



Graduate Handbook

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1 INTRODUCTION

1.1 Welcome and Purpose of This Handbook

Welcome to the Department of Industrial Engineering at Clemson University! We wish you success at every stage of your academic journey.

This handbook is intended to familiarize you, as a graduate student in Industrial Engineering (IE), 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.

These rules and requirements are in addition to and subordinate to those described in the *Graduate School Policies and Procedures*, which you can find through the Graduate School office in E-108 Martin Hall or at <https://www.clemson.edu/graduate/students/policies-procedures/index.html>. Any inconsistencies within this handbook or between this handbook and the *Graduate School Policies and Procedures* should be brought to the attention of the Graduate Coordinator. The Graduate School website has additional information about the community, the University, and resources for students (e.g., housing, events and activities).

1.2 Contact Information

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Computer issues: Email ithelp@clemson.edu

Keys and administrative matters: Denise Lennox

Academic issues or curriculum: Dr. Kapil Chalil Madathil

2 PROSPECTIVE STUDENTS

2.1 Applying to IE at Clemson

The online application is at <https://www.clemson.edu/graduate/admissions/index.htm>. In the banner on the left, there is an icon entitled “Apply Now” that will get you started. Once the online application is complete and application fee is paid, students can check the status of the application process by clicking on the icon “Application Status Check” and follow the instructions.

Admission decisions are made independently of funding decisions; hence, gaining admission *does not* imply that funding is available or will be offered. The Graduate School officially notifies students of admissions decisions, not the Department of Industrial Engineering or the IE Graduate Coordinator. The following sections describe various aspects of the application process.

2.2 Admission Requirements

Minimum requirements to be considered for admission generally follow those of the Graduate School (see Graduate School Admission at <https://www.clemson.edu/graduate/admissions/index.htm>). Minimum requirements include 1) at least a four-year bachelor’s degree from an institution whose scholastic rating is satisfactory to the University and 2) a high quality of previous academic record. The GRE is not required for PhD and MS applications. Please note that you may include unofficial or official GRE scores in your application file if you believe it will strengthen your application. Please note that your chances for admissions or assistantships will not be impacted by not including GRE scores. Further, international students are required to furnish satisfactory scores on either the Test of English as a Foreign Language (TOEFL) or International English Language Testing System (IELTS) exam.

It is expected that applicants to the IE graduate program will have earned baccalaureate degrees in engineering, physical sciences, mathematics, or other related majors with strong mathematical backgrounds. Entering graduate students are assumed to have competence in calculus, linear algebra, and probability/statistics.

Upon receipt of all admission materials, the Graduate Committee in IE will evaluate the application regarding admission. Students who are judged to have the background and motivation to be successful in the program are accepted and affirmed by the Graduate School. There are no minimum score requirements. However, students admitted to the IE Graduate Program typically have:

- An undergraduate grade point average (GPA) of at least 3.0 or above (on a 4.0 scale). Students with a master’s degree typically have a GPA above 3.5 in their graduate courses.
- Scores on the Graduate Record Exam (GRE) that exceed 160 (old score of 700) on the Quantitative Reasoning section.
- Scores on the Test of English as a Foreign Language (TOEFL) that exceed 100 (iBT) or 600 (PBT) and 7.0 (IELTS) for international students.

If the student’s performance on these measures is not consistent with the guidelines, it is important that the reference letters and the statement of purpose provide the Graduate Committee with additional information as to why the student should still be considered for admission to the IE Graduate Program.

Completed applications received before the deadline posted on the IE Graduate Program website will receive full consideration. You may find some helpful information about admissions from the following websites:

- <https://www.clemson.edu/cecas/departments/ie/academics/graduate/faq.html>
- <https://www.clemson.edu/graduate/admissions/index.html>

2.3 Transfer Credits

Clemson 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 by the Graduate Program Coordinator. The request must be in writing for each course or credited activity to be transferred. An official transcript, catalog description and syllabus or other supporting documentation must accompany each request. Grades earned for courses taken at institutions other than Clemson University will not be included in the student's academic GPA. It is the student's responsibility to supply are required documentation to the Graduate Program Coordinator.

Transfer credit will not be awarded for research, internships, courses graded pass/fail, or course work in which the grade received is 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. Coursework completed outside the six-year time limit may not be transferred to Clemson University or validated for graduate credit. See the *Graduate School Policies and Procedures* for more information regarding transfer credits (<https://www.clemson.edu/graduate/students/policies-procedures/index.html>).

2.4 Direct Admission to the Ph.D. Program

Students with no previous graduate degrees can be considered for direct admission to the Ph.D. program (bypassing the M.S. program) if they have exceptional academic credentials with a bachelor's degree in a field approved by the department.

