculty member is encouraged, but is not required, to privately inform the student charged of the nature of the allegation. Within three working days from the date the associate dean has received a formal charge of an alleged violation, he or she will provide the student with a copy of the charge and the procedures of the GAIC. Those procedures vary depending on the level of the violation and whether the student chooses to pursue a hearing. For more information about the procedures, refer to the Graduate School Announcements at www.registrar.clemson.edu/html/catalogGrad.htm.

Departmental Policy on Ethics

The effectiveness of the research infrastructure throughout the world is based on the personal and professional integrity of the people involved. The central assumption to all research endeavors is that researchers have done what they say they have done. The Department of Mechanical Engineering is part of that infrastructure and the research conducted here must withstand the highest scrutiny. Consequently, we must all ensure that our scholarly work is conducted and reported with the highest ethical standards. We must be careful in our recordkeeping and diligent in our efforts to always attribute credit where it belongs. In particular, we must guard against any activity that would bring the integrity of the department or the individuals within it into question. Among the activities to be avoided are:

- Falsification of data – ranging from fabrication to deceptively selective reporting of results or methods, including the purposeful omission of conflicting data with intent to falsify results.
- Plagiarism – representation of another’s work as one’s own.
- Misappropriation of others’ ideas – the unauthorized use of privileged information, however obtained.

The Honor Code

This Honor Code was initiated by engineering students in the College of Engineering and Science with the advice and approval from the faculty. The document reflects mutual trust between the students and faculty at Clemson University. By living under the guidance of the Code, we are contributing to our personal success as well as the success of all engineers associated with the College of Engineering and Science.

As members of the College of Engineering and Science, we recognize that lasting excellence is achieved only through honor, demanding standards for personal integrity that reflect the standards of conduct expected of all engineers. All undergraduate and graduate engineering students, faculty members, and administrators in the College of
Engineering and Science are expected to abide by the ethical standards defined herein. These standards are based on the following principles:

*Engineers, both students and professionals, must be of honorable and trustworthy character. It is dishonest to claim credit for work which is not the result of one’s own efforts.*

*Students, faculty members, and administrators are bound by a mutual trust to uphold the principles and enforce the policies of the Honor Code. This makes it the duty and responsibility of all members of the College of Engineering and Science to report promptly any suspected violations of the Code.*

The Honor Code establishes a standard of academic integrity. As such, this code demands a firm adherence to a set of values. This Honor Code requires that all graduate students exercise honesty and ethical behavior in all their academic pursuits, whether these undertakings pertain to study, coursework, research or teaching.

We recognize that our graduate students have very diverse cultural backgrounds. Because of this, the term ethical behavior is defined as conforming to accepted professional standards of conduct, such as codes of ethics used by professional societies in the United States. This regulates the behavior in which their professions are conducted. The knowledge and practice of ethical behavior is the full responsibility of the student. Graduate students may, however, consult with their advisor, Department Chair, Graduate Program Coordinator, the International Student Office, or the Graduate School for further information of what is expected of them.
UNIVERSITY HARASSMENT POLICIES

It is the policy of Clemson University to conduct and provide programs, activities and services to students, faculty and staff in an atmosphere free from harassment. Harassment is unwelcome verbal or physical conduct, based upon race, color, religion, sex, sexual orientation, gender, national origin, age, disability, status as a military veteran or protected activity (e.g., opposition to prohibited discrimination or participation in the statutory complaint process), that unreasonably interferes with the person's work or educational performance or creates an intimidating or hostile work or educational environment. Examples may include, but are not limited to, epithets, slurs, jokes or other verbal, graphic or physical conduct.

Harassment of University faculty, staff, students or visitors is prohibited and shall subject the offender to appropriate disciplinary action, including dismissal from the program.

Employees or students who feel they are victims of any form of discrimination are encouraged to consult the Office Access & Equity (E-103 Martin Hall, (864) 656-3181) for advice and assistance in resolving complaints.

In the event a graduate student wishes to appeal the resolution of the Office of Access & Equity, the student must submit a written request for an appeal to the dean of the Graduate School, who in turn will convene an ad hoc committee that will review the process and/or sanction. The committee membership will come from faculty and students already appointed to the Graduate Council.

Sexual Harassment

Title VII of the Civil Rights Act of 1964, as amended, provides that it shall be unlawful discriminatory practice for any employer, because of the sex of any person, to discharge without just cause, to refuse to hire, or otherwise discriminate against any person with respect to any matter directly or indirectly related to employment. Harassment of any employee on the basis of sex violates this federal law. The Equal Employment Opportunity Commission has issued guidelines as to what constitutes sexual harassment of an employee under Title VII.

Unwelcome sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature constitute sexual harassment when any of the following occurs:

1. Submission to such conduct is made explicitly or implicitly a term or condition of an individual's employment or academic standing;
2. Submission to or rejection of such conduct by an individual is used as a basis for employment or for arriving at academic decisions affecting an individual;
3. Such conduct unreasonably interferes with an individual's work or academic performance, or creates an intimidating, hostile or offensive working or academic environment.

Sexual harassment of University faculty, staff or students is prohibited and shall subject the offender to dismissal or other sanctions after compliance with procedural due
process requirements. In the event a claim of sexual harassment arises, the claimant may use University grievance procedures that have been established for faculty, staff and students as appropriate. This policy also prohibits an employee from sexually harassing a superior and a student from sexually harassing a faculty member.

**Amorous Relationships**

Amorous relationships that might be appropriate in other circumstances can be inappropriate when they occur between a faculty member, officer or supervisor of the University, and any student or subordinate employee for whom he/she has a professional responsibility.

Those in positions of authority inherently carry the element of power in their relationships with students or subordinates. It is imperative that those with authority neither abuse, nor appear to abuse, this power entrusted to them.

Officers, supervisors and members of the teaching staff should be aware that any romantic involvement with a student or subordinate employee could make them liable for formal action if a complaint is initiated. Even when both parties have consented to such a relationship, it is the officer, supervisor or faculty member who may be held accountable for unprofessional behavior. Difficulties can also arise from third parties who may feel that they have been disadvantaged by such relationships. Graduate assistants, research assistants, tutors and teaching assistants who are professionally responsible for students would be wise to exercise special care in their relationships with students they instruct or evaluate.

Any questions concerning these statements or Clemson University’s Policy on Sexual Harassment should be directed to the Office Access & Equity (E-103 Martin Hall, (864) 656-3181).
GETTING THROUGH THE GRADUATE PROGRAM

Academic Requirements

Maintaining academic standing

A graduate student must maintain a minimum overall average of B (3.0) for all courses taken. If at any time you fail to satisfy this requirement, you will be automatically placed on probation for one semester during which time you will not be eligible for financial aid/assistantship. The first time a student is placed on probation is referred to as level PR1. A student on level PR1 status must enroll in 9 credit hours of course work the following semester and bring his/her GPA to 3.0 or greater. A student may be granted status PR2 for a second semester with a GPA <3.0. Decisions are based on probability of academic recovery within Graduate School regulations. In addition, a failing grade (D or F) in a course in your major area may be cause for dismissal regardless of your overall average.

The awarding of an advanced degree does not merely attest to completion of academic requirements in courses, seminars and research activities, but also to the acquisition of acceptable professional standards, including standards of ethics (see the University’s Academic Integrity Policy). Violations of professional standards may result in disciplinary action, including dismissal from the program.

Maximum enrollment

The upper limits on graduate student enrollment per semester, as outlined in Table 1, refer to graduate and undergraduate credits combined and should be attempted only by the most qualified students. Should the six-week and three-week sessions run concurrently, the total credits are not permitted to exceed the upper limit for the six-week session. Graduate students paid solely on an hourly basis are not classified as graduate assistants but are subject to the same limitation in credit loads. All requests for permission to exceed these limits must be requested by memo and approved by the Chair of the Department of Mechanical Engineering and the Dean of Graduate School.

Table 1. The upper limits on graduate student enrollment per semester.

<table>
<thead>
<tr>
<th>Student Category</th>
<th>Maximum Credit Hours</th>
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<tbody>
<tr>
<td></td>
<td>6-Week Session</td>
</tr>
<tr>
<td></td>
<td>3-Week Session</td>
</tr>
<tr>
<td>Full-time Students</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>3</td>
</tr>
<tr>
<td>1/4-time Graduate Assistants</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>3</td>
</tr>
<tr>
<td>1/2-time Graduate Assistants</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>2</td>
</tr>
<tr>
<td>3/4-time Graduate Assistants</td>
<td>9</td>
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<tr>
<td></td>
<td>3</td>
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<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Persons employed full time</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>3</td>
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</tr>
</tbody>
</table>

Quarter-time, half-time and three-quarter-time graduate assistants are defined as those who contribute an average of 10, 20 and 30 clock hours per week, respectively, of service to the University for the entire semester. A person employed full time is defined as anyone employed five full working days per week regardless of the employer(s). A graduate student who becomes employed full time while the assistantship is in force must notify the Graduate School and the department providing the assistantship.
Department of Mechanical Engineering Seminar Series

The Department of Mechanical Engineering sponsors a Seminar Series of typically 6-8 lectures per year by scholars in various areas of mechanical engineering. Seminars are announced via email and posted fliers prior to each seminar. Students are strongly encouraged to attend as many seminars as possible.

Honors and awards

Every year the faculty of the Department of Mechanical Engineering will have the opportunity to nominate students for three graduate student awards, which are listed below. These nominations are due to the Scholarships, Awards and Honors (SAH) Committee early in the Spring semester. Faculty members are encouraged to create strong packages at the time a student has demonstrated excellence, rather than waiting for solicitations by the SAH Committee. Several College level awards are also available. Students should contact the Graduate School for additional information concerning College level awards.

1. Departmental Graduate Teaching Assistant Award: The awardees will be selected at the rate of two per year. All selections will be made at a Spring meeting of the SAH Committee. Nominees will have taught in either the previous Fall or Spring semester.

2. Departmental Masters Award: This award recognizes a student for outstanding academic achievement in the master’s degree programs in the Department of Mechanical Engineering. The award will be based upon scholarly achievement, which is indicated by academic performance, research accomplishments and/or teaching excellence, as appropriate. A student must be nominated for this award by his/her major research advisor. Nominating letters will be solicited from the faculty at the appropriate time by the SAH Committee.

3. Departmental Doctoral Award: This award recognizes a student for outstanding academic achievement in the doctoral degree programs in the Department of Mechanical Engineering. To be eligible for the award, a student must have passed the comprehensive examinations and be nominated for the award by his/her research advisor. The award will be based upon scholarly achievement, which is indicated by academic performance, research accomplishments and/or teaching excellence, as appropriate. Nominating letters will be solicited from the faculty at the appropriate time by the SAH Committee.

Incomplete coursework

A grade of Incomplete will be given only if you have not completed the course for some unavoidable reason that is acceptable to the instructor. Unless you complete the requirements for removal of the I grade within the time period stipulated by University policy, the Student Records Office will automatically change the I to an F. Extensions of the deadline for completing the course work are granted only in extreme circumstances. Students who have Incompletes cannot graduate, even if the incomplete courses are not part of your GS2 plan of study. Special courses that constitute multi-semester projects are exempt from this rule. Incomplete grades for those courses may be given until the project is complete.
**Enrollment on a Pass/Fail basis**

The only graduate courses that may be taken on a pass/fail basis are thesis and dissertation research and a small number of unstructured courses in which the pass/fail grading system appears in the course description.

**Auditing courses**

Permission for a student to audit a particular graduate course is at the discretion of the chair of the department, the coordinator of the program offering the course and/or the instructor. The principal factors involved in granting permission are that the auditor must possess the necessary academic background and space must be available.

Audited courses do not carry credit and the fact that a course has been audited is not noted on your official record. Graduate auditors are not required to stand tests or exams. However, the instructor, at his/her own discretion, may demand the auditor's participation in class to whatever extent deemed desirable.

You may not satisfy by audit a stated prerequisite for a graduate course. Additionally, you may not establish credit through examination in any course for which you were previously registered as an auditor.

**Withdrawing from courses**

As a graduate student in the Department of Mechanical Engineering, you are strongly encouraged to consult your major advisor before dropping any course for which you are enrolled in. **If you drop a course when you have an assistantship, and your course load drops below nine credit hours, your assistantship may be revoked for that semester.**

**Continuous enrollment, leave of absence**

Graduate students who do not maintain continuous enrollment are subject to the requirements in effect at the time you return. Only students who are enrolled are eligible to use University facilities and human resources. Note that you must meet minimum enrollment requirements to be eligible for financial aid (see [Assistantships/Financial Support](#) below.

All graduate students in the program are expected to maintain continuous enrollment during fall and spring semesters. The Department of Mechanical Engineering makes every effort to schedule relevant courses such that students can easily maintain enrollment.

To prevent the possibility of termination of financial support, you must request and be granted a leave of absence from the department. Your request must be approved by both the Program Coordinator and the Department Chair. If you have an assistantship or fellowship and take a leave of absence, you are not guaranteed financial support upon your return, even if you did not use up all your support before your leave.

Students failing to enroll for a two-year period must apply to the Graduate School for readmission.
Withdrawing from the program/University

If for any reason you decide to withdraw from the program, inform your Major Advisor, then the Program Coordinator, who will inform you of the procedures to be followed to officially withdraw from the University. Failure to follow the procedures may result in your owing tuition and other fees to the University. This applies to both domestic and international students.

Policy on changes of major

The GS14 form is used to request a change of degree and/or major. Students enrolled in the MS degree in Mechanical Engineering may request a change in major to a PhD degree program at any time with the consent of both their academic advisor and the Graduate Program Coordinator (or vice versa).

Policy on transfer to another institution or program

The relationship between a faculty advisor and a graduate student is a unique one. Regardless of the form of financial support (and even without support) students must maintain a professional relationship with both their advisor and their peers. Early departure from a program can result in substantial delays to the research including its delivery to the sponsor.

As such, students are expected to complete the degree program that was started at Clemson. Any request to transfer to another program or institution during the work towards a specific degree must be approved by the academic advisor before any departmental letter of release will be provided. In this event the Graduate Student Transfer Release Form (included at the end of this document) requesting a letter of release should be signed by the advisor and provided to the Graduate Student Services Program Coordinator. Only the Department Chair may sign a letter of release but will not do so without the consent of the academic advisor.

Policy on intellectual property

All computer programs written, data generated, discoveries made, derivations developed, etc., by a Clemson graduate student are the property of Clemson University, not of the student.

Advisory Committee

Each graduate student must have a faculty advisor who will also be the chair of the student’s advisory committee. The advisor must be a regular member of the Department of Mechanical Engineering faculty.

The Major Advisor

Students are expected to become familiar with the instructional and research activities within the department, particularly before the selection of an academic advisor. It is encouraged that you meet with faculty within your research area to gain information. An
academic advisor should be selected during the first semester of study if possible. Students not having an advisor should contact the Graduate Program Coordinator to discuss course enrollment options. Normally, the academic advisor also serves as the graduate research advisor for the student, as well as the chairman of the advisory committee. This person must be a faculty member in the program awarding the degree.