2.4.1 Duplication of degrees

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

2.4.2 Social security number

If you are an international student receiving an assistantship, your first step in the employment process is SEVIS Check-In. This step can be completed online at <https://www.clemson.edu/campus-life/campus-services/international/student-arrival/SEVIS%20Check-In.html>. Once that step is completed, you should then schedule a meeting with the Accountant in 100D Freeman Hall. You will be provided with an Employment Verification Letter that you will need when applying for a Social Security Card (SSC). 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 on campus on the dates indicated by the Graduate School. Once you have your signed Social Security card, you will schedule a meeting with Human Resources who will complete the necessary paperwork to get you on payroll. You can use this link to make an appointment <https://www.clemson.edu/human-resources/contact/index.php?about=International> or give them a call at 864-656-2000. When you go to your meeting, be sure to take your SSC and the following:

- U.S. Visa
- Unexpired foreign passport
- I-94
- DS-2019 (J1 visa)/I-20 (F1 visa)

2.5 Costs

For tuition and fees, see <https://www.clemson.edu/graduate/finance-tuition/index.html>. 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).

2.6 Departmental Support – Assistantships and Hourly Funding

Award decisions are based on academic record, test scores, statement of purpose, and letters of recommendation. Students who are admitted to our Ph.D. program are provided with teaching or research assistantships for the first year of their graduate studies. Although not guaranteed, Ph.D. students who successfully make progress towards their degree and find a dissertation advisor typically continue to receive an assistantship. M.S. students should be prepared to finance their entire program of study. Occasionally, some of our M.S. students who perform at a high level after enrolling at Clemson are funded in later semesters through either hourly employment or an assistantship. M.S. students may be eligible for funding if they are (1) enrolled in full-time graduate studies, (2) in high academic standing, and (3) making satisfactory progress toward their degree.

Tuition and fees for students receiving an assistantship are combined into a reduced flat fee. To receive this reduced fee in a particular semester, a qualified student must be on the department payroll by the end of the second week of that semester. Students with assistantships may choose to defer tuition and fees. This means that fees and tuition costs will be deducted from the first six full paychecks of the semester.

Teaching assistantships, research assistantships, and hourly funding are awarded on a semester-by-semester basis and are not guaranteed in subsequent semesters. There may be other employment opportunities for graduate assistants or other positions around campus (like food service, campus police, etc.) after enrollment.

2.7 Housing and Area Information

Information about housing, transportation (CAT bus and Greenville LINK), and student life are provided on the Clemson University Graduate School website <https://www.clemson.edu/graduate/>.

3 ENROLLED STUDENTS

3.1 Orientation

Clemson University orientation for new graduate students is conducted online via Tiger Training—this is mandatory for all new graduate students. College and department trainings will be announced to new students prior to arrival through Clemson e-mail addresses.

3.2 Student Responsibilities

The faculty members in IE expect you to approach your graduate study in a professional manner. Graduate studies should be treated as a job and, as such, you should expect to work focused hours each week on your studies and research. It should also be noted that graduate students may not be allowed all breaks/holidays afforded to undergraduate students.

3.3 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. The Department of Industrial Engineering takes academic integrity very seriously and pursues every option available to maintain our high academic standards, including writing up student offenses and following through with grade and/or dismissal sanctions if warranted. Students can become familiar with the rules and procedures by reading the Graduate School's Policies and Procedures guidelines

<https://www.clemson.edu/graduate/students/policies-procedures/index.html>).

3.4 Maintaining Academic Standing

A graduate student must maintain a minimum overall grade point average (GPA) of 3.0 for all courses taken in order to graduate from Clemson University. If at any time you fail to satisfy this requirement, you may be automatically placed on probation and directed to work with Graduate Student Services and Program Coordinators to develop a plan for successfully raising your GPA.

3.5 Other important Graduate School policies and procedures

For other graduate school policies and procedures please see the Graduate School Policies and Procedures webpage at: <https://www.clemson.edu/graduate/students/policies-procedures/index.html>. Here you can find information about the policies and regulations related to incomplete coursework, enrolling in a class on a pass/fail basis, auditing courses, withdrawing from a course, enrollment and leave of absence policies, as well as the procedures for withdrawing from the University.

3.6 Harassment

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. For more detailed information on this topic, please see the Graduate School Policies and Procedures webpage at: <https://www.clemson.edu/graduate/students/policies-procedures/index.html>.

3.7 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, Computing and Applied Sciences facility.
- *Smoking*: In the interest of the safety and health of all the occupants of our buildings, no smoking is allowed in any classroom, hallway, laboratory, office or other public spaces.

3.8 Departmental Resources and Responsibilities

3.8.1 Computer access and use

Graduate students will have access to computers in research labs, open departmental labs and in CCIT computer labs. Any problems with computers in department labs should be reported to ithelp@clemson.edu. CCIT offers numerous instructional short courses. Visit their website at <http://ccit.clemson.edu/training/> for details.

3.8.2 E-mail

E-mail 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, and you are expected to check your email regularly (at least once a day). If you are requested to respond, you should do so in a timely manner. There are resources available at

<http://www.clemson.edu/ccit/> for accessing Clemson emails on mobile devices. There are also resources available for initializing google apps and g.clemson email addresses on the CCIT website. We do not recommend forwarding emails from your Clemson account to a private email account. If you forward e-mails from your Clemson account to a private account such as Gmail, you take full responsibility for not receiving important or time-sensitive information due to malfunctions with the private account.

3.8.3 Mailboxes and personal mail

Each Ph.D. student is assigned a mailbox in Freeman 278, which you should check regularly. All personal mails are 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 Freeman Hall.

3.8.4 Keys

You will be issued keys to areas where you have been granted access and TigerOne card access to the building's entrance doors. Keys for other areas like research laboratories will be issued upon obtaining permission from the faculty member in charge of the lab. Students leaving the University through graduation or for an extended period of time for any reason *must* return all keys to the Office Manager. We recommend that you give your keys to the Office Manager any time you leave the country. A fee will be charged for any unreturned key.

The key(s) issued to you are for your use exclusively. You must never loan keys to anyone else, not even another graduate student. Failure to observe this rule may result in revocation of your key privilege. Unauthorized possession of a key to a University building is prohibited by South Carolina law. You are responsible for locking all rooms to which you have gained access with a key.

3.8.5 Building security, maintenance

Freeman Hall is normally locked after 9:00 pm on weekdays and throughout weekends. As you enter and leave the building, if it is locked, be sure that all doors are locked behind you. Should you discover a building problem, report this to the Office Manager. If something major is found wrong outside of normal office hours, inform the Graduate Coordinator and/or the Department Chair after you have called the Clemson University Police Department (CUPD) at (864) 656-2222.

3.8.6 Use of departmental office resources

Graduate students employed as teaching or research assistants may use the departmental copier and fax for official business associated with their employment. Use for any other purpose is strictly prohibited. The department does not furnish office supplies to graduate students for personal use. All use of office supplies while conducting contract-related research or as part of a teaching assistantship must be authorized by the appropriate faculty member. See the Accountant Fiscal Analyst for all requests of this nature.

3.8.7 Student offices/desks

It is the goal of the department to provide a desk for each graduate student. However, due to the limited available space, it may not be possible to accommodate each student. Therefore, a priority system is used which first assigns a desk to doctoral students, graduate assistants and graduate fellows, then to unsupported master's students. New students should see the Office Manager concerning a desk assignment.

3.8.8 Student photos

At the beginning of each semester (as part of the new student orientation), professional headshots of matriculating PhD students are taken. They may be used for the departmental website, promotional materials and articles, and your own professional and educational use.

3.8.9 Student travel and awards

A student's faculty supervisor or research advisor will inform students when travel is required as part of their duties in the department and will provide student with details of the rules and regulations that are applicable. The student and the faculty are responsible for obtaining the funding to support the travel. Note there are several opportunities for awards and scholarships to support professional travel.

The Graduate Student Government (GSG) makes awards to full-time graduate students toward their attendance at conferences and other professional development events. See the GSG website for application information (<https://gsg.people.clemson.edu/>).

The IE Department has competitive awards to partially support the travel of full-time graduate students towards their attendance at conferences. A student is eligible to receive at most one IE travel award per academic year. There will be a formal announcement of the application process for the award in each fall and spring semester.

3.8.10 Inclement weather

Cancellation of classes due to inclement weather is determined by University Administration and announced through Clemson's website, CU Safe Alert texts (opt-in service), 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 other Clemson campuses.

3.9 Campus Facilities and Resources

3.9.1 Emergencies

Call 9-1-1 (transfers to CUPD) or CUPD directly at 864-656-2222 for all major emergencies: fire, medical, police.

3.9.2 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 Policies and Procedures* (<https://gsg.people.clemson.edu/>) for more information or contact the GSG office at (864) 656-2697. Your active participation in the Graduate Student Government is encouraged.

3.9.3 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 have access to services from the Counseling and Psychological Services program (CAPS), located in Redfern Health Center. Visit the CAPS website at <https://www.clemson.edu/campus-life/student-health/caps/index.html> or call them at (864) 656-2451 to learn more.

3.10 Professional Development

There are a number of opportunities for you to develop professionally in addition to your coursework 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. In addition, the Graduate School provides professional development information on the Grad 360 website (<https://grad360.sites.clemson.edu/>).

3.10.1 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 Career Center hosts career fairs each fall and spring and offers workshops in a variety of career-related topics. There is also information provided about internships and part-time and summer work. For more information, see their website at <http://career.clemson.edu> or call (864) 656-6000.

3.10.2 Professional and student organizations

Graduate students are encouraged to join the one of our three student organizations associated with industrial engineering's professional societies:

- Institute of Industrial and Systems Engineers (IISE)
- Institute for Operations Research and the Management Sciences (INFORMS)
- Human Factors and Ergonomic Society (HFES)

3.11 Graduate School Deadlines and Forms

The Graduate School sets deadlines according to the academic calendar for the semester in which you plan to graduate. Specific deadline dates for Graduate School forms can be found at <https://www.clemson.edu/graduate/students/deadlines.html>. For all other deadline-related questions not answered in this document, please see the Graduate Student Services and/or Program Coordinator. *In general, any form that is required to be submitted to the graduate school should also be sent to the Graduate Student Services Coordinator so that the department has it on file.*

All graduate students should have an advisory committee and fill out a Plan of Study. Every student's advisory committee must have a majority of committee members whose primary faculty appointment is in the Department of Industrial Engineering.