The selection of the Major Advisor is one of the most important decisions a graduate student will face. The major Advisor helps plan the curriculum and guides the student’s research activities and the preparation of his/her thesis/dissertation or special project report. A change of Major Advisor will be permitted only under the most unusual circumstances.

Advisory Committee

Each graduate student will have an advisory committee comprised of a majority of Mechanical Engineering faculty. The student, in concert with the research advisor, will initiate a recommendation to establish the advisory committee. The advisory committee must consist of at least three faculty members for the MS degree and four for the PhD degree. If the student has declared a minor, at least one member of the committee must be from the faculty of the program offering the minor. The advisory committee must be appointed before registration occurs for the second semester of graduate study. The Advisory Committee will approve the curriculum (study plans), supervise the graduate program, administer the comprehensive and/or final examinations, and initiate the recommendation for awarding the degree. The Major Advisor will serve as the chair of the Advisory Committee.

The graduate student is responsible for forming the Advisory Committee and keeping them apprised of his/her progress.

Plan of study (GS2)

All new students are required to attend orientations held by the Department of Mechanical Engineering and the Graduate School to acquaint themselves with instructional and research activities of the department as well as with general regulations. Information from these orientations will help the student select a more specific research area and will allow them to choose their advisory committee members more responsibly.

Departmental policy requires that MS students submit a GS2 prior to the time it is required by the Graduate School. The form should be filed before registration for the second semester of each student's program of study. Once the student receives the advisory committee signatures the GS2 form should be submitted to the Graduate Student Services Program Coordinator for the final signatures (Graduate Coordinator, Dean, and Graduate School). A copy will be returned to the student and the Graduate Student Services Program Coordinator after the form has been approved by the Graduate School. Students who do not properly file the GS2 risk failing to receive proper advice from their faculty committee members and may face undue difficulties, including fines or delays in graduating. Students will not be permitted to enroll in courses for their second semester of study without a GS-2 form on file. In addition,
students will not be allowed to enroll in any 600 level courses without either a GS-2 on file or the consent of the course instructor.

The GS2 represents a contract between the student, the advisor and the University. The Graduate School will use the Plan of Study in determining whether or not the student has met the graduation requirements when the application for a degree is made. It should be noted that study plans can be changed as degree programs proceed. The GS2 form is available at http://www.grad.clemson.edu/forms/GeneralForms.php. The GS2 form may be changed at any time; however, requests for changes in the plan of study must be processed before the requested change actually takes place. Retroactive change requests may not be acceptable. A revised GS2 form must also be approved and signed by all committee members and by the Department Chair. Revised forms must be on file in the Enrolled Student Services Office in the term in which the student plans to graduate.

Assistantships/Financial Support

Financial support is awarded based on availability of funds and academic merit. If a student changes his/her subject area after support has been extended, support eligibility is reviewed and funding may or may not be provided. PhD students and MS students pursuing research (thesis) are given priority for financial support. A graduate student pursuing Mechanical Engineering degree changing status from thesis to course option (non-thesis) may lose financial support.

Graduate students are eligible for financial support if they are (1) enrolled in full-time graduate studies, (2) in good academic standing, i.e., not on probation, and (3) making satisfactory progress toward their degree. Graduate Assistants receiving funding pay a flat fee for tuition and fees. To receive the reduced tuition and fees for a particular semester, a qualified student must be on the department payroll by the end of the second week of that semester.

Graduate students must maintain a cumulative 3.0 average in all graduate-level courses (600-level and above). Students who fail to meet these requirements become ineligible for graduation and are placed on academic probation. Students placed on academic probation are required to enroll in at least nine credit hours of course work towards their degree requirements the semester immediately following their placement on probation (not including summer sessions). Failure to raise the student's cumulative GPA to a 3.0 or above at the end of this semester will result in dismissal from the program. Students whose cumulative GPA is below a 3.0 will not receive any state funds. Also, a student who receives an “F” during any semester is not eligible for state funds for the next semester (without the consent of the Department Chair).

Supported students are required to fill out tax forms (federal and state) and the I-9 form which verifies citizenship. Two forms of identification are needed to fill out the I-9 form properly, a valid driver's license, a social security card, a passport and/or a birth certificate. The tax forms and I-9 forms are usually distributed during orientation but funding may begin at other times during the semester. If this is the case, you may pick up your tax forms and I-9 form from the main offices in the Fluor Daniel Building. It is suggested that you fill out all required forms in a timely manner. Paychecks cannot be
distributed until all parties (Graduate School, International Office, Human Resources) have approved the paperwork.

Graduate Research Assistantships (GRA):

- GRA’s are employed for up to a half-time basis (up to 20 hours per week) on a research project during a specified appointment period, as indicated on your offer letter.
- GRA’s are employed to assist professors in their research activities.
- Students must be enrolled full-time (9 hrs) to receive funding.
- International students who have applied for or received their OPT should contact the Graduate Student Services Program Coordinator or the Departmental Payroll Staff.

Graduate Teaching Assistantships (GTA) and/or Graduate Laboratory Assistantships (GLA):

- GTA’s (GLA) are employed for up to a half-time basis (20 hours per week) to assist with the teaching of undergraduate courses in mechanical engineering.
- GTA’s (GLA) are responsible for grading lab reports and attending GTA (GLA) meetings as needed.
- Students must be enrolled full-time (9 hrs) to receive funding.
- International students who have applied for or received their OPT should contact the Graduate Student Services Program Coordinator or the Departmental Payroll Staff.

Graduate Grading Assistantships (GGA):

- GGA’s assist with grading for specific undergraduate and graduate courses in mechanical engineering.
- Hours are predetermined as stated in the duties memo presented at the beginning of each semester.
- International students who have applied for or received their OPT should contact the Graduate Student Services Program Coordinator or the Departmental Payroll Staff.

Graduate Fellowships Holders:

- Students must be enrolled full-time (9 hrs).
Offer Letter:

- The responsibilities and details of an individual’s financial support are included in his or her official offer letter from the Department Chair. This letter requires the individual’s signature indicating an acceptance of the terms. GTA’s (GLA’s) are notified at a later date of their teaching duties (specific course, etc). To maintain the assistantship, students must complete the duties in a satisfactory manner and make satisfactory progress towards their degree.

Employment paperwork

If you have been awarded an assistantship, you must report to the departmental staff at the beginning of your assistantship and complete the following forms: information sheet, tax forms (federal and state), and I-9 Form. You will need to provide proof of nationality, Social Security number, age, etc. (usually by way of a passport, driver’s license, birth certificate or Social Security card).

Employment-related information

Income taxes: The State of South Carolina, as well as the U.S. government, levies an income tax. Therefore, as a general rule, state and federal taxes will be withheld from your pay and you will need to file income tax returns with both the state and federal taxing agencies.

Paydays: Paydays are alternate Fridays. When you go on the payroll for the first time, you will have a two-week lag before you will be paid. This “lag pay” is paid out after your termination from your position.

Paperless pay: Stipend checks must be direct-deposited through the University system. You must fill out an “Authorization for Deposit of Net Pay” Form upon starting your assistantship. This action is mandatory; no exceptions. Pay stubs will not be given/mailed to you, but are available electronically through MyCLE.

To view your pay stub and other employment-related information on MyCLE, go to bb.clemson.edu. Enter your employee ID and password in the username and password fields and click “Login”. (If you do not know your employee user ID, you can obtain it by presenting a photo ID at the CCIT Help Desk in Martin M-1.) Then select “View Paycheck” from the CU Faculty & Staff Resources list. Re-enter your employee ID and password to sign in to PeopleSoft. Your most recent pay stub will appear.

Work injury protocol: Should you be injured during the course of your employment responsibilities, you must immediately report the injury to your supervisor. Your supervisor should then immediately call the workers’ compensation insurance company. Their medical manager will gather information about the accident and direct you to a healthcare facility or physician for treatment. No coverage will be provided for work-related claims unless reported by your supervisor before you receive medical treatment at the authorized provider.

In the event of severe injury/emergency, call 911 first, and then execute the above procedures.
**Workload:** The normal ½-time graduate assistantship workload is 20 hours per week (average). Students are sometimes hired for 12.5% (5 hours), 25% (10 hours), 37.5% (15 hours) and 70% (28 hours) of full-time work, under appropriate circumstances. You should be aware of both your academic and work obligations, and are encouraged to discuss any problems with faculty.

**Reduction of pay:** Normally, your agreed-upon workload will be submitted as hours worked for each payroll period. However, if the amount of work you perform consistently deviates below the required workload, your pay will be reduced accordingly. Due to the procedure in which time sheets are currently used, it may be necessary to implement any pay reductions in the pay period following the one in which the work deficiency actually occurred. Pay also may be withheld from students who violate the vacation policy (see below).

**Vacation policy:** As a rule, graduate assistants do not accrue paid vacation time. Your work timeframe should not be perceived to be the same as the semester class schedule. Generally, graduate assistants work on the same calendar as faculty with 12-month appointments unless different work expectations are distinctly articulated in your offer letter. In the event of a death in your immediate family, illness of a close family member or personal illness or hardship, you may request up to four weeks leave without pay per semester and one week of leave without pay per summer session from your immediate supervisor.

**Military leave policy:** The Graduate School has ruled that a graduate student on military leave, for example summer camp, will not receive a stipend for the period of that leave. Students planning to take military leave should notify the departmental secretary of the inclusive dates. Short periods of about one week can be taken as regular vacation with no interruption in pay. Students leaving the campus for six weeks to attend summer camp must obtain written permission from the dean of the Graduate School to be excused from the continuous enrollment provision.

**Holidays:** Graduate students are entitled to take as holidays the days on which the University is officially closed. See the official University holiday schedule at [www.clemson.edu/humanres/Payroll_Benefits/holidays.htm](http://www.clemson.edu/humanres/Payroll_Benefits/holidays.htm).

**Termination of pay:** Pay for any session will end when you leave Clemson or are no longer available for work assignments. Normal termination dates for the spring and fall semesters for students not continuing into the next session is graduation day. Any deviations from these dates must be approved by your Major Advisor or the Department Chair.

**Outside employment**

One of the purposes of a graduate assistantship (research, teaching or administrative) is to support your subsistence during your graduate studies. Therefore it is the policy of the department to disallow you from outside employment if you hold more than a ½-time assistantship. Exceptions to this policy include temporary consulting and/or tutoring jobs, which you may do if you receive approval from your Major Advisor.
PROCEDURES FOR STUDENTS SEEKING GRADUATE DEGREES

General Requirements for Mechanical Engineering Program

Typical Minimum Degree Requirements

The typical requirements for MS and PhD programs in Mechanical Engineering are outlined in Table 2.

Core course requirements

Mechanical Engineering degree seeking Masters students and PhD students not having a Masters degree are required to satisfy core course requirements listed in the Table “Mechanical Engineering Minimum Degree Requirements”. There are four “Subject Area Groups” for the purpose of defining core course requirements: Engineering Mechanics (EM), Thermal and Fluid Sciences (TFS), Dynamic Systems and Controls (DSC), and Design and Manufacturing (DM). Students are placed in a particular Subject Area Group based on the nature of their research and with the approval of their advisory committee. Non-thesis MS students also need to have an assigned advisor and advisory committee (and GS2 form on file) and to meet appropriate core course requirements.

Core course requirements must be met by all MS and PhD students not having an MS degree. All PhD students, whether having an MS degree or not, are required to take a minimum of 12 credit hours of graduate level course work. Core courses and the Subject Area Group will be listed on your Plan of Study (GS2) (an abbreviation for each Subject Area Group should be marked on the top right hand corner of the GS2 for: DM, DSC, EM, or TFS). Any changes to course requirements, such as waivers or substitutions, must be approved by the Department Chair. Requests should be made in a timely manner and should be pre-approved by the Department Chair. Courses taken prior to the request are subject to rejection by the Chair.

Academic advising for new students

Students will generally enroll in courses after discussion with their academic advisor and committee members based on their GS2 form described above. However, new students enrolling in classes who do not yet have an advisor are provided the following list of recommended courses to enroll in their first semester based on their desired research areas for future study. Students are strongly encouraged not to enroll in either non ME (other than MTHSC) or 6000 level courses without advising as their eventual committees may not approve such courses. Further questions should be directed to either the Graduate Student Services Program Coordinator or the Graduate Program Coordinator for advising. Course names can be found in the back of this manual.

Thermal Fluid Sciences (TFS):

Fall Enrollment: ME 8010, ME 8100, and a MTHSC (6000 level or above) or Physics 8110 or 8120 (MTHSC 6340 recommended).

Spring Enrollment: ME 8120 (plus accompanying ME 8121 lab), ME 8310, and a MTHSC (6000 level or above) or Physics 8110 or 8120 (MTHSC 6340 recommended).
Dynamic Systems and Controls (DSC):
Fall enrollment: ME 8460, ME 8230, and MTHSC 6340 or equivalent
Spring Enrollment: ME 8200, ME 8930 (Modelling of thin structures: beams, plates and shells, Dr. Coutris), and a MTHSC, or other core ME course.

Design and Manufacturing (DM):
Fall Enrollment: ME 8700, ME 8710, and ME 8180.
Spring Enrollment: ME 8610, ME 6710 (plus accompanying ME 6711 lab), MTHSC 6340.

Engineering Mechanics (EM):
Fall Enrollment: ME 8180, ME 8460, MTHSC 6340
Spring Enrollment: ME 6320, ME 8520 and MTHSC 6340
Table 2. Mechanical Engineering minimum degree requirements.

<table>
<thead>
<tr>
<th>Program</th>
<th>MS Thesis</th>
<th>MS Non Thesis</th>
<th>PhD****</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Hours of Courses*</td>
<td>24 hours</td>
<td>33 hours</td>
<td>Same as MS Thesis with no MS***</td>
</tr>
<tr>
<td>Core Courses Required</td>
<td>EM – 4 courses</td>
<td>EM – 4 courses</td>
<td>EM – 4 courses**</td>
</tr>
<tr>
<td></td>
<td>TFS – 5 courses</td>
<td>TFS – 5 courses</td>
<td>TFS – 5 courses**</td>
</tr>
<tr>
<td>Written Requirements</td>
<td>6 hour Thesis (Grad School)</td>
<td></td>
<td>18 hour Dissertation (Grad School)</td>
</tr>
<tr>
<td>Exams</td>
<td>Thesis Defense</td>
<td>N/A</td>
<td>Qualifying Comprehensive Dissertation Defense</td>
</tr>
</tbody>
</table>

*At least half of the courses must be above the 600 level (i.e., 800 & 900 level). 50% or more of the courses must come from ME. At least 50% of ME courses must be above 600.

** Applies to MS students and PhD students not having an MS degree

*** All PhD students enrolling in the PhD program on or after 1/2013 will be required to take a minimum of 12 credit hours of course work.