Committee Selection

- Students pursuing the M.S. degree via the non-thesis option will have a single-member committee comprised of the Graduate Coordinator.
- Students pursuing the M.S. degree via the thesis option should have a minimum of three committee members, a majority of which must have primary appointments in the IE department. Students submit their GS2 during their second semester. Their thesis advisor(s) will serve as the committee chair/co-chairs, and the students should consult with their advisor(s) on the selection of other committee members.
- Ph.D. students should have a minimum of four committee members. Upon successfully completing the Qualifying Exam, Ph.D. students must inform the Graduate Program Coordinator of their intended faculty advisor within 30 days. The Graduate Program Coordinator will inform the student by email who the other three committee members should be for the initial form GS2 submission (this is a placeholder submission). Once the student's final research committee is determined (often by the Comprehensive Exam), the student will re-file the GS2 to properly identify the advisory committee.

Plan of Study

- When filling out the form, it is very important that the entire course name be typed out.

- All committee members will review the courses and research listed for accuracy before approval is granted.
- As soon as the MS student reaches 30 graduate credit hours completed on their GS2, the Graduate School assumes the student is graduating.
- Detailed information is available at <http://www.clemson.edu/graduate/students/gs2-hints.html>

Note to all graduating PhD and MS Thesis students: Please make sure your advisory committee chair completes your GS7M or GS7D forms, as the IE department will submit these forms to the Graduate School only once all required signatures are obtained.

3.11.1 General Thesis and Dissertation Guidelines

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

3.11.2 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 Policies and Procedures*. A list of the deadlines is also available from the Graduate School website, <https://www.clemson.edu/graduate/students/deadlines.html>. 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 or dissertation before leaving the University. Many former students who left without completing their thesis or dissertation still have not completed their degree requirements. Experience shows it is very difficult to complete a report/thesis/dissertation after leaving the University.

3.12 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 lab or office that you occupied is clean and ready for another occupant. Please leave your lab or office in the condition you would have liked to have found it originally.
- Return all borrowed materials (books, journals, etc.) to their appropriate location.
- Inform the Graduate Coordinator that you are leaving and have complied with all regulations and schedule an exit interview.

3.13 Appeals Process

Appeals for waivers to any of these policies and procedures are made to the Graduate Committee. You must outline the nature of your appeal and the desired outcome in writing and submit the document to the Graduate Coordinator. A meeting of the Graduate Committee will be held, and the decision will be communicated to you in writing.

Any appeals for coursework to count towards a concentration must be made prior to the first day of classes in a given semester in order for the Graduate Committee to render a decision prior to the Add/Drop deadline for that semester.

3.14 Financial Support

The Department of Industrial Engineering understands that financial aid is of prime importance to many students. Although not guaranteed, Ph.D. students who successfully make progress towards their degree and find a dissertation advisor typically continue to receive an assistantship. Unfortunately, very few entering M.S. students receive funding from the Department. Occasionally, some of our M.S. students who perform at a high level after enrolling at Clemson are funded in later semesters through either hourly employment or an assistantship. Teaching assistantships, research assistantships, and hourly funding are awarded on a semester-by-semester basis. There may be other employment opportunities for graduate assistants or other positions around campus (like food service, campus police, etc.) after enrollment.

The following information provides more details on financial support should you receive an offer at any point in your time at Clemson. Please read this very carefully so that you fully understand all requirements of the appointment before you accept the offer.

3.14.1 Assistantships and fellowships

Graduate assistantships are available in teaching and research. Graduate teaching assistantships include graders, laboratory assistants/instructors and teachers of record. These may be in the form of $\frac{1}{4}$ -time (10 hours per week) $\frac{1}{2}$ -time (20 hours per week) or $\frac{3}{4}$ -time (28 hours per week) appointments. Graduate research assistantships are generally made by individual faculty members to conduct research on specific projects. These may also be $\frac{1}{4}$ -time, $\frac{1}{2}$ -time, or $\frac{3}{4}$ -time appointments.

Fellowships are available from organizations outside Clemson University. Information on these opportunities is available from the department and from the Graduate School website (<https://www.clemson.edu/graduate/finance-tuition/fellowships.html>).

3.14.2 Hourly employment

On occasion, a graduate student may be employed on an hourly basis by a faculty member or by the Department. The assignment can be a research position with a faculty member, an hourly grading position to support classroom instruction, or other Department needs. Hourly students will complete timesheets every pay period and record the days and times they worked on their assigned tasks. 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 occurred.

3.14.3 Minimum enrollment

A minimum enrollment is required for appointment as a graduate assistant. During the academic year, the minimum enrollment is nine semester hours for all graduate assistants. Minimum enrollment in the summer sessions is three semester hours per session. An assistantship may be withdrawn at any time for failure to maintain satisfactory enrollment status.

There is no minimum enrollment requirement for hourly employment.

3.14.4 Employment-related information

3.14.4.1 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.

3.14.4.2 Paydays

Employees receive pay two times per month, for the period ending the 15th and the period ending on the last day of each month. 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.

3.14.5 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. Students can view their pay stub and other employment-related information on [HR Self Service](#) (View Paycheck, Benefits, etc.). From the menu within this system you can review paychecks, acquire tax information and access other employment information.

3.14.6 Work injury protocol

Should you be injured during 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.

3.14.7 Workload

The normal ½-time graduate assistantship workload is 20 hours per week (average). As described above, students are sometimes hired for a different number of hours, under appropriate circumstances. You should be aware of both your academic and work obligations and are encouraged to discuss any problems with your supervisor.

3.14.8 Work product

Computer programs written, data generated, discoveries made, derivations developed, etc., in the course of your appointment are the property of Clemson University.

3.14.9 Reduction of pay

Normally, your agreed-upon workload will be compensated as hours worked for each payroll period. However, if the amount of work you perform consistently deviates below the required workload, your pay may be reduced accordingly by your supervisor. For hourly employment, it may be necessary to implement any pay reductions in the pay period following the one in which the work deficiency occurred. Pay may also be withheld from students who violate the vacation policy (see below).

3.14.10 Vacation policy

As a rule, graduate assistants and hourly employees do not accrue paid vacation time. Your work timeframe should be based on enrolled credit hours and the terms in your assistantship offer let. In the case of events that would require unpaid leave, please refer to the graduate school policies and procedures: <https://www.clemson.edu/graduate/students/policies-procedures/index.html>.

3.14.11 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 Graduate Program 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 summer camp must obtain written permission from the dean of the Graduate School to be excused from the continuous enrollment provision.

3.14.12 Holidays

Graduate students are entitled to take as holidays the days on which the University is officially closed (see them at <http://www.clemson.edu/employment/benefits/holiday.html>).

3.14.13 PhD Student Family Leave

PhD students can request a six week, paid parental leave where their responsibilities to their department (if in a TA position) or advisor (if in a RA position) are temporarily paused. Students should request leave by reaching out to the graduate program coordinator and the graduate student services coordinator. Students should request leave at the beginning of the semester they intend to take it, so that arrangements can be made to cover their responsibilities. If the student is requesting leave prior to completion of their qualifying exam, the Department will allow them to take the qualifying exam at the end of the next academic semester.

3.14.14 PhD Student Bereavement Leave

PhD students can request two weeks for paid bereavement if a member of their immediate family passes away.

4 THE DOCTOR OF PHILOSOPHY DEGREE

The Doctor of Philosophy is the highest academic degree offered. The Ph.D. program emphasizes scientific and analytical foundations of industrial engineering as well as knowledge that is required for practice at the highest professional levels. In addition to formal coursework, a Ph.D. student devotes significant time to independent study, participation in seminars, and preparation of a dissertation based on independent and original research. The basis for granting the Ph.D. includes:

- A grasp of the subject matter contained in the broad field of industrial engineering.
- Competency to plan and conduct independent and original research that contributes to knowledge in a focused area of industrial engineering.
- The ability to adequately and professionally communicate in oral and written form.

4.1 Summary of Ph.D. Degree Requirements

Pursuing a doctoral degree involves the following minimum requirements:

- It is mandatory for a Ph.D. student to have a Committee Chair 30 days after the successful completion of the Qualifying Exam. The Committee Chair must have an appointment in the Department of Industrial Engineering at Clemson.
- If a student wishes to continue in a Ph.D. program after obtaining an MS from the IE Department at Clemson University, or wishes to transition from an MS student into a PhD student, the student must complete an application to the Ph.D. program. The application includes a CV, statement of purpose, and three letters of recommendation. This includes having the support from at least one faculty member willing to serve as the Committee Chair. If admitted, the student needs to submit a GS-14 or GS2-14.
- Completing at least 18 credits of doctoral research (IE 9910) exclusive of any research credits earned at the master's level.
- Completing at least 12 credits of coursework, exclusive of IE 9910 research credits.
- Completing a minimum of:

- 60 semester credit hours of graduate course work (including IE 9910 credits) beyond a baccalaureate degree; or
- 30 semester credit hours of graduate course work (including IE 9910 credits) beyond a Master's degree.
- Passing all Doctoral Examinations.
- Satisfying the University's degree requirements addressed in the Graduate School Policies and Procedures (<https://www.clemson.edu/graduate/students/policies-procedures/index.html>)
- Finally, at least one-half of the total graduate credit hours shown on the GS2, exclusive of any dissertation research, must be selected from courses numbered 8000 or above.

4.1.1 *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 Committee Chair 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 (9910) on the Clemson University campus in a continuous 12-month period. Once the 12-month period residency requirement is satisfied, it is expected that students pursuing a Ph.D. in IE will remain on campus and work closely with their research advisor. Should it become necessary for a student conduct their research off-campus or take a leave of absence, the student is required to:

1. Enroll in a minimum of 3 hours (9 if on assistantship) every fall, spring, and summer semester.
2. Develop a written plan describing how 1) degree progress will continue to be made during the time away from campus and 2) regular contact and communication with the research advisor will be maintained.