**** A minimum of 30 and 60 credit hours must appear on the GS2 for PhD students having an MS and those not having an MS, respectively. This includes courses and research credits (ME 991)

The Department of Mechanical Engineering requires that all MS graduate students take three of the following nine courses from the Department Core:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME 8010</td>
<td>Foundations of Fluid Mechanics</td>
</tr>
<tr>
<td>ME 8100</td>
<td>Macroscopic Thermodynamics</td>
</tr>
<tr>
<td>ME 8180</td>
<td>Intro to Finite Element Analysis</td>
</tr>
<tr>
<td>ME 8200</td>
<td>Modern Control Engineering</td>
</tr>
<tr>
<td>ME 8290</td>
<td>Energy Methods</td>
</tr>
<tr>
<td>ME 8310</td>
<td>Convective Heat Transfer</td>
</tr>
<tr>
<td>ME 8370</td>
<td>Theory of Elasticity I</td>
</tr>
<tr>
<td>ME 8460</td>
<td>Intermediate Dynamics</td>
</tr>
<tr>
<td>ME 8610</td>
<td>Material Selection for Design</td>
</tr>
<tr>
<td>ME 8700</td>
<td>Design Methodology</td>
</tr>
</tbody>
</table>

Table 3. Mechanical Engineering required core courses for each subject group.

<table>
<thead>
<tr>
<th>Engineering Mechanics (EM) Core</th>
<th>Dynamics, Systems and Controls (DSC) &amp; Design and Manufacturing (DM) Cores</th>
<th>Thermal/Fluid Sciences (TFS) Core*****</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) ME 8370; (2) ME 8460 or ME 8010; (3) ME 8180 or ME 8520; (4) Approved Math/Physics course</td>
<td>No Group Cores (Dept. Core). Students must satisfy the above requirements and take courses approved by their Advisory Committee</td>
<td>(1) ME 8010; (2) ME 8100; (3) ME 8120; (4) ME 8310; (5) MTHSC (6000 and above Physics 8110 or Phys 8120)*</td>
</tr>
</tbody>
</table>

*****Thermal Fluid Sciences (TFS) graduate students shall take no more than one 600 level graduate course in fulfillment of their degree requirements unless a specific exception is approved by his/her faculty committee.
MASTER’S DEGREE PROGRAM IN THE DEPARTMENT

Master of Science Degree in Mechanical Engineering Program

Introduction

Within the Department of Mechanical Engineering, the Master of Science (MS) degree program in mechanical engineering has two options: (a) the MS thesis option and (b) the MS non-thesis option. The typical requirements for both options of the MS program are outlined in Table 1. Additional information pertaining to academic requirements, core course requirements and departmental expectations for graduate work form can be found in the section entitled “PROCEDURES FOR STUDENTS SEEKING GRADUATE DEGREES”.

MS thesis option

The purposes of the MS thesis: Students enrolled in the MS thesis option must prepare and defend an MS thesis. The purposes of the MS thesis are to demonstrate the capability of the student to: (1) formulate engineering problems within a research project; (2) utilize engineering knowledge relevant to a meaningful resolution of a specific problem; (3) effectively plan and carry out the work leading to the completion of the project; and (4) report (orally and in writing) the results of the project in concise, precise professional style.

A GPA of >=3.0 in courses listed on their Form GS-2 and successful completion of the thesis presentation and the thesis defense (i.e. the final examination) constitute candidacy for graduation.

Thesis topic and advisory committee selections: Before the fifth week of the first semester, the student must select a research advisor. The research advisor will assist the student in the selection of an appropriate topic for his/her thesis and the remaining members of his/her advisory committee. The student is expected to have selected a thesis research topic, the members of his/her advisory committee, and filed a study plan (Form GS-2) prior to on-line registration for his/her second semester of enrollment in the MS degree program.

Thesis preparation guidelines/regulations: The MS degree candidate (thesis option) must prepare his/her thesis as an electronic manuscript and submit it to the Graduate School. Details regarding the electronic manuscript submission process that the student will go through prior to graduation can be found at the Theses and Dissertations (http://www.grad.clemson.edu/Manuscript.php). Regulations concerning the mechanics of thesis preparation, including format, font type and size, margins, as prepared and adopted by the Graduate Council of Clemson University, can also be found at the Theses and Dissertations (http://www.grad.clemson.edu/Manuscript.php).

Thesis submittal to committee and defense scheduling: The student should complete, with the research advisor's approval, a final draft of the thesis at least four weeks before the thesis presentation and defense (the final examination). Hard and electronic copies of the final draft approved by the research advisor must be submitted to the advisory committee at least two weeks before the thesis defense. It is within the right of the
advisory committee member to refuse to meet for the thesis defense without a two week review period.

The research advisor (or the committee chairperson in the case when the research advisor is not a faculty member of the Department of Mechanical Engineering) will approve scheduling of the thesis defense, which must be administered at least three weeks before the date on which the degree is to be conferred. The Graduate School Announcements (http://www.grad.clemson.edu/forms/RecentCatalogs.php) contains information regarding the scheduling requirements for the thesis defense (the final examination).

Thesis presentation and defense: Candidates for Master of Science degrees (thesis option) must present their thesis and pass a defense at least three weeks prior to the date of the convocation at which the degrees are to be conferred. The final date for the thesis defense (the final examination) is established each semester by the Graduate School and can be found at the Graduate School Announcements (http://www.grad.clemson.edu/forms/RecentCatalogs.php).

The thesis defense (the final examination) is administered by the student's advisory committee and immediately follows the thesis presentation. All faculty members and students are invited to attend thesis presentation. Thesis defense, on the other hand, is conducted by the student's advisory committee only.

The student is required to submit the thesis title, abstract, date, time, and place along with committee members by email to the ME Graduate Student Services Program Coordinator at least two weeks prior to their defense. Thesis defense notices will be sent to the Graduate School, ME Graduate Students, and ME faculty by the ME Graduate Student Services Program Coordinator at least ten days before the defense. The thesis defense, which normally is oral, demands a broad and penetrating interpretation of the student's research project and may include examination of the student's major and minor research areas. After the defense is completed, Form GS-7 signed by all members of the advisory committee is submitted by the committee chairperson to the ME Graduate Student Services Program Coordinator. This form is next forwarded to the Graduate School.

**MS non-thesis option**

The final examination requirement: Mechanical Engineering students enrolled in the MS non-thesis are not required to pass a final examination (GS-7). These students should check the box on the GS-2 form labeled MS non-thesis no GS-7 required. Satisfying the constraints of Tables 12 and 3, and a GPA of ≥3.0 in all graduate courses meets the requirements for graduation candidacy.

Advisory committee selection: The student is expected to have selected an advisory committee prior to on-line registration for his/her second semester of enrollment in the MS degree program (non-thesis option). The predominant duty of the committee is to advise the student in what classes to take.
Both MS thesis and MS non-thesis options

Admission to candidacy for the MS degree: A student must be admitted to candidacy for the Master of Science degree before the third week of the semester in which the degree is expected to be conferred (Graduate School announcements contain the exact date). For a MS degree candidate, admission to the candidacy is secured when the advisory committee signs Form GS-4 and the form is submitted to the Graduate School. A late fee will be assessed for a student whose Form GS-4 is submitted after the deadline dates specified in the Graduate School Announcements (http://www.grad.clemson.edu/forms/RecentCatalogs.php). The fee will increase daily thereafter (excluding Saturday, Sunday and University holidays). If the student requests the mailing of their diploma, there is a nominal fee and the fee must be paid when the form is submitted. THIS FORM MUST BE COMPLETED FOR EACH SEMESTER IN WHICH THE STUDENT MAY EXPECT TO GRADUATE. If the student has questions about graduation, or he/she is not certain about what is required for graduation, the student should call the Graduate Enrolled Services at 656-5339 (students with last names beginning with A-L) or 656-5341 (students with last names beginning with M-Z).

Students must be enrolled during the semester they plan to graduate. If the student is not a Graduate Assistant (GRA, GLA, GTA, GGA) and is not funded, he/she may enroll in 1 hour of ME 891. Graduate Assistants on funding must be enrolled full-time (9 hrs).

Application for the diploma: Form GS-2 must be on file by the end of the semester preceding the one on which the degree is to be conferred. Form GS-4 is the application for the diploma and it must be filed by the third week of the semester of graduation. At this time, student should make arrangements for cap and gown rental if participation in the commencement ceremony is desired. Note that a GS-4 form must be completed and filed for each semester in which the student plans to graduate. i.e., if the student plans to graduate in May but cannot complete the necessary requirements and changes to August – a new GS-4 form must be completed and filed for August.

Time required for the MS degree: The faculty of the Department of Mechanical Engineering considers that, normally, three semesters and a summer are sufficient for full-time graduate students to complete the necessary work and obtain the Master of Science degrees. Longer tenures are discouraged, and financial support is generally unavailable after three semesters and a summer. Students should check the Graduate School Announcements for time regulations set by the University.

Table 9-a. MS thesis-option student checklist.

<table>
<thead>
<tr>
<th>What</th>
<th>When</th>
<th>How</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selection of research advisor</td>
<td>Before fifth week of first semester</td>
<td>Student provides ME Graduate Student Services Program Coordinator with name of research advisor</td>
</tr>
<tr>
<td>Preparation of study program</td>
<td>Before seventh week of first semester</td>
<td>Student does it in consultation with research advisor</td>
</tr>
</tbody>
</table>
Before on-line registration for second semester

Student must file fully completed and signed Form GS-2 with ME Graduate Student Services Program Coordinator

By the end of the third week of the semester in which degree is expected

Student must submit fully completed and signed Form GS-4 to the Graduate School

First draft must be submitted at least four weeks before date of thesis presentation and defense; final draft approved by research advisor must be submitted at least two weeks before defense

Student must submit first draft and final draft to advisory committee

At least three weeks prior to date on which degree is expected (see Graduate School schedule for last possible date)

After examination is completed, Form GS-7 is filed by committee chairperson with ME Graduate Student Services Program Coordinator. The form is next forwarded to the Graduate School.

Before leaving campus

Student must file Check-Out Form signed by research advisor to ME Graduate Student Services Program Coordinator

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**Master's student checklist**

For the convenience of MS students, Tables 9 (a-b) provides a checklist of milestones in the Master of Science degree program for the thesis and non-thesis options, respectively.

**Table 9-b. MS non-thesis-option student checklist.**

<table>
<thead>
<tr>
<th>What</th>
<th>When</th>
<th>How</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selection of advisor/adjunct committee chairperson</td>
<td>Before fifth week of first semester</td>
<td>Student provides ME Graduate Student Services Program Coordinator with name of advisor</td>
</tr>
<tr>
<td>Preparation of study program</td>
<td>Before seventh week of first semester</td>
<td>Student does it in consultation with advisor</td>
</tr>
<tr>
<td>Selection of advisory committee and filing of study plan</td>
<td>Before on-line registration for second semester</td>
<td>Student must file fully completed and signed Form GS-2 with ME Graduate Student Services Program Coordinator</td>
</tr>
</tbody>
</table>
DOCTORAL DEGREE PROGRAM IN THE DEPARTMENT

Doctoral Degree in Mechanical Engineering Program

PhD qualifying examination

Purpose and scope: The purpose of the PhD qualifying examination is to:

- Provide students with an opportunity to review the core disciplines in mechanical engineering (approximately 75% at the undergraduate and 25% at the graduate level) and a focus area of central importance to their specialization;
- Provide an assessment as to whether students possess attributes of a doctoral candidate by demonstrating understanding of and the ability to apply fundamental principles; and
- Evaluate a student’s potential for satisfactorily completing the doctoral program.

Exam selection and scheduling: With the approval of their advisory committee, students must pre-select 3 exams. At least 2 of the exams must be offered by the Department of Mechanical Engineering. One of the three exams may be administered by another department in the College of Engineering and Science when the subject area is especially pertinent to the student's area of specialization and if such an exam is available.

The following exams will be offered by the Department of Mechanical Engineering. Each exam will be constructed and graded by a designated examining committee comprised of two or more faculty members.

- Heat Transfer
- Thermodynamics
- Fluid Mechanics
- Engineering Materials
- Engineering Design
- Manufacturing Processes
- Dynamics and Vibrations
• Systems and Controls
• Solid Mechanics
• Engineering Mathematics

Exams must be taken only after admission into the Mechanical Engineering graduate program, and no later than the second semester of enrollment excluding summer sessions. For example, a student whose first semester in the Mechanical Engineering graduate program is Fall of 2008, must take the qualifiers in January 2009. Similarly, a student whose first semester in the Mechanical Engineering graduate program is Spring of 2009 must take the qualifiers in August of 2009. An additional semester of preparation is given to students who enter the PhD program without an MS degree approved by the Graduate Research Committee. Hence, students without an MS must take the exams no later than the third semester of enrollment in the PhD program excluding summer sessions. Regardless of when a student takes the qualifier exams, all three exams must be taken during the first attempt. This is true for students with or without an MS degree. Students taking the examinations for the first time who fail to sign up for three exams will be given an F for each exam they did not sign up for. Students who fail to attend an exam for which they signed up will be given an F for that exam. In the event of extenuating circumstances, an advisor may request a one semester delay in taking the qualifier exams for a student. Such requests are expected to be rare. Examples of such circumstances include backgrounds in fields significantly different from mechanical engineering and significant medical or personal problems. Requests should be made in writing and submitted to the Graduate and Research Committee for approval.

Each exam will be written and last no more than two hours. The exams will be scheduled in the morning and in the afternoon on Monday and Tuesday of the first week of the Fall and Spring semesters; before classes begin.

Grading – PhD qualifying exam: All problems on all exams will be graded by all members of an examining committee. Grades of Pass (P), Marginal (M) or Fail (F) will be assigned for each written exam based on the consensus of each examining committee. Grading of the written exams will be completed and the results will be available by Noon on Monday of the second week of the semester.

Procedures after exam is graded:

• Students receiving a P grade on all exams may continue in the PhD program.
• Students receiving an F grade on all three exams on the first attempt will not be permitted to continue in the PhD program.
• Students who have received F grades on one or two exams must either re-take exams for which an F grade was received, or take different exam(s) during the next semester when exams are offered. Switching to a different exam still constitutes a second attempt. Taking an exam for the first time as a result of not taking three exams during the first attempt, still constitutes a second attempt.
Students receiving an M (marginal) grade on any exam will be given a short (nominally 30-minute) oral exam by the respective examining committee. Oral exams will be scheduled in an expedient manner and results will nominally be made available by the end of the second week of the semester. The sole purpose of the oral exam is for the examining committee to obtain additional information in order to determine the final outcome of the student’s written exam. Hence, the scope of questions during the oral exam should be limited to the subject matter covered on the written exam. Upon completion of the oral exam, the examining committee will assign one of the following grades:

- Pass (P) – student has passed the exam;
- Conditional Pass (CP) - student has passed the exam subject to conditions, e.g. taking a graduate-level course selected by the examining committee and passing it with a grade of A. This grade should be given only on rare occasions;
- Fail (F) – student has failed the exam.

Students who received an F grade on a second attempt on any examination will not be permitted to continue in the PhD program.

Appeal procedure: The qualifying exam process provides for re-examination mechanisms for students who fail one or two exams on their first attempt. Students who receive one or more M grades are given oral exams. Failure of three exams on first attempts or one or more exams on second attempts dictates that students may not continue in the PhD program. It is the consensus of the faculty of the Department of Mechanical Engineering that outcomes of the qualifying exam process will not be the subject of appeal, except where it is the consensus view of a student’s advisory committee that procedures set forth were not followed.