This written plan must be approved by the student's research advisor and the Graduate Program Coordinator prior to its submission to the Graduate School.

4.1.2 *Coursework restrictions*

Students in the Ph.D. program cannot enroll in courses associated with the Master of Engineering (MEng Online) Program. These courses include IE 8500-8590.

4.2 **Breadth Requirement**

Although the Ph.D. degree in Industrial Engineering (IE) at Clemson requires specialization in either Human Factors (HF) or Operations Research (OR), students must also acquire breadth of knowledge in the industrial engineering discipline. This breadth will facilitate collaborative research opportunities for IE students, and will allow them to be more versatile in their careers after graduation. There are two pieces to the breadth requirement: (1) enrolling in the IE PhD Seminar course for your first fall semester and (2) completing the course-based breadth requirement.

All PhD students are expected to register for IE 8900 PhD Seminar during the fall of their first full academic year on campus. This is a 1-credit course and will have research presentations given by a mixture of external speakers in both OR and HF and Clemson IE faculty. This seminar course will give students a breadth of knowledge of the types of research the IE discipline is able to address. It will also help first-year PhD students identify a research advisor by introducing them to each Clemson IE faculty member. It is highly encouraged that PhD students continue actively participating in the seminar series beyond their first semester.

For the course-based breadth requirement, HF PhD students should take:

- IE 8030 Engineering Optimization and Applications. This course covers deterministic OR, including linear programming and modeling.

For the course-based breadth requirement, OR PhD students should take:

- IE 8000 - Human Factors Engineering

The course-based breadth requirement can be satisfied by one of the following mechanisms:

1. By taking the corresponding IE course and earning a C or better (or “pass”).
2. Via allowable substitutions of those classes taken at Clemson.
3. By petition to the graduate committee.

The petition mechanism can be used to satisfy at most two classes. Those classes must be taken at the graduate level.

IMPORTANT NOTE: Breadth requirement courses must be completed before the student takes his/her comprehensive exam.

4.2.1 *Substitutions for Breadth Requirement Courses*

IE 8030 is considered to be a Master’s level introductory course to deterministic OR (LP, modeling). If a student has prior knowledge in these areas, one of the following courses would be considered a suitable alternative:

- IE 8600 Dynamic Programming
- IE 8800 Advanced Methods of Operations Research
- MATH 8100 Mathematical Programming
- MATH 8110 Nonlinear Programming
- MATH 8130 Advanced Linear Programming
- MATH 8140 Network Flow Programming
- MATH 8160 Network Algorithms and Data Structures

IE 8090 is considered to be a Master’s level introductory course to probability and statistics. If a student has prior knowledge in these areas, one of the following courses would be considered a suitable alternative:

- MATH 8030 Stochastic Processes
- MATH 8170 Stochastic Models in Operations Research I
- MATH 8180 Stochastic Models in Operations Research II

The student has the option to appeal to the Graduate Committee for approval of a course not listed on either approved substitution list.

4.3 **Depth Requirement**

Beyond the breadth requirements, all PhD students must meet their depth requirements. The depth requirement ensures that the PhD student acquires depth of knowledge in their general research areas.

The depth requirement for Human Factors PhD students focuses on the following five courses:

- IE 8000 Human Factors Engineering

- IE 8020 Design and Analysis of Human-Computer Systems
- IE 8060 Occupational Biomechanics and Physical Ergonomics
- IE 8080 Research Design and Analysis for Human Factors Engineering*
- IE 8150 Research Methods in Ergonomics

* The Data Analysis course (MATH 8050) is a prerequisite for the IE 8080 course. Typically, all new PhD students must enroll in it during the Fall semester of their first year. However, if your transcript shows that you have a background in statistical methods as evidenced by the course(s) you have taken, you might be eligible for an exemption. In such cases, you should reach out to the faculty member teaching IE 8080 in that semester. If they approve, you may be permitted to enroll in IE 8080 without having completed MATH 8050.

The depth requirement for Operations Research PhD students focuses on the following four courses:

- IE 8700 Advanced Models and Methods in Linear and Integer Programming
- IE 8780 Foundations of Probability for Industrial Engineering
- IE 8800 Advanced Methods of Operations Research
- IE 8880 Advanced Probabilistic Methods

4.4 Suggested First-Year PhD Student Course Plan (Required Courses)

- Human Factors students
 - Fall (9 hours) - IE 8000, IE 8060, & MATH 8050
 - Spring (9 hours) – IE 8020, IE 8080, & IE 8150
 - 2nd Fall - IE 8030
- Operations Research students
 - Fall (9 hours) - IE 8700, IE 8780, 3rd course (suggested: a 6000-level outside IE)
 - Spring (9 hours) - IE 8800, IE 8880, 3rd course (suggested: a 6000-level outside IE)
 - 2nd Fall - IE 8000

4.5 Doctoral Examinations

Doctoral students are required to successfully complete three examinations: the Qualifying Examination, the Comprehensive Examination, and the Doctoral Dissertation Defense.

4.5.1 Qualifying Examination

All Ph.D. students are required to take a written Qualifying Exam at the end of the first year of study in May. Students starting the PhD program in January of year n are expected to sit for the Qualifying Exam no later than May of year $(n+1)$, 16 months later. The purpose of this exam is to assess the student's depth of advanced knowledge in his or her chosen area of human factors or operations research. The Qualifying Exam is based on a core set of topics distributed to the students at the beginning of their first semester in the Ph.D. program. Students may need to acquire additional knowledge not taken in their coursework to master these topics. The Qualifying Exam is six hours long: three hours in a morning session and three hours in an afternoon session.

The human factors exam evaluates the student's core knowledge of human factors principles and theory and their knowledge of methods and statistics. The operations research exam consists of two parts: deterministic operations research and stochastic operations research.

For both exams, a student can bring two two-sided sheets of notes (8.5" x 11"), one for the morning section and the other for the afternoon section. As both the human factors and the operations research exams are in two parts (morning and afternoon), a student's outcome on the exam will be one

of the following:

1. Pass both sections = qualifying exam passed; student is eligible to continue in the PhD program

2. Fail both sections = qualifying exam failed; student is dismissed from the PhD program; student can work with the Graduate Coordinator to change their program of study to the Master of Science in IE
3. Pass one section, fail one section = student may retake only the failed section in the middle of July, approximately two months after the initial qualifying exam attempt, if they choose to make another attempt.
 - a. Pass section being re-taken = qualifying exam passed; student is eligible to continue in the PhD program
 - b. Fail section being re-taken = qualifying exam failed; student is dismissed from the PhD program; student can work with the Graduate Coordinator to change their program of study to the Master of Science in IE

4.5.2 *Comprehensive Examination*

The purpose of the Comprehensive Examination is to test the student's ability to convey a deeper level of knowledge on subjects related to their chosen area of expertise, but not necessarily specific to their dissertation topic. The Comprehensive Exam should be attempted for the first time after the breadth requirement is completed, but not later than the student's third fall semester. Students who fail the Comprehensive Exam on the first attempt may be granted a second attempt by the Advisory Committee. The second attempt must occur within six months of the first attempt. Failure of the second attempt will result in dismissal from the program. The Comprehensive Exam consists of a written portion and an oral portion.

The student has the following two options to pass the written portion of the comprehensive exam: 1) prepare a research prospectus, or 2) prepare a dissertation proposal. If option 1 is selected, then the student will submit a dissertation proposal document to their Advisory Committee at a later time. The selection of one of these options and the timing of the dissertation proposal submission should be approved by the student's Advisory Committee.

Please Note: The Breadth Requirement must be completed before the student takes his/her Comprehensive Exam.

Written Portion

The student must submit their *research document* to the Advisory Committee. The format of the student's research document is flexible and up to the discretion of the student's Advisory Committee. Examples of the research document might be a research prospectus, dissertation proposal, or a paper submitted to a journal, as the Advisory Committee deems it appropriate. However, in all cases, there must be significant, unanswered research questions being proposed for future research.

A research prospectus document is typically 10-15 pages in length, single-spaced, in 12-point font. It might include an abstract, introduction, literature review, and research questions/research significance/potential research contributions. If appropriate, the student may also detail intended research directions along with a proposed timeline, experimental strategy, or analytical development tasks.

A dissertation proposal typically contains a few dissertation chapters, which may include the research topic, a description and citations of prior and recent research in the area that demonstrates an in-depth knowledge of the area, preliminary findings, and a proposed set of research questions.

Within 7-10 calendar days after the student submits their *research document*, the Advisory Committee will determine the exact nature and scope of the exam and construct a written examination to test the student's knowledge in their area of specialization within IE. The Advisory Committee's

questions are released on a Friday, allowing the exam to span two weekends. After the student receives this examination, the student returns his or her answers to the written questions to the Advisory Committee within 10 calendar days.

Oral Portion

Within 7-10 calendar days after the student submits answers to the written examination, the student is required to take an oral examination. The oral exam is designed to take approximately two hours. The student will begin by presenting research ideas contained in their research document, followed by questions from the Advisory Committee regarding advanced book knowledge, components of the research plan, answers to the written exam questions, and other topics related to the proposed area of specialization. The committee will provide guidance on the desired scope and duration of the student research presentation that begins this portion of the exam.

4.5.3 *Doctoral Dissertation Defense*

The final examination is the Doctoral Dissertation Defense, in which the student presents the completed Dissertation to their Advisory Committee. There must be at least nine months between receiving notification that the Comprehensive Exam has been passed and the Dissertation Defense.

The Dissertation Defense will be open to the University community. Each student must notify the date, time, location, and other details of their defense to the Graduate School. This notification is done by submitting the defense form available on the Graduate School website at least 10 days prior to the defense.