PhD comprehensive examination

General requirements and a description of the PhD Comprehensive Examination are given in the Graduate School Announcements (www.grad.clemson.edu). Satisfactory completion of the comprehensive examination must occur no more than five years and at least six months prior to the date of graduation (this is a Graduate School policy).

In the Department of Mechanical Engineering the comprehensive examination may only be taken after an advisory committee has been selected, a graduate degree curriculum has been approved using Form GS-2, and the Qualifying Examinations have been successfully completed.

- The exam must be passed by the end of the fifth semester in which student status is full-time and a GS5 Form must be filed with the Graduate Student Services Coordinator:
  - In extenuating circumstances, the advisor may request a delay from the student’s advisory committee in order for the student to take the exam during the sixth semester.
A student's advisory committee may request the comprehensive exam be taken earlier.

Time begins when a student enrolls in the PhD program. Students become PhD candidates after they pass the Comprehensive exam and their GS5 Form has been processed.

- Grading of the first taking of the exam will be "Pass", “Fail”, or "Marginal". A student who receives a grade of Fail will be dismissed from the program. A student who receives a Marginal has one more chance to take and pass the exam.

Additionally, comprehensive examinations are given only at the recommendation of the student's advisory committee and after completion of most of the required course work. Advisory committees often direct that a student take the comprehensive examination after preparing, or in conjunction with presenting, the research proposal. The precise format is determined by the advisory committee and may be oral and/or written. The comprehensive examination typically focuses on the student's research area, but also may cover additional material in order to obtain objective evidence of an adequate intellectual mastery of major and minor specializations.

**PhD. research proposal**

Prior to admission to candidacy for the PhD degree, all PhD students are required to electronically submit a proposal describing the work of their dissertation research to their advisory committee. The proposed research program should be based upon the student’s own preparations and also earlier interactions with the advisor and advisory committee. A record of approval should be provided to the Graduate Program Coordinator. The following format for the proposal is suggested:

1. Title
2. Research Objective
3. Pertinent Background Material
4. Methods
5. Major Resource Needs
   a. Currently available
   b. Required

**Admission to Candidacy for the PhD Degree**

In addition to the requirements set forth in the Graduate School Announcements (www.grad.clemson.edu), the Department of Mechanical Engineering requires the following:

The request for admission to candidacy must contain a list of each course yet to be taken and must also indicate the title of the student's proposed research. The request should be signed by the chairperson of the student's advisory committee and the Chair of the Department of Mechanical Engineering.
**PhD final oral examination**

Information relating to final oral examination scheduling and requirements is contained in the Graduate School Announcements ([www.grad.clemson.edu](http://www.grad.clemson.edu)). Additional information can be obtained from the Graduate Program Coordinator.

**Submittal of the dissertation to the committee chairperson**

With the approval of the research advisor, a student should normally complete a draft of the dissertation at least five weeks before the date of the final oral examination. Final copies approved by the advisor must be presented to advisory committee members *no less than two weeks* before the final oral examination. It is within the right of the committee member to refuse to meet without a two week review period. The committee chairperson will schedule the final examination, which must be given no later than three weeks before the date on which the degree is to be conferred. The last date for the final examination is published in the Graduate School Announcements ([www.grad.clemson.edu](http://www.grad.clemson.edu)).

**Submittal of the dissertation to the graduate office**

The degree candidate is required to bring the completed dissertation final draft with all necessary signatures to the Graduate School prior to reproducing the necessary copies. Dissertations must be constructed in accordance with format instructions of the Graduate School. Because the Graduate School must carefully check that all degree requirements have been met, strict deadlines for processing of dissertations must be observed. A nominal binding fee must be paid to the Bursar, and the Bursar's receipt must be submitted to the Graduate School along with the dissertation. The student is responsible for placing the dissertation in proper final form.

Four copies, excluding the personal and committee copies, are to be submitted to the Dean of the Graduate School. An additional copy of the approval page, title page, and an abstract must also be submitted, with the abstract not exceeding word count restrictions. A doctoral student must pay a fee to the Bursar for publication of the abstract. **Students are responsible for the cost of copying the dissertation.**

**Application for the diploma**

The formal application procedure for the diploma is governed by the Graduate School and published in the Graduate School Announcements ([www.grad.clemson.edu](http://www.grad.clemson.edu)). A nominal diploma fee must be paid at the time of application if mailing is required, and arrangements should be made for cap and gown rental. The GS 4 is required for each semester the student plans to graduate. If the graduation date is changed a new GS4 Form is required each time.

**Time required for the doctoral degree**

Although excessive tenures are discouraged, the department does not recognize any minimum or maximum time for obtaining the PhD degree. The Graduate School does place restrictions on the maximum time allowed to obtain a graduate degree, however, as specified in the Graduate School Announcements ([www.grad.clemson.edu](http://www.grad.clemson.edu)). A
minimum of 12 credit hours of course work is required (for students entering the PhD program on or after January 2013). Committees are encouraged to require courses other than those that directly support the dissertation defense. A minimum of 18 semester hours of doctoral research credit are required. Work in the minor field or fields, if required, normally comprises from 12 to 24 hours in courses carrying graduate credit. In general, the degree will be awarded when the academic and research advisor(s) are satisfied that the research program is complete and that all other formal requirements have been met. Typically, doctoral degrees are completed in a three-four year period.

PhD checklist

For the convenience of the PhD student, Table 10 provides a checklist of milestones for the PhD program.

Endowed Teaching Fellows policy

Intent and Objectives: The Endowed Teaching Fellows program is established within the Department of Mechanical Engineering in order to promote PhD students who have the potential and desire to pursue an academic career. Through the Endowed Teaching Fellows program the Department will help such students acquire in-class teaching experience with the intent of making them more competitive when applying for a faculty position. The Teaching Fellows program is a two-semester program for each Endowed Teaching Fellow. During the first semester, the Fellow will be advised and will team teach a section of a required undergraduate Mechanical Engineering course with a Faculty Mentor. During the second semester, the Fellow will teach one section of the same course alone. The Fellow will receive a stipend supplement. It is permissible for the Faculty Mentor to be the Fellow’s advisor. However, a mentor other than the advisor is suggested in order to maximize the Fellow’s exposure to different perspectives on the academic enterprise.

Announcement: The Graduate Research Committee (GRC) will announce the call for nominations for the Endowed Teaching Fellows program to all PhD students and Mechanical Engineering faculty via email at the beginning of each Fall and Spring semester, contingent on the availability of funds. The announcement will contain this Teaching Fellows Policy and the relevant due dates.

Eligibility: To be considered for an Endowed Teaching Fellowship the student applicant:

- Must be a PhD student who has passed the PhD Qualifying Exam.
- Must have completed at least two semesters as a graduate student at Clemson prior to the submission of their application package.
- Must have a graduate GPA of 3.5 or higher at the time of submission of their application package.
- Must be perceived by each member of the student’s advisory committee as having high potential to be successful in academia.
- Must possess good communication skills.
Application: To apply for the Endowed Teaching Fellowship, the student must submit the following to the respective subject area group Chair and the Chair of the Graduate Research Committee:

- Letter of interest and statement of career plans.
- Resume.
- Academic record.
- A nomination statement written by the student’s academic advisor and signed by each member of the student’s advisory committee stating that the student has high potential to be successful in academia.

Students who fail to submit one or more of the above or fail to meet the application deadline will not be considered.

Considerations by the Subject Area Group: Each subject area group will conduct a meeting where the qualifications and potential of each applicant in that subject area are discussed. This will be followed by a closed ballot. Ballots will permit a yes or no vote for each applicant. The subject area group will provide the Chair of the Graduate Research Committee with a ranked list of the applicants indicating ties, if any. The subject area groups are free to forward to the Chair of the Graduate Research Committee any other comments about the candidates that they deem relevant.

Considerations by the Graduate Research Committee: The Graduate Research Committee reviews both the application packages and the ballots it receives from the subject area groups. Candidates that the Graduate Research Committee considers having made the final cut are required to give a brief oral presentation to the Graduate Research Committee in order to assess their communication and potential teaching skills. The Graduate Research Committee contacts these candidates with details on the exact length and topic of the oral presentation as well as location and time of the presentation. Open discussion regarding the qualifications and the potential of each applicant are held by the Graduate Research Committee. This is followed by a closed ballot vote for the purpose of ranking the candidates. Ballots will permit a yes or no vote for each applicant. Ballots will be tallied by the chair of the Graduate Research Committee to provide a ranked list of the applicants indicating ties, if any. All subject area group and Graduate Research Committee ballots and ranked lists are given to the Department Chair.

Selection by the Department Chair: Final selection of Endowed Teaching Fellows is made by the Department Chair.

NEARING GRADUATION

Admission to Doctoral Candidacy

Admission to the Graduate School does not qualify a student as a candidate for a doctoral degree. Such candidacy depends on the acceptance by the dean of the Graduate School of a written request for admission to candidacy. You should file this request, Form GS5, once you have completed a major share of the prescribed graduate
residence doctoral course work (research credits excepted), and have successfully undertaken the comprehensive examination(s). Your request for admission to candidacy must list each of the major and minor subjects to be offered for the degree and must contain the title of your proposed dissertation. The request must bear the signed approval of your Major Advisor and the department chair.

You must be admitted to candidacy for the PhD degree at least six months prior to your dissertation defense.

**Graduate School Deadlines**

The Graduate School sets deadlines for the following items. The specific dates are determined according to the academic calendar for the semester in which you plan to graduate (see Table 10).

**Table 10.** Graduate School deadlines for PhD students.

<table>
<thead>
<tr>
<th>Form/process</th>
<th>Approximate deadline*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Submit your final GS2 to Enrolled Services</td>
<td>End of the term prior to the term in which you plan to graduate</td>
</tr>
<tr>
<td>Submit GS5 to Enrolled Services</td>
<td>Six months prior to defense</td>
</tr>
<tr>
<td>Complete online application for diploma (formerly Form GS4)</td>
<td>Within the first four weeks of the term in which you will graduate</td>
</tr>
<tr>
<td>Written notification of defense submitted to Enrolled Services</td>
<td>At least 10 days prior to your defense.</td>
</tr>
<tr>
<td>Submit completed thesis/dissertation electronically for formatting review</td>
<td>Two weeks prior to graduation</td>
</tr>
<tr>
<td>File GS7 with Enrolled Services</td>
<td>Two weeks prior to graduation</td>
</tr>
<tr>
<td>All revisions requested by the Manuscript Review Office must be completed and approved by the Manuscript Review Office</td>
<td>One week prior to graduation</td>
</tr>
</tbody>
</table>

*Refer to the Graduate School’s website for actual deadline dates ([www.grad.clemson.edu/Deadlines.php](http://www.grad.clemson.edu/Deadlines.php)). All Graduate School forms are available online at [www.grad.clemson.edu/forms/GeneralForms.php](http://www.grad.clemson.edu/forms/GeneralForms.php).

**Thesis/Project/Dissertation**

The purpose of a thesis or dissertation is to demonstrate your capability to:
- Formulate a research problem;
- Demonstrate knowledge relevant to a meaningful resolution of a specific problem;
- Effectively plan the work leading to the completion of the problem;
- Report the results of your research in concise, precise professional style.
General guidelines

All theses and dissertations shall be prepared in accordance with guidelines established by the Graduate School (see www.grad.clemson.edu/Manuscript.php). This guide provides advice on preparing an acceptable and effective thesis or dissertation. You should consult this guide before beginning the writing phase of your graduate research. Pay particular attention to formatting requirements.

Planning

Task planning is a very important part of any research program. The deadlines for the tasks depend on the date of anticipated graduation and are presented in the Graduate School Announcements. A list of the deadlines is also available from the Graduate School website, www.grad.clemson.edu/Deadlines.php. Failure to meet any of these deadlines will result in postponement of your graduation.

You must allot sufficient time for writing the thesis or dissertation. It is highly recommended that you fully complete your thesis/dissertation before leaving the University. Many former students who left without completing their thesis/dissertation still have not completed their degree requirements. Experience shows it is very difficult to complete a thesis/dissertation after leaving the University.

Library/listing/archives of previous manuscripts

Prior students' manuscripts are available for your review. Many faculty members also maintain copies of manuscripts of students for whom they served as Major Advisor. Your committee members may be able to direct you toward pertinent examples for your review.

Proposal preparation, format, contents

The proposal is a persuasive document intended to present a brief, concise argument about the worthiness of your research. The written document should reflect your effort and not that of your Major Advisor. Your Major Advisor may work with you on points of clarification to improve the structure of the document.

Your Major Advisor will review your initial draft and offer suggestions for changes. Upon his/her approval, you or your Major Advisor will distribute copies to the other Advisory Committee members for their comments.

Writing the special project report, thesis or dissertation

The writing process usually begins toward the end of the research period. The document must be written in a format that is acceptable to the Graduate School for theses and dissertations. You should follow the formatting rules provided by the Graduate School at www.grad.clemson.edu/Manuscript.php. The Graduate School’s manuscript website provides examples of properly formatted pages, tables and figures. You can format the document yourself, or hire someone to do this for you. It typically takes anywhere from 10-30 hours to format a manuscript at a cost of $10 to $20 an hour. Formatting can be difficult and it is often more efficient to leave this activity to a
professional. The Graduate School’s website offers a list of typists available in the Clemson area.

**Review and approval**

You should normally complete a final draft of your manuscript for your Major Advisor’s approval well in advance of your oral examination/defense to ensure sufficient time for editing and revisions. Final copies of a version approved by your Major Advisor must be submitted to your Advisory Committee generally at least two weeks before your defense (no less than one week and only with advance notification of the committee members). The manuscript may not be forwarded to the committee members for final consideration without the approval of the primary faculty advisor. It is within the rights of any committee member to refuse to meet for your defense if they have not been given the two week review period. Your final examination must be administered at least three weeks prior to the date on which your degree is to be conferred.

As you near completion of your thesis/project/dissertation, you must defend your work to your Advisory Committee in a formal setting. The actual structure and content of your defense is determined by your Major Advisor.

As a result of their review of the written document and your oral examination/defense, your Advisory Committee may require that you do more work. After completion of that work and a successful final oral examination, your Advisory Committee will provide any comments or corrections that you must make to your manuscript. After you make the corrections, you must submit your manuscript electronically to the Graduate School for formatting review (see below).

**Formatting guidelines and electronic submission**

Once you have defended your thesis/dissertation, you must submit it electronically to the Manuscript Review Office of the Graduate School for formatting review. The Graduate School enforces specific formatting guidelines to ensure that your manuscript is considered credible and professional. Templates, examples and specific guidelines are provided on the Graduate School website ([www.grad.clemson.edu/manuscript](http://www.grad.clemson.edu/manuscript)) to assist you in formatting. You will not be allowed to graduate until the Manuscript Review Office has approved your final manuscript.

The Manuscript Review Office uses an electronic thesis/dissertation submission process (ETD). Hard-copy (i.e., paper) manuscripts will not be accepted. Not only does this process make your manuscript more accessible, but it also costs you much less due to the minimization of printing costs.

For more information about ETD and the formatting process, see [www.grad.clemson.edu/manuscript](http://www.grad.clemson.edu/manuscript).

Your Major Advisor will be cognizant of departmental practices regarding the quality of the manuscript at the various review stages and of the wishes of the department chair, as an ex-officio committee member, to exercise the option of approving the manuscript in its final form.
Clemson University and the Department of Mechanical Engineering retain full ownership rights to any inventions, discoveries, developments and/or improvements, whether or not patentable (inventions), which are conceived, developed or reduced to practice, or caused to be conceived, developed or reduced to practice by graduate students during the course of their research activities conducted as part of any Graduate School curriculum. Any such invention will be handled by the University in the same manner as set forth in The Faculty Manual of Clemson University (www.lib.clemson.edu/fs/FacultyManual/facman1.htm).

You will retain copyright ownership of your thesis/dissertation. However, the right to publish research will be maintained by the Department of Mechanical Engineering. Copyright ownership of any research publications will be determined by University policy and by the policies of organizations responsible for publishing or distributing copyrighted materials.

All graduate students should keep a formal notebook for recording research procedures and results. Students are urged to study the recommendations for maintaining proper research records that are listed at the University's Patent Policy page (www.clemson.edu/extension/Policy/misc/patents.htm).

All data, research notebooks and related materials (slides, pictures, graphs, publication reprints, etc.) generated by any graduate student within the department are the property of the department and will remain in the department after your graduation/departure. You must collect these materials and submit them to your Major Advisor before you graduate/depart. The major advisor will have final authority on the disposition of any or all of these materials.

**Residence for Doctoral Degree**

Residence is a necessary concept in graduate education, particularly in the preparation of the dissertation. The purpose of residence is to require you to spend a specified minimum amount of time in direct personal association with members of the faculty of the University and under direct advisement of your Major Advisor and Advisory Committee, and to participate in other normal activities pertinent to graduate education such as seminars and close association with other student researchers.

To receive the Doctor of Philosophy degree, you must complete at least 15 hours of graduate credit including research credit hours (991) on the Clemson University campus in a continuous 12-month period.

For students employed substantially more than ½-time, a statement specifying the manner in which the residence requirement is to be satisfied shall be formulated by your Advisory Committee and included in your curriculum. Also, upon completion of the final examination, your Advisory Committee will forward to the Graduate School a statement approved by the department chair and college dean certifying that residence requirements have been met.
Exceptions to the residence requirement may be granted by the Dean of the Graduate School. Major Advisors seeking an exemption to this policy must submit an academic plan for the student that is signed by the Major Advisor and the Department Chair.

**Final Examination(s)**

*Master’s Final Examination*

Candidates for a master’s degree must pass a final examination at least three weeks prior to the date of the convocation at which the degree is to be conferred. The final date for this examination is established each semester by the Graduate School. The examination is conducted by your Advisory Committee, but all faculty members are invited to participate. The Thesis Defense constitutes the Master’s Final Examination in the Department of Mechanical Engineering for MS Thesis students.

You are required to send an abstract title, abstract, date, time and place, along with a listing of your committee members, via email to the Graduate Student Services Program Coordinator no less than nine days prior to your defense. The Graduate Student Services Program Coordinator will notify the Graduate School, program faculty and other students in the program of the time and place of the examination no less than one week prior to the scheduled time.

*PhD dissertation defense*

An oral examination given at least three weeks before graduation will serve to examine your dissertation research. (See deadlines set by the Graduate School for the specific date for each term at [www.grad.clemson.edu/deadlines.html](http://www.grad.clemson.edu/deadlines.html).) You are required to provide a broad and penetrating interpretation of your research project and conclusions. Your committee members should receive a final draft copy of the dissertation at least ten working days before the examination. This examination will be conducted under the authority of your Advisory Committee. All faculty members will be invited to participate in the examination and to provide comments to your Advisory Committee.

Successful completion of this examination and your dissertation will result in a recommendation (GS7 Form) by your Advisory Committee to the Graduate School that the PhD degree be awarded.

Unsatisfactory performance on the final examination will result in a requirement for complete re-examination (with or without recommendations for additional work) or dismissal.

*Timing*

You must complete your final examination(s) at least three weeks prior to graduation. We recommend that you set the schedule for the exam(s) with your Advisory Committee as early in your final semester as possible, to ensure their availability and your completion of the requirement.

You are required to send an abstract title, abstract, date, time and place, along with a listing of your committee members, via email to the Graduate Student Services Program Coordinator no less than nine days prior to your defense. The Graduate Student
Services Program Coordinator will notify the Graduate School, program faculty and other students in the program of the time and place of the examination no less than one week prior to the scheduled time.

Application for Diploma

You must submit a formal application for a diploma to the Graduate School. You must complete this form online in the first four weeks of the semester in which you intend to graduate. Early submission is not accepted (e.g., do not complete the form in January if you do not plan to graduate until August or December, only if you plan to graduate in May). If you miss the deadline, you must contact Enrolled Services to receive a hard-copy version of the application; late fees will accrue at $25 the first day after the deadline and an additional $5 each business day thereafter to a maximum of $125. If you submit the form and, for some reason, do not graduate in that semester, you must re-submit in each term in which you hope to graduate thereafter.

If your name in the student database is not as you want it to appear on your diploma (due to marriage, etc.), you must contact Enrolled Services prior to submitting the Diploma Application form online. Any degree/major changes via form GS2 must also be processed before you submit the Diploma Application.

There is no fee to receive a diploma if you attend the graduation ceremony or agree to pick up your diploma in the Enrolled Services office in Sikes Hall. There is a $10 fee assessed if you request that your diploma be mailed to you.

For more information, contact Enrolled Services at (864) 656-5339, if your last name begins with A-L, or (864) 656-5341 if your last name begins with M-Z.

If you choose to participate in graduation ceremonies, you should make arrangements for cap and gown purchase (or rental, if preferred, for PhD gowns) at this same time. See the Clemson University Bookstore’s website at www.clemson.edu/bookstore/gsupplies.htm for deadlines and more information.

Final Check-Out

When you leave the University due to graduation or any other reason, you must do the following pertaining to the department:

- Turn in all keys to the Department.
- Be sure that all equipment and supplies which you have drawn are returned to stock.
- Be sure that any portion of the laboratory and/or office that you occupied is clean and ready for another occupant.
- Return all borrowed materials (books, journals, etc.) to their appropriate location.
- Inform the Program Coordinator that you are leaving and have complied with all regulations, and schedule an exit interview.
- Complete the departmental Graduate Student Final Check-Out Form. A sample form may be found in the Appendix. Copies may be obtained from the Student Services Secretary. No student will be cleared with the Graduate School until the check-out form has been completed.
ADMINISTRATIVE POLICIES & PROCEDURES

Drugs, alcohol, smoking

Drugs: The use, possession, distribution or dispensation of illegal drugs is strictly prohibited. Violation could result in your dismissal from the University.

Alcohol: Alcoholic beverages are prohibited for any activity held in any College of Engineering and Science facility.

Smoking: In the interest of the safety and health of all the occupants of our buildings, the following smoking policy will be enforced. No smoking is allowed in any classroom, hallway, laboratory, office or other public spaces. These rules are necessary not only for health reasons but also for general building safety.

Computer access and use

Graduate students will have access to a computer typically through their research group. Personal computers and laptops are also available for use in CCIT computer labs.

- Computers used in research labs are paid for through research funding by research professors.
- The departmental technician will give computer support as needed for computers in, and will notify University computer support personnel if necessary. This includes software and hardware problems. Clemson computer support personnel will not work on a computer unless the primary visible language is English.
- Do not connect a computer to the University network without permission from the departmental technician. All computers connected to the University network must have the latest anti-virus software running continuously.
- Some software is available on the Clemson network. See the departmental technician for details. Department owned computers will only run software for which a legal license is obtained. Pirated software is not permitted.
- All Clemson University and CCIT rules concerning computers will be followed.
- Graduate students have access to the printer in room 207. The departmental technician can connect your computer to a printer.

CCIT offers numerous instructional short courses. Visit their website at ccit.clemson.edu/services/training for details.

Email access, use

Email is the most common medium used by the department and the University to communicate with you. Many events and information of importance to your success in the program are announced via email. It is very important that you check your email regularly, at least once a day. This is the primary way of communicating information to you. If you are requested to respond, you should do so in a timely
manner. Note that if you have an assistantship, you will have both a student and an employee email account and will be responsible for checking both on a regular basis.

Mailboxes and personal mail

Each graduate student is assigned a mailbox, which you should check regularly. All personal mail is to be directed to your home address. The department is not to be used as your mailing address. The department assumes no responsibility for personal deliveries to Fluor Daniel EIB.

Outgoing mail, both U.S. and campus mail, can be placed in the appropriate receptacles in the reception area. You must provide adequate postage for any U.S. mail. International mail must be taken to the U.S. Post Office.

Intra-department communications and notices

Notices of interest to graduate students will be placed on the departmental bulletin board and, on occasion, directly mailed to students. To ensure receipt of departmental mailings, each student should have a current address and phone number on file with the Graduate Student Services Program Coordinator and the University. The department maintains a mail slot for receipt of graduate student mail.

Keys and keycards

Key and keycard requests should be initiated through the department assistant in room 102, and the request must be approved by your academic adviser and department chair, or his designee. The key(s) issued to you are for your use only, they must never be loaned to anyone else, even another graduate student. Failure to observe this rule will result in your key privilege being withdrawn. Keys must be returned before the student leaves. There is a fee for each not returned to the department.

Building security

Building security is everyone's responsibility. You should make sure to lock your office and laboratory doors when you leave (even for a few minutes). In the evenings and on weekends building doors should not be propped open at any time. Do not bring personal items of value into the building. Do not allow people in the building if they do not have card access, especially during sporting events. Thefts can occur. Do not be careless about building security. You may be the next theft victim.

On football weekends the Fluor Daniel building will be locked. Persons entering or leaving Fluor Daniel building on those days should ensure that all doors are locked behind them. Report building problems or if there is anything wrong outside of normal office hours to your Major Advisor and/or the department chair after you have called the University Security Office at (864) 656-2222.

Office supplies

The department does not furnish office supplies to graduate students. Entrance to the supply room is by key only and students must be accompanied by a staff or faculty member.
Copy machines

Copy machines are located in room 106A and room 255 and are available for graduate student use. A 7-digit code is required for access which must be approved by student's advisor. This code can be obtained from the departmental assistant in room 207.

Equipment check-out

Equipment needed for research and teaching activities, such as digital cameras, laptops, projectors, etc., can be signed out with the departmental assistant in room 102A. Graduate students are personally responsible for equipment signed out to them. Lending or borrowing of equipment between graduate students is prohibited.

Telephone use and long distance charges

Your use of departmental office telephones must be restricted to business use and emergencies during business hours. You must inform your friends and family not to call you on the departmental office phone on routine matters. With the permission of your Major Advisor, you may obtain long-distance authorization numbers to use for business-related long-distance calls. CAUTION: Never use your University code for personal calls; all long-distance calls are documented on monthly bills.

ASME Membership

Application forms for membership in ASME may be obtained from the ASME advisor. Graduate students are encouraged to associate with the national society, as well as the Greenville section.

Departmental machine shop

The department maintains a well-equipped machine shop staffed by departmental technicians in ground floor of Daniel EIB. Any request for services of the departmental technician must be made in writing. Under no circumstances is anyone to use any of the department's machine shop equipment without prior authorization and instruction from the technician as to proper use of the equipment.

Procurement procedures

Graduate students will be held responsible for the purchase of any equipment they order without proper authorization. The guidelines below must be followed when making any type of purchase that will be charged to a departmental or research account.

Authorization. Graduate students should obtain written authorization from their advisor before initiating any purchase. Faculty advisor may authorize the purchase via email or other written notice with an account number to a departmental assistant, Kathryn Poole or Gwen Dockins, depending on the type of purchase.

Purchases Less Than $2,500. Please see the Departmental Assistant, Kathryn Poole, to initiate purchases to be made. The assistant is located in 102B Flour Daniel and may be reached by phone at 656-3456. These purchases require completion of Purchase Authorization Form located in her office. The purchasing limit includes the unit price of the item(s) being purchased and all additional charges, except sales tax.
Interdepartmental Orders (IDOS). Interdepartmental Orders are for purchases made from other on-campus departments. Please see the Departmental Assistant, Kathryn Poole, in room 102B to initiate charges being made by Interdepartmental Order.

Purchase Requisitions. Purchase requisitions are issued for purchases over $2,500. Most items over $2,500 will have to be opened to competitive bidding and purchase. Please see the Departmental Assistant, Gwen Dockins, located in room 207 regarding requisition requirements.

Departmental files
Departmental files should not be accessed without proper authorization. Students should contact the Graduate Student Services Program Coordinator for information on obtaining necessary authorization.

Departmental telephones
Graduate students making research-related calls at the request of an advisor should use the telephones in the departmental office. No student will be authorized to place long distance telephone calls without the permission of the appropriate advisor. Student use of departmental telephones must be limited to business and University calls.

Prior theses/dissertations
Prior theses/dissertations are available and can be checked out by seeing the Graduate Student Services Program Coordinator.

Faculty offices
Faculty members carry out numerous duties, of which research and graduate education are but two. Please observe faculty office hours when posted and arrange appointments in advance. Do not enter a faculty office without knocking on the door and wait to be invited in before opening the door.

Graduate student offices
Graduate student offices will be assigned after the start of the semester. Priority is given to graduate laboratory assistants (GLA) then to graduate research assistants (GRA) then to graders (GGA) then to other non-supported graduate students. Office space is limited, and not all students will have desks. If a student is assigned a desk, it is this student’s responsibility to maintain the area clean and organized. Janitors will sweep floors and empty wastepaper baskets only. No cooking is allowed in student offices; the graduate lounge is equipped with a microwave and a sink for such a purpose.

Vacations/Leave time
Graduate students are expected to work over the entire semester period as defined by the University Calendar. The student work time frame should NOT be perceived to be the same as the semester class schedule. Generally, graduate “teaching” assistants work on the same calendar as faculty with 12-month appointments unless different work
expectations are distinctly articulated in the letter of appointment. Graduate Research Assistants should not be paid if they are not present on-campus and do not report to work with the exception of University holidays.

A graduate assistant may request up to four weeks leave without pay per semester and one week of leave without pay per summer session from his or her immediate supervisor for illness of close family member, death in the immediate family, and personal illness or hardship.

Military leave
The Graduate School has ruled that a graduate student on military leave, for example ROTC camp, will not receive a stipend for the period of that leave. Students planning to take military leave should notify the Assistant Graduate Coordinator of the inclusive dates. Short periods of about one week can be taken as regular vacation with no interruption in pay. Students leaving the campus for six weeks to attend ROTC camp must obtain written permission from the Dean of the Graduate School to be excused from the continuous enrollment provision.

Final check out
Graduate students leaving the University for any reason should:

1. Turn in all keys to departmental staff members in the Machine Shop;
2. Return all equipment and supplies to appropriate locations;
3. Clean assigned laboratory space, and or office space
4. Inform the Department Chair of the departure; and
5. Return all borrowed material (books, proceedings, CDs, etc.)
6. Complete the departmental Graduate Student Final Check-Out Form
   (Copies of this form may be obtained from the Graduate Student Services Program Coordinator.

Graduate assistants
The Graduate School defines a graduate assistant as a student with a baccalaureate degree from an approved institution who contracts to devote a minimum of ten working hours per week to the University for at least one semester. Graduate assistants pay tuition charges at the rates listed in the current Graduate School Announcements (www.grad.clemson.edu). To receive a tuition reduction for a particular semester, students must be on assistantships at the beginning of the semester.

Student travel
Department-specific travel information and guidelines from the Clemson University Travel Guidelines Index have been incorporated into this section. The complete Guidelines Index, including authority references and guidelines specific to University administration, is available at www.clemson.edu/procurement (CU Dept Info, Travel Guidelines). Summarized departmental procedures are as follows:
Step 1. Complete “Request to Travel” form, obtain appropriate signatures (PI or faculty member responsible for the account number to which it will be charged) and submit to Gwen Dockins.

Step 2. Enter travel status according to guidelines outlined herein.

Step 3. Upon completion of travel, complete “Travel Worksheet”, obtain appropriate signatures, and submit to Gwen Dockins for reimbursement.

Traveler's responsibilities: When you file for reimbursement of travel expenses you are stating that:

- You have followed the University's travel policies;
- You have not nor will not receive reimbursement for these expenses from any other entity outside the University;
- None of the expenses are of a personal nature;
- All supporting documentation is on file with your department or business officer.

NOTE: Under the Progressive Discipline Policy of the University, any employee who falsifies records or documents or willfully violates written rules, regulations or policies can be suspended or terminated from their job.

You must file travel reimbursements within 60 calendar days of the completion of the trip and within the same fiscal year in which the trip occurred. Multiple trip reimbursement requests for trips of a repetitive nature should be claimed on a travel log form. These requests should be submitted at least quarterly. Reimbursement will be made only upon completion of the travel. Any reimbursement request that is not submitted when due will require you to submit and receive approval of a written request stating the reason for the delay with approval by the dean/department chair or the business officer and the Director of Procurement Services.

All travel vouchers submitted for reimbursement are required to have the signature of the traveler and one other person authorized to spend funds from the account numbers that appear on the travel voucher. All signatures must be original. No stamped signatures will be accepted.

Travelers are expected to exercise the same judgment when making travel arrangements and expenditures that a prudent person would exercise if traveling on personal business and expending personal funds.

- Excess costs, circuitous routes, delays or luxury accommodations unnecessary or unjustified in the performance of an assignment are not considered exercising prudence.
- Travel by commercial airlines will be in coach or tourist class, except where exigencies require otherwise.
- Transportation to or from points of arrival and departure will be by the most economical method.

Expenses for spouses: Reimbursements to an individual may cover only those expenses pertaining to that individual. It may not include expenses pertaining to other
individuals, regardless of who paid the expense. Travel expenses for spouses, friends or other individuals not traveling on official University business are not reimbursable.

Unauthorized costs: You will be responsible for unauthorized costs and any additional expenses incurred for personal preference or convenience. No reimbursement for reduced fare advance purchase tickets will be made directly to employees prior to the completion of travel if charged on a personal credit card, since direct payment by the University is available using the Departmental Purchase Card.

Meals: You must be in travel status (more than 10 miles from your residence or official headquarters) to be eligible for reimbursement of meals. While on official travel within South Carolina, actual expenses incurred in obtaining meals up to a maximum of $25 per day will be reimbursed. While on official travel outside South Carolina, actual expenses incurred in obtaining meals up to a maximum of $32 per day will be reimbursed. Actual reimbursement amounts depend on your departure and return times, as follows:

<table>
<thead>
<tr>
<th></th>
<th>If You Depart</th>
<th>If You Return</th>
<th>Out of State</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Before</td>
<td>After</td>
<td>In State</td>
</tr>
<tr>
<td>Breakfast</td>
<td>6:30 a.m.</td>
<td>11:00 a.m.</td>
<td>$ 6</td>
</tr>
<tr>
<td>Lunch</td>
<td>11:00 a.m.</td>
<td>1:30 p.m.</td>
<td>7</td>
</tr>
<tr>
<td>Dinner</td>
<td>5:15 p.m.</td>
<td>8:30 p.m.</td>
<td>12</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>$25</td>
</tr>
</tbody>
</table>

If you receive reimbursements for meals on non-overnight travel, this amount could be considered income and be reported on your W-2 tax form. For instance, meals on day trips are subject to tax withholding except when a business purpose for the meal can be documented. If you are claiming reimbursement for such business meals, documentation must include the name and affiliation of the person sharing the meal and the nature of the business discussed.

Lodging: Lodging expenses will be allowed subject to the following limitations, provided an original, itemized receipt is furnished. Lodging arrangements and any required deposits are your responsibility and will be reimbursed as part of the lodging expenses upon completion of the trip.

- Actual lodging expenses will be reimbursed; however, more moderately priced accommodations must be made when a choice is available. Employees should request a state or government rate when available.
- No reimbursement will be made for overnight lodging within 50 miles of your residence or official headquarters.
- The expense for shared lodging may be reimbursed to one employee if only one original itemized receipt is obtained. If the room is shared with other than a University employee, the single room rate will apply.
- All necessary and reasonable tips for baggage handling will be reimbursed.
Miscellaneous expenses: Movies, bar bills, laundry, room service, safes and security insurance, health or spa fees, etc., will not be subject to reimbursement on the travel expense report. These are considered personal in nature and are your responsibility.

Employees are allowed one personal call, of short duration, per day. Charges for long distance telephone calls, telegrams, fax charges or Internet access made on official business will be allowed. A fixed charge by a hotel for telephone service may be reimbursed as part of lodging. It is the responsibility of the traveler and the department to substantiate whether calls are of a business or personal nature and whether they will be reimbursed.

Foreign travel: Travel outside the continental United States, Alaska, Hawaii, Canada, Puerto Rico or the Virgin Islands require approval prior to departure. Foreign travel funded from sponsored program activities must be approved in advance by Sponsored Programs Accounting.

While on foreign travel, actual lodging expenses will be reimbursed. Fees for the purchase of traveler's checks, passports and visas will be reimbursed provided a receipt is furnished. All expenses claimed must be converted to U.S. dollars and the conversion rate and computation should be shown on each receipt.

When an employee is on foreign travel, meal expenses not exceeding federal rates will be reimbursed. These rates are listed at the following website: www.state.gov/m/a/als/prdm.

The Provost Advisory Council approved a risk management recommendation to require all Clemson students to obtain international travel insurance when traveling abroad. This applies to both faculty-led and semester abroad programs. The cost is $31 per month and includes $100,000 basic medical (no deductible), medical evacuation/repatriation and up to $2,000 to transport a family member to a patient hospitalized for more than six days. Faculty and staff traveling with student groups may also be covered under the student policy at this cost. Contact the Office of Risk Management at (864) 656-3354 for additional information.

Travel by automobile: Automobile transportation may be used when common carrier transportation cannot be arranged satisfactorily, or to reduce expenses when two or more University employees are traveling together.

When planning to travel by car, see Gwen Dockins. She will then contact Transportation Services in advance to reserve a Motor Pool vehicle. The Motor Pool requires 72 hours advance notice.

University employees may use their own automobile for official travel provided the University would incur no added expenses above that of other forms of transportation available. Reimbursement for personal automobiles is as follows:

- $0.445 per mile, if no University-owned vehicle is available. (In order to be reimbursed at this rate, a statement from Transportation Services confirming the non-availability must be attached to the Travel Reimbursement Voucher.)
- $0.445 per mile for travel to and from nearby airports or train depots when official travel is by airplane or train.
- $0.405 per mile when you wish to use your own automobile although a Motor Pool vehicle is available.

Taxi fares and reasonable tolls will be reimbursed to the individual. Receipts must be furnished if claiming airport, hotel or parking garage parking of more than $5.00.

No reimbursement will be made to operators of state-owned vehicles who must pay fines for moving or non-moving violations.

**Rental cars:** Travelers should check with several car rental agencies for the most competitive rates. Address insurance requirements with the rental agency. If you do not take the insurance from the vendor, your personal insurance will be required to provide the coverage. Clemson University will only cover you if the rental is in Clemson University's name. Most national car rental companies require a personal credit card which obligates the person renting the vehicle.

**Registration fees:** Registration fees in the amount necessary to qualify you to attend conventions, meetings, conferences, etc., are allowed. These fees can be paid using the Departmental Purchase Card or by completing a Direct Purchase Voucher (DPV) and sending it to Accounts Payable at least ten days to two weeks before the deadline of the meeting. If this is not prepaid, and is paid at the time of registration of the meeting, reimbursement will be made after the trip is completed. You must have a detailed receipt that indicates the means of payment.

**Receipts:** Student travelers must submit a receipt for each expense of $5.00 or more, except for meals, taxi fare, tolls and portage. All receipts and paid bills should be originals. If originals are not available, a memorandum, approved at the next level in the approval process, must accompany the travel voucher when it is submitted.

**Travel awards:** The Graduate Student Government (GSG) awards amounts of up to $500 to full-time graduate students toward their attendance at conferences and other professional development events. See the GSG website for application information ([people.clemson.edu/~gsg/Travel_Awards.htm](people.clemson.edu/~gsg/Travel_Awards.htm)).

**Inclement weather**

Cancellation of classes due to inclement weather is determined by University Administration and announced through local radio and television stations. University Administration attempts to alert students of any disruption of scheduled classes by 7 a.m. Separate announcements are made for the main campus and the University Center in Greenville, so you should listen carefully to the specific announcement.
Student advisory council

The Department graduate students have a Student Advisory Council comprised of students representing each of the research groups. A chair is elected from the members of the Council. The Council meets periodically to discuss issues of mutual concern. It also meets with the department chair to jointly consider opportunities for quality improvements.

Political and religious activities

The University cannot engage in political and religious activities. Therefore, it is departmental policy that no political or religious signs will be displayed in Fluor Daniel. Nor should University email lists/systems be used to transmit political or religious messages.

Campus Facilities and Resources

Emergencies

Call the Clemson University Police Department ((864) 656-2222) for all major emergencies: fire, medical, police. They will ensure that the proper authorities are dispatched. In case of fire, exit the building immediately. Use stairwells; do not use the elevator.

Campus shuttle bus

Clemson University supplies a shuttle bus to transport students between the main campus and the Research Park during fall, spring and summer semesters. Trips are scheduled from 7 a.m. until 6 p.m. Monday through Friday (except during holidays and Fall Break). The shuttle makes one trip per hour from the Hendrix Center to the Research Park. The shuttle leaves the Hendrix Center on the hour and arrives at the Research Park at approximately 20 minutes after the hour. Stops are at AMRL, Rich Lab and Ceramic and Materials Lab.

Graduate Student Government

The Graduate Student Government (GSG) is a University-wide organization of all graduate students for promoting graduate student interests. At the start of each fall semester, departmental GSG representatives are elected. The biweekly senate meetings are open to all graduate students. See the Graduate School Announcements (www.registrar.clemson.edu/html/catalogGrad.htm) for more information, or contact the GSG office at (864) 656-2697. Your active participation in the Graduate Student Government is encouraged.

R.M. Cooper Library

Located on campus adjacent to the reflecting pool, the main library houses more than 1.5 million items, including books, periodicals and microforms. Periodicals can be checked out for a maximum of three days ($1/day late fee) while books can be checked out for six weeks ($0.25/day late fee). The catalog is online and can be accessed from any campus computer. Free online literature searches can be conducted at the main
library. An appointment must be made to complete the online search. In addition, the library contains a number of computers and printers as well as copiers, two of which are located in the reference area, and several of which are located on the ground floor. Additionally, there is a coffee shop and convenience store located within the library. For more information about the library, call (864) 656-3024 or the Library Hours Hotline at (864) 656-3027.

The library also has two satellite branches. The Emery A. Gunnin Architectural Library, located in Lee Hall, provides materials on architecture, visual arts, city and regional planning, building science and constructions, and landscape architecture. Its extensive slide library can also be helpful to those interested in history, art, etc. The library's Special Collections Unit, housed in the Strom Thurmond Institute building, contains rare books, manuscripts of prominent South Carolinians, and materials relating to the history of Clemson University and South Carolina. A smaller, specialized collection is also located in the Chemistry Library in Hunter Hall.

Copy services

Copiers are available in the Cooper Library on various levels. They are coin operated and cost 10¢ per copy. (If you use your Tiger Stripe Card in the copiers, the copies cost only 5¢ per copy.) Student Services also provides copiers at the Manning Hall Lobby, Calhoun Courts Commons Building basement, and the Students Government Complex.

The Union Copy Center, located on the first floor of the Hendrix Center, provides self-service and counter services to students. For more information and hours, call (864) 656-2725.

The Campus Copy Shop located at One Rubin Square, 384 College Avenue, between Hallmark and Domino's Pizza, offers self-service copiers. They also do full laser copies, engineering copies, blue-prints, binding, passport photos, lamination, reductions and enlargements, resumes, PMTs, typesetting, etc. They also may be a pickup location for course notes. For more information and hours, call (864) 654-3863.

University Union, Hendrix Student Center, and Brooks Center

The Edgar Brown University Union, the Hendrix Student Center, and the Brooks Center for Performing Arts provide social, educational, cultural, and recreational activities for members of the University and larger community. Hundreds of varied activities are offered to the campus community each year, including films, videos, concerts, bands, comedy and variety acts, short courses, speakers, game tournaments, cultural arts performances, outdoor recreational trips, group travel, and special events.

University bookstore

The University Bookstore is located on the first floor of the Hendrix Student Center. It stocks all required textbooks and supplies as specified by the various departments, as well as general trade books, greeting cards, computer software, personal care items, etc. The bookstore holds textbook buy-back year-round. The bookstore accepts VISA, MasterCard, and Tiger Stripe. The bookstore also allows students to buy their books online: www.whywaitforbooks.com. Once you get there just pick South Carolina, then
Clemson, then English Department, then your course and section number. Graduate assistants and teaching assistants may be eligible for discounts at the University Bookstore.

**University health services**

The Redfern Student Health Center on campus provides health services to University students. Redfern offers a variety of services including: outpatient ambulatory care for illnesses and injury, health education on women's health issues, nutritional counseling, dermatology, and orthopedic clinics. Students are seen at Redfern throughout the day by appointment. A walk-in clinic is available to students who do not have an appointment. ASK-A-NURSE telephone services are also available.

If you have questions about services provided, call Redfern Health Center at (864) 656-2233; if you would like to schedule an appointment to see a doctor at Redfern, call the appointment line at (864) 656-1541. For service hours or other information, see their website at [http://stuaff.clemson.edu/redfern/](http://stuaff.clemson.edu/redfern/).

**Fike Recreation Center**

Graduate students may use these facilities. Lockers are available at the recreation center. For specific information about the facilities and activities offered, visit [stuaff.clemson.edu/campusrec/facilities.html](http://stuaff.clemson.edu/campusrec/facilities.html).

**Sporting events**

Graduate students may purchase season tickets for Clemson football and basketball games. If interested, you should inquire at the IPTAY ticket office (Gate 9, Memorial Stadium) to complete an application. Further information can be obtained from the ticket office ((864) 656-2118). Baseball games are free with University ID. Tickets for soccer games may be purchased at the gate (usually $3 with University ID).

**Campus parking**

Parking on campus is restricted and requires a permit that can be purchased at Parking Services located on the ground level of the Edgar Brown University Union ((864) 656-2270) or via their website at [stuaff.clemson.edu/parking](http://stuaff.clemson.edu/parking).

**Professional Development**

There are a number of opportunities for you to develop professionally in addition to your course work and research. These include presenting talks and/or posters at regional and national conferences, becoming a student member of professional organizations, and preparing for your eventual job search.

**Career planning**

The Michelin Career Center provides information about market conditions and gives assistance in acquiring knowledge about your career opportunities and job requirements. The Center hosts career fairs each fall and spring, and offers workshops in a variety of career-related topics. The Center also provides information about
internships and part-time and summer work. For more information, see their website at career.clemson.edu or call (864) 656-6000.

**Student government**

The Graduate Student Government represents the interests of all graduate students at Clemson. Generally the GSG promotes student participation in University affairs and learning experiences. It also elects representatives to various University boards and committees. Participation in the GSG can provide valuable leadership experience.

**Research & Laboratory Work**

**Off-campus research**

This policy refers to research actually conducted at an off-campus facility as opposed to research conducted primarily at the University by an off-campus student. The department does not encourage off-campus doctoral research, but in unusual circumstances it may be desirable. It is your responsibility to propose and obtain approval as required by the *Graduate School Announcements* ([www.registrar.clemson.edu/html/catalogGrad.htm](http://www.registrar.clemson.edu/html/catalogGrad.htm)).

**Safety and Hazardous Materials**

Safety is everyone's business. Graduate students are expected to adhere strictly to all safety regulations.

**Eye and face protection:** Eye and face protection devices that meet OSHA requirements and American National Standards for industrial eye protection should be the minimum eye protection used for activities where there may be flying or falling particles or chemical splashes. **Either safety or prescription glasses with side shields must be worn in any laboratory at all times,** unless an exception has been made by the departmental representative. Visitors to any laboratory must wear safety or prescription glasses, preferably with side shields. The wearing of contact lenses is strongly discouraged. Soft contact lenses are susceptible to absorption of vapors and may aggravate some chemical exposures, particularly if they are worn for extended periods. Manufacturers of soft lenses generally recommend they not be used in certain atmospheres.

**Body protection:** Protection of the body from contact with solid and liquid contaminants will require some protective clothing. Such protective clothing may include boots, gloves, pants, coats and head covers. Complete protection of the skin from contact with gases and vapors requires full-body protection such as an encapsulating suit. Whenever in a laboratory, all students, faculty and staff must ensure that arms, legs and torso are covered at all times. For example, you can wear either (a) long pants and a long-sleeved shirt, (b) a knee-length, long-sleeved laboratory coat, or (c) long pants and a waist-length laboratory coat. In addition, you must use rubber and plastic aprons whenever corrosive or irritating chemicals are handled. Because plastic aprons can accumulate static electricity, avoid their use in areas where flammable solvents could be ignited. Discard and replace protective clothing if it cannot be effectively
decontaminated. Select clothing materials for resistance to the chemicals to which they will be exposed, and for appropriate resistance to permeations.

**Footwear:** Wear closed-toed shoes at all times (i.e., sandals, flip flops, and bare feet are *not* permitted). Shoes made of impermeable material such as leather are strongly recommended. Sneakers offer little protection against falling objects or chemical spills. High-heeled shoes pose a hazard and are not to be worn when working in laboratories.

**Hazardous waste management:** Legal and regulatory requirements, reinforced by public opinion, spur the handling of hazardous wastes in a responsible way. Even laboratory personnel who work with relatively small amounts of chemicals recognize that the chemical wastes generated during their experiments are their responsibility and that waste management systems are necessary.

The Resource Conservation and Recovery Act of 1976 mandated a system for managing hazardous waste. Regulations adopted by the Environmental Protection Agency (EPA) now extend through South Carolina state law to those who generate, store, transport, treat and dispose of hazardous waste. The South Carolina agency responsible for enforcing EPA regulations is the Department of Health and Environmental Control (DHEC).
APPENDICES

Appendix A. Course Descriptions

Mechanical Engineering Program

ME 6070: Applied Heat Transfer. 3(3). Application Oriented Extension of ME 3040, considering topics in transient conduction, flow of fluids, energy exchange by radiation, and mass transfer. Applications in heat-exchanger design with emphasis on economics and variation of operating conditions from the design point. **Prerequisites:** ME 3040 or consent of instructor.

ME 6170: Mechatronics System Design. 3(2). Mechatronics integrates control, sensors, and computers to create a variety of electromechanical products. Includes concepts of design, appropriate dynamic system modeling and analysis, sensors and transducers, actuating devices, and real time microprocessor interfacing and control. Laboratory experiments, simulation, and design projects are used to exemplify the course concepts. **Prerequisites:** ME 3050 or consent of instructor. **Corequisite:** ME 7171

ME 6171: Mechatronics System Design Laboratory 0(3). Non-credit laboratory to accompany ME 6170. **Corequisite:** ME 6170

ME 6200: Energy Sources and Their Utilization. 3(3). Covers availability and use of energy sources such as fossil fuels, solar (direct and indirect), and nuclear; addresses energy density and constraints to use (technical and economic) for each source. **Prerequisites:** ME 3030 and ME 3040 or consent of instructor.

ME 6210: Introduction to Compressible Flow. 3(3). Introductory concepts to compressible flow; methods of treating one-dimensional gas dynamics including flow in nozzles and diffusers, normal shocks, moving and oblique shocks, Prandtl-Meyer Flow, Fanno Flow, Rayleigh Flow, and reaction propulsion systems. **Prerequisites:** ME 3030 and ME 3080 or consent of instructor.

ME 6220: Design of Gas Turbines. 3(3). Guiding principles in gas turbine cycles are reviewed. Turbine and compressor design procedures and performance prediction for both axial and radial flow machines are presented. Methods of design of rotary heat-exchangers and retrofitting gas turbine for regenerative operation are presented. Design projects are used to illustrate the procedures. **Prerequisites:** ME 3080 or consent of instructor.

ME 6230: Introduction to Aerodynamics. 3(3). Basic theories of aerodynamics are presented with the purpose of accurately predicting the aerodynamic forces and moments which act on a vehicle in flight. **Prerequisites:** ME 3080 or consent of instructor.

ME 6260 Nuclear Energy, 3(3). Engineering methods and science principles are considered for the design of components to nuclear power stations. A systems level understanding is emphasized. Includes nuclear fuel cycle and regulatory considerations. **Prerequisites:** ME 3030 and ME 3040 or consent of instructor.

ME 6290: Thermal Environmental Control. 3(3). Mechanical vapor compression refrigeration cycles, refrigerants, thermoelectric cooling systems, cryogenics, thermodynamic properties of air, psychrometric charts, heating and cooling coils, solar radiation, heating and cooling loads, insulation systems. **Prerequisites:** ME 3030 and ME 3080 or consent of instructor.
ME 6300: Mechanics of Composite Materials.  3(3). Develop fundamental relationships for predicting the mechanical and thermal response of multi-layered materials and structures. Develops micromechanical and macromechanical relationships are developed for laminated materials with emphasis on continuous filament composites. Discusses the unique nature of composites and the advantages of designing with composites. Prerequisite: ME 3020 or consent of instructor.

ME 6320: Advanced Strength of Materials.  3(3). Topics in strength of materials not covered in ME 3020. Three-dimensional stress and strain transformations, theorems of failure, shear center, unsymmetrical bending, curved beams, and energy methods. Other topics such as stress concentrations and fatigue concepts are treated as time permits. Prerequisites: ME 3020 or consent of instructor.

ME 6530: Dynamic Performance of Vehicles.  3(3). Introduces techniques for analyzing the dynamic behavior of vehicles. Types of vehicles to be considered will be chosen from aircraft, surface ships, automobiles and trucks, railway vehicles, and magnetically levitated vehicles. Prerequisites: ME 3050 or consent of the instructor.

ME 6540: Design of Machine Elements.  3(3). Design of common machine elements including clutches, brakes, bearings, springs, and gears. Optimization techniques and numerical methods are employed as appropriate. Prerequisites: ME 3060 or consent of instructor.

ME 6550: Design for Manufacturing.  3(3). Concepts of product and process design for automated manufacturing. Topics include product design for automated manufacturing, inspection and assembly using automation, industrial robots, knowledge-based systems, and concepts of flexible product manufacture. Prerequisites: ME 3120 or consent of instructor.

ME 6570: Fundamentals of Wind Power.  3(3). Introduces wind turbine systems, including wind energy potential and application to power generation. Topics include wind energy principles, wind site assessment, wind turbine components, power generation machinery control systems, connection to the electric grind, and maintenance. May also be offered as ECE 6570. Prerequisites: ECE 2070 or ECE 3200; or consent of instructor.

ME 6710: Computer-Aided Engineering Analysis and Design.  3(3). Students are exposed to geometric and solid modeling, finite elements, optimization, and rapid-prototyping. Students design an artifact, represent it on the computer, analyze it using FEA, then optimize before prototyping it. Emphasizes the use of computer-based tools for engineering design. Prerequisites: ENGR 1410 and ME 2020 or consent of instructor. Corequisite: ME 6171.

ME 6711: Computer-Aided Engineering Analysis and Design Laboratory, 0(3). Non-credit laboratory to accompany ME 6710. Corequisite: ME 6710.

ME 6930: Selected Topics in Mechanical Engineering. 1-6 (1-6). Study of topics not found in other courses. May be repeated for a maximum of six credits, but only if different topics are covered. Prerequisites: Consent of instructor.

ME 8010: Foundations of Fluid Mechanics  3(3). Derivations of basic equations for multi-dimensional flow fields; analytical techniques for solving problems in laminar viscous flow and laminar inviscid flow; theories of similitude. Prerequisites: Consent of instructor.

ME 8100: Macroscopic Thermodynamics. 3(3). First, second and third laws of thermodynamics with engineering applications; thermodynamic property relations; chemical equilibrium. Prerequisite: ME 3030 or consent of instructor.

ME 8110: Gas Dynamics. 3(3). Concepts from thermodynamics, one-dimensional gas dynamics, one-dimensional wave motion, normal and oblique shocks; flow in ducts and wind
tunnels; two-dimensional equation of motion; small perturbation theory. **Prerequisite:** Students are expected to have completed an undergraduate course in fluid mechanics before enrolling in this course.

**ME 8120: Experimental Methods in Thermal Science. 3(2).** Theories of measurements, instrumentation and techniques for measuring temperature, pressure and velocity on a practical graduate engineering level; mathematical presentation of data uncertainty analysis, data acquisition techniques, and theory and state-of-the-art measuring system. Corequisite: ME 8121.

**ME 8121: Experimental Methods in Thermal Science. 0(2).** Non-credit laboratory to accompany ME 8120. **Corequisite:** ME 8120.

**ME 8140: Concepts of Turbulent Flow. 3(3).** Concepts of fluid turbulence; turbulent transport mechanisms, dynamics of turbulence and experimental techniques pertinent to existing theories; classification of shear flows and their prediction methods. **Prerequisite:** ME 8010 or consent of instructor.

**ME 8150 (PHYS 8150): Statistical Thermodynamics I. 3(3).** Fundamental principles of kinetic theory and quantum statistical mechanics; Boltzmann statistics, Fermi-Dirac statistics and Bose-Einstein statistics. Students are expected to have completed a course in thermodynamics or obtained consent of instructor before enrolling in this course. May also be offered as PHYS 8150.

**ME 8180: Introduction to Finite Element Analysis. 3(3).** Introduction to the finite element method; applications to heat transfer, fluid flow and solids; introduction to transient analysis; analysis strategies using finite elements; introduction to solid modeling, finite element modeling and analysis using commercial codes. **Prerequisite:** Students are expected to have completed a numerical methods course or obtained consent of instructor before enrolling in this course.

**ME 8190: Computational Methods in Thermal Sciences. 3(3).** Numerical techniques as applied to the solution of fluid flow and heat transfer problems; use of finite difference methods.

**ME 8200: Modern Control Engineering. 3(3).** State-space approach to analysis of linear dynamic systems and control design, state-space representation, key topics in linear algebra and vector spaces, principles of controllability, observability, stability and performance specification; trade-offs between state variables and transfer function techniques. Observer designs, pole placement and optimal control theory; LQR and Kalman filtering. **Prerequisite:** ME 8230 or consent of instructor. Students who have not completed ME 8230 but have completed an undergraduate controls course should request a registration override from the instructor.

**ME 8210: Advanced Control Engineering. 3(3).** Review topics from modern control engineering, characteristics of nonlinear systems. Phase Plate and Describing-Function techniques. Lyapunov theory and stability analysis; nonlinear feedback control systems using Lyapunov method. Advanced topics, variable structure system control, adaptive control-systems analysis and design, robust adaptive control, optimal control and digital control. **Prerequisite:** ME 8200 or consent of instructor. Students who have not completed ME 8200 but have completed a graduate-level course in modern control should request a registration override from the instructor.

**ME 8230: Control Systems Engineering 3(3).** Physical modeling, mathematical analysis and feedback principles for control of multidisciplinary dynamic systems, including mechanical, electrical, electro-mechanical, hydraulic and pneumatic systems. Transient response, root locus and frequency response principles applied to control of complex dynamic systems. Sensors, actuators and dynamic plant integration to develop, model, control and analyze dynamic
systems. Students are expected to have completed an undergraduate course on system
dynamics or obtained consent of instructor before enrolling in this course.

ME 8290: Energy Methods and Variational Principles. 3(3). Application of variational
principles in solid mechanics problems; virtual work; Castigliano’s theorems on deflection and
rotation; stationary potential energy; energy stability criterion; Hamilton’s principle.
Prerequisites: ME 8370 or consent of instructor.

ME 8300: Conduction and Radiation Heat Transfer. 3(3). Fundamental concepts related to
conduction and radiation heat transfer; analytical methods for steady and transient conduction
heat transfer in one and two physical dimensions; radiation exchange between surfaces with
and without radiatively participating media; combined conduction and radiation heat transfer.
Prerequisites: ME 3040 or consent of instructor.

ME 8310: Convective Heat Transfer. 3(3). Derivation of continuity, momentum and energy
equations for boundary layer flow; solutions for confined and external flow regimes in laminar
and turbulent flow. Prerequisites: ME 3040 and MTHSC 2080 or consent of instructor.

ME 8320: Radiative Heat Transfer. 3(3). Radiation properties; enclosure theory; radiation
exchange between solid bodies; radiation exchange in the presence of absorbing, transmitting
and emitting media; combined radiation, conduction and convection exchange. Prerequisites:
ME 3040 or consent of instructor.

ME 8330: Heat Transfer with Change of Phase. 3(3). Nucleate boiling in a pool; film boiling
in a pool; forced nucleate boiling; forced film boiling; effect of impurities on boiling phenomena;
dropwise condensation; filmwise condensation; effect of noncondensable gases on
condensation; boiling and condensing processes in systems. Prerequisites: ME 3040 or
consent of instructor.

ME 8340: Principles of Structural Stability. 3(3). Practical criteria for analysis of
conservative and nonconservative systems’ stability; methods of adjacent equilibrium, initial
imperfections, total potential energy and vibration as applied to practical problems. Prerequisite:
ME 8370.

ME 8360: Fracture Mechanics. 3(3). Fundamental elasticity-based course in the development
of the basic concepts of engineering fracture mechanics; the Griffith criterion, Barrenblatt
and Dugdale models, linear elastic fracture mechanics (L.E.F.M.), plane strain fracture toughness,
the crack-tip stress and strain field, and plasticity and the J-integral. Prerequisite: ME 8370.

ME 8370: Theory of Elasticity I. 3(3). Theory of stress and deformation for continuous media;
linear stress-strain relations for elastic material; two-dimensional problems including Airy stress
function, polynomial solutions, plane stress and plane strain in rectangular and polar
coordinates, torsion and bending of prismatic bars and thermal stresses. Prerequisites: ME
3020 or consent of instructor.

ME 8380: Theory of Elasticity II. 3(3). Continuation of ME 8370 including topics from either
three-dimensional problems associated with an infinite elastic medium, elastic half-space,
contact stresses, symmetrically loaded sphere and circular cylinder, or complex variable
methods in plane elasticity, stress concentrations problems, singular stresses and fracture, and
composite materials. Prerequisites: ME 8370 and PHYS 8120.

ME 8430: Nonlinear Dynamics of Mechanical Systems. 3(3). Concepts in nonlinear
dynamic systems with emphasis to mechanical systems. Classification, stability and bifurcations
or equilibrium solutions. Analytic construction, stability and bifurcations of periodic solutions.
Floquet theory, Pincare maps. Quasi-periodic solutions, Lyapunov exponents and routes to
chaos. Perturbation and asymptotic methods for approximate analytic solutions of weakly
nonlinear systems. *Prerequisite:* ME 8460 or consent of instructor. Students who have not completed ME 8460 but have completed an undergraduate course in dynamics and differential equations should request a registration override from the instructor.

**ME 8450: Structural Vibrations. 3(3).** Vibrations of lumped-parameters systems; free and forced vibrations of SDOF and MDOF systems, general eigenvalue problem and modal analysis. Variational approach and energy methods. Vibrations of distributed-parameter systems; strings, bars, shafts, beams, membranes and plates. Approximate methods; Rayleigh’s Quotient, Rayleigh-Ritz methods, method of functions expansion, Galerkin’s and assumed mode methods. *Prerequisite:* ME 8460 or consent of instructor. Students who have not completed ME 8460 but have completed an undergraduate course in vibration or in dynamics and differential equations, should request a registration override from the instructor.

**ME 8460: Intermediate Dynamics: 3(3).** Kinematics and dynamics of particles and rigid bodies using vectorial and analytical approaches. Fundamentals of analytic dynamics; holonomic versus nonholonomic constraints, virtual displacements and work, Hamilton’s Principle and Euler-Lagrange’s equations. Rigid body dynamics; principle axes and Euler angles. Kinematics and dynamics of elastic bodies. Students who have not completed ME 8460 but have completed undergraduate courses in dynamics and differential equations should request a registration override from the instructor.

**ME 8520: Advanced Finite Element Analysis. 3(3).** Application of variational and weighted residuals methods; nonlinear analysis, steady-state and time-dependent problems; application of commercial finite element codes; advanced computational procedures. *Prerequisite:* CE 8080 or consent of instructor.

**ME 8590 (ECE 8590): Intelligent Robotic Systems. 3(3).** Integration and fusion of data from multiple sensors on multiple robots; intelligent decision making on motion planning and execution based on sensed data, involving mutual compliance; simultaneous force and position controls using computers. *Prerequisite:* ECE/ME 8540.

**ME 8610: Materials Selection in Engineering Design. 3(3).** Advanced study of various physical, chemical, and mechanical materials properties which govern the selection of materials in engineering design. Case studies of materials selection in design with metals, ceramics, polymers, and composites are presented.

**ME 8700: Advanced Design Methodologies. 3(3).** Nurturing or creativity; decision-making processes for design, in-depth study of the mechanical design process and tools; quality function deployment, concurrent design, systemic design, robust design, design for assembly, and axiomatic design.

**ME 8710: Engineering Optimization. 3(3).** Optimization in the context of engineering design; nonlinear and linear, static and dynamic, constrained and unconstrained formulation and solution of practical problems; structural optimization; multiobjective optimization; genetic algorithms; simulated annealing.

**ME 8720: Design Automation for Mechanical Engineers. 3(3).** Students are exposed to data structures, search algorithms, geometric algorithms, geometric modeling, and software engineering for mechanical engineers. Students design and implement mechanical CAD software packages. Emphasizes the use of software development tools, algorithm design, and their interfaces in mechanical engineering. Students are expected to have programming experience before enrolling in this course. Those with no programming experience may request consent of instructor.
**ME 8730: Research Methods in Collaborative Design. 3(3).** Topics include research methods for studying collaborative design, influencing factor of collaboration, computer issues in collaboration, and mechanical engineering as facilitated by collaboration. Technical writing and experimentation are emphasized.

**ME 8740: Integration Through Optimization, 3(3).** Theory, methodology and applications of decomposition, integration and coordination for large-scale or complex optimization problems encountered in engineering design. Topics include conventional and non-conventional engineering optimization algorithms, analysis models and methods, multidisciplinary optimization, and multicriteria optimization. Case studies are included. May also be offered as MTHS 8740. *Prerequisite:* MTHS 8100 or MTHS 8600 or MTHS 8710.

**ME 8910: Masters Thesis Research. 1-12(1-12).** Masters thesis research

**ME 8930: Selected Topics in ME. 1-6(1-6).** Topics not covered in other courses. May be repeated for credit.

**ME 9300: Advanced Topics in Heat Transfer. 1-6(1-6).** Topics not covered in other courses. May be repeated for a maximum of six credits.

**ME 9310: Advanced Topics in Fluid Mechanics. 1-6(1-6).** Topics not covered in other courses. May be repeated for a maximum of six credits.

**ME 9320: Advanced Topics in Thermodynamics. 1-6(1-6).** Topics not covered in other courses. May be repeated for a maximum of six credits.

**ME 9910: Doctoral Dissertation Research. 1-12(1-12).** Doctoral dissertation research.
Appendix B. Faculty and Staff Listing

Students are directed to the Department of Mechanical Engineering web pages for a listing of all faculty and staff members and their current contact information.

Appendix C. Support Services

Grievance policy and ombudsman information

It is the policy of the Graduate School to address all grievances of an academic nature filed by enrolled graduate students. Graduate student grievances are heard by the Graduate Academic Grievance Committee (GAGC). The GAGC typically consists of three faculty representatives from each of the five colleges and one graduate student representative from each college. A six-member Initial Grievance Review Board (IGRB) is formed from among GAGC members and is responsible for determining which grievances will go forward to the GAGC.

Procedure: Grievances must be filed with the Graduate School within 60 days of the alleged act and may involve the following: violations of program, department, college or Graduate School policies related to final grades in courses or research (891 or 991); violations of program, department, college or Graduate School policies related to the completion of any academic requirement including theses and dissertations, and oral or written comprehensive examinations; and graduate student assistantship employment including offers of assistantship appointments made during recruiting not honored after enrollment.

At any time prior to filing a grievance, the student may consult with the University ombudsman charged with mediation in cases involving graduate students.

Any student wishing to file a complaint must first make every attempt to resolve it within the college. The student must first take the complaint to the faculty or staff member(s) involved. If no resolution can be reached, the student should request assistance from the department chair and the dean of the college.

If the grievance remains unresolved, the student may file the complaint with the Graduate School. The student must first meet with the associate dean of the Graduate School charged with oversight of the GAGC. The associate dean will describe the grievance process to the student. If the student wishes to proceed with the grievance, the associate dean will provide the student with Graduate School Form GSG-A, “Request to File a Grievance,” which will enable the student to provide a written statement detailing the grievance and his or her attempts to resolve it at the college level by documenting a) the dates of consultations at the college level, b) the names of those persons consulted, and c) the signature of the collegiate dean attesting that no resolution could be reached. The student must return the fully executed FORM GSG-A to the Graduate School within 30 days of receipt from the associate dean. Students who fail to file the grievance within this timeframe forfeit their opportunity to proceed.

The student may seek external counsel (an advisor, an attorney, etc.) to assist with preparation of materials to submit to the GAGC. The student may request such
individual accompany him or her to the hearing and may wish to proceed to prepare for
this event. Questions concerning possible impacts on the student’s graduate status
should he or she not be successful in the grievance may be discussed at this time with
the associate dean of the Graduate School.

The IGRB will determine if the complaint, as submitted on Form GSg-A constitutes a
grievance under the Graduate School’s policies. Grievable complaints will be addressed
by a subcommittee of the GAGC appointed for the purpose of addressing the complaint
in question. The subcommittee will convene an informal, closed hearing to recommend
a resolution to the grievance. For more information about the procedures, refer to the
Graduate School Announcements at www.registrar.clemson.edu/html/catalogGrad.htm.

University ombudsman: The ombudsman is an independent, confidential resource that
provides assistance to faculty, graduate students and post-doctoral students in
resolving problems, complaints and conflicts when normal processes and procedures
have not worked satisfactorily. The Ombudsman’s Office serves as a central information
source on policies, procedures and regulations affecting faculty, graduate students and
post-docs. The office refers individuals to persons able to resolve problems or handle
appeals at the lowest possible level. Where appropriate, the ombudsman can facilitate
and/or mediate communication between parties who find themselves in a dispute.

The ombudsman strives to ensure that faculty, graduate students and post-docs receive
fair and equitable treatment within the University system. He provides an independent
point of view in an informal and confidential environment. The ombudsman will not
identify you or discuss your personal concerns with anyone without your permission.
Private confidential meetings can be arranged at your convenience. All communications
will be treated with strict confidentiality. The ombudsman works toward resolutions
based on principles of fairness. He is neither an advocate for faculty, administration or
students, nor an agent of the University, but is an advocate of fair processes.

The Office of the Ombudsman provides fair and impartial counseling to faculty
members, graduate students and post-docs by: 1) addressing problems and concerns,
and identifying and evaluating options to reach resolutions; 2) providing available
resources within the University, particularly as to policies and procedures; 3) serving as
a neutral party in conflict resolution; 4) opening lines of communication through
mediation; and 5) recommending changes in University policies and procedures when
necessary. The ombudsman assists in issues of harassment, academics, unfair or
inequitable treatment, or any other University policy that you feel has been applied
unfairly or erroneously.

The ombudsman, as a designated neutral, has the responsibility of maintaining strict
confidentiality concerning matters that are brought to his attention unless given
permission to do otherwise. The only exceptions, at the sole discretion of the
ombudsman, are where there appears to be imminent threat of serious harm. The
ombudsman must take all reasonable steps to protect any records and files pertaining
to confidential discussions from inspection by all other persons, including management.
The ombudsman will not testify in any formal judicial or administrative hearing about concerns brought to his attention. When making recommendations, the ombudsman has the responsibility to suggest actions or policies that will be equitable to all parties. Concerns can be directed to the University ombudsman by letter, walk-in, appointment or telephone: R. Gordon Halfacre, University Ombudsman for Faculty and Graduate Students and member of the Ombudsman Association, 101 Clemson House; telephone (864) 656-4353 or (864) 656-4957; email ombudsman@clemson.edu.

Counseling services

The demands of graduate school can sometimes seem overwhelming. If you feel you could benefit from talking to a counselor — about grad school stress or any other issue — you may be eligible to receive services from the Counseling and Psychological Services program (CAPS), located in Redfern Health Center. To learn about their current programs, visit the CAPS website at stuaff.clemson.edu/redfern/caps or call them at (864) 656-2451.
Appendix D. Graduate School Forms

You will be required to complete the following forms through the course of your studies. Up-to-date versions of the Graduate School forms are available at www.grad.clemson.edu/forms/GeneralForms.php.

<table>
<thead>
<tr>
<th>Forms to Complete in Mechanical Engineering</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form ID</td>
</tr>
<tr>
<td>---------</td>
</tr>
<tr>
<td>GS2 – Plan of Study</td>
</tr>
<tr>
<td>GS5 – Admission to Doctoral Candidacy (for PhD students only)</td>
</tr>
<tr>
<td>Diploma Application</td>
</tr>
<tr>
<td>GS7 – Final Comprehensive Exam and Thesis/Dissertation Approval Form</td>
</tr>
</tbody>
</table>

* See specific deadline dates for Graduate School forms at www.grad.clemson.edu/Deadlines.php.

Appendix E. Departmental Forms
PhD Qualification Form

DEPARTMENT OF MECHANICAL ENGINEERING
PHD QUALIFICATION FORM

________________________________________ has been evaluated for entry into the PhD program in Mechanical Engineering.

The method of evaluation was (check appropriate boxes):

____ written examination

____ oral examination

The results of the examination have been judged to be:

Certification by the PhD Qualifying Examination Committee Coordinator, the Graduate and Research Committee Chair, and the Mechanical Engineering Department Chair is required.

Name ___________________________ Signature _________________ Date _________
(Qualifying Exam Coordinator)

Name ___________________________ Signature _________________ Date _________
(Graduate & Research Committee Chair)

Name ___________________________ Signature _________________ Date _________
(ME Department Chair)
Graduate Student Final Check-out Form

Each student must secure the following certification before leaving the department.

************************************************************************

A. Student Name: ________________________________________

B. Forwarding Address:    ________________________________________

C. Phone Number: _______________ Email: _____________________

D. To my knowledge, the student is cleared for departure.

Advisor: _______________________________

1. All university keys, shop supplies and tools have been returned.

   ___________________________________   ____________________
   Department Technician             Date

2. Key Deposit has been returned if paid.

   ___________________   ____________________      __________________
   Departmental Assistant  Check No.         Date

3. I have returned all items mentioned in (1) above, and my lab space and office area is clean and devoid of all personal items. A forwarded address has been submitted.

   ______________________________
   Graduate Student Signature     Date

4. Student is cleared.

   ________________________________
   Graduate Student Services Program Coordinator    Date
Graduate Student Transfer Release Form

1. Student Name: _________________________________________________

2. Level of study:  □ Master’s  □ Doctorate

3. Start date: ______/_______/_______   End date:  ______/_______/_______
   (MM)        (DD)            (YY)                              (MM)          (DD)

4. Institution to which the student is transferring: ________________________
   ___________________________________________________________________

5. Forwarding address:  ____________________________________________
   ___________________________________________________________________

6. Phone: ______________________  Email: ___________________________

Consent by the graduate student’s research advisor, the Graduate and Research
Committee Chair, and the Mechanical Engineering Department Chair is required.

Name: ___________________ Signature _____________    Date _________
   (Advisor)

Name: ___________________ Signature _____________    Date _________
   (Graduate & Research
   Committee Chair)

Name: ___________________ Signature _____________    Date _________
   (ME Department Chair)
FORM 15: Acknowledgment of Contents
(Place in student's departmental record)

I have read, understand, and will comply with the policies and procedures contained in
the Manual for Graduate Students of the Department of Mechanical Engineering.

Signature: _____________________________________

Name (Please print): _____________________________________

Date: _____________________________________