In addition to notifying the Graduate School, the candidate should also reach out to the Graduate Student Services Coordinator for a template to announce the defense within the department. The candidate should populate the template with appropriate information and provide it back to the Graduate Student Services Coordinator to announce the defense to the department.

At least 10 calendar days prior to the Dissertation Defense, the student must submit their final dissertation to the Advisory Committee. This exam is designed for approximately two hours, where the Advisory Committee's examination typically focuses on the dissertation but may include questions related to other components of the student's program as well. In the rare circumstance that a student fails the exam, the Advisory Committee may grant a second attempt; however, failure of the second exam will result in dismissal from the Graduate School. Upon successfully defending your dissertation, your advisor must complete form GS7-D and file it with the Graduate School.

4.5.4 *Exceptions to Exam Policies*

Any exceptions to standard exam policies must be submitted to the Graduate Committee in the form of a petition. Such petitions will only be granted in extreme circumstances.

4.5.5 *An example Doctoral examination timeline (forms)*

Tasks and Suggested Timeline	Year 1			Year 2			Year 3			Year 4		
	Fall	Spring	Summer	Fall	Spring	Summer	Fall	Spring	Summer	Fall	Spring	Summer
Select a major advisor												
Select the advisory committee												
Qualifying exam												
Submit GS2 form												
Complete breadth requirement												
Comprehensive exam												
Submit GS5D form												
Submit Research Approval form												
Dissertation Defense												

4.6 Advisor Requirement and Advisory Committee

All Ph.D. students, after passing the qualifying exams, must always have a research advisor, select an Advisory Committee, and file Form GS2. The Advisory Committee consists of a student's Committee Chair and at least three additional faculty members. It is expected that the research advisor should have appropriate experience in the research focus area the student wishes to pursue. Faculty members from outside the IE department are permitted to be members of the Advisory Committee; however, a simple majority of the committee (including Committee Chair) must be from the IE department.

If a student does not have an advisor for a span of 30 contiguous days after passing the qualifying exam, then that student's case is automatically brought to the graduate committee. The graduate committee can decide to (a) remove the student from the Ph.D. program, (b) articulate a set of requirements that the student must satisfy, by a certain date, or (c) postpone making a decision on the student until a given time. Option (c) requires the department chair's approval.

4.7 Research Dissemination Expectations

The development of high-quality journal publications is a Ph.D. student's primary goal of their studies, and all Ph.D. students should expect enthusiastic and professional support from their advisors. The IE department will support students in whatever way possible toward the accomplishment of this aim. As such, IE Ph.D. students are expected to submit multiple articles to refereed journals during the course of their Ph.D. studies, perhaps with one or more accepted for publication, before the Dissertation Defense is scheduled. In addition, Ph.D. students are expected to present their research work at conferences.

4.8 Masters of Science En Route

Students who are currently enrolled in the doctoral program and who have completed or plan to complete all requirements for the master's degree in Industrial Engineering, may be eligible to receive a master's degree *en route* to their Ph.D. This option is only available to students without a current master's degree in Industrial Engineering.

4.8.1 Requirements for MS En Route

Students who wish to pursue the MS en route option during their Ph.D. program must complete the following course requirements:

- At least 30 semester credit hours of coursework in total must be completed.
- At least 18 semester credit hours of coursework must be in IE.
- At least 50% of the total graduate credit hours shown on the GS2 must be selected from 8000-level courses.
- Courses taken outside of IE can be selected as follows:
 - All graduate-level courses in the College of Engineering, Computing and Applied Sciences
 - Graduate-level courses in Mathematics, Statistics, Accounting, Finance, Economics, Management, Psychology.
 - All other classes would need to be approved on a case-by-case basis.
 - No research or independent study credits from other departments are accepted.
- The Ph.D. breadth requirement must be complete.
 - For HF students, this is IE 8030 Engineering Optimization and Applications
 - For OR students, this is IE 8000 Human Factors Engineering

4.8.2 Procedures for MS En Route

All students must begin the process of applying for a MS degree en route in the semester prior to anticipated graduation. The student is required to:

1. Notify the Graduate Student Services Coordinator of your intent to pursue the M.S. degree en route to your Ph.D.
2. Fill out the [GS2-14 form](#) and send according to the digital workflow instructions in the *Instructions* section of the form.
3. After the GS2-14 is approved, the student must apply for Graduation through the iRoar portal

4.9 Procedures and Deadlines

There are some deadlines internal to the IE Department, as well as University and Graduate School deadlines. University and Graduate School deadlines can be found at:

<http://www.clemson.edu/graduate/students/deadlines.html>. In addition, guidance on the formatting and submission process of theses and dissertations can be found at:

<http://www.clemson.edu/graduate/students/theses-and-dissertations/index.html>. Use the following checklist for Ph.D. deadlines within the Department.

5 THE MASTER OF SCIENCE DEGREE

Students may pursue the Master of Science (M.S.) degree in Industrial Engineering by either the *non-thesis* or *thesis* options. These options are designed to provide you with a strong foundation across the breadth of industrial engineering and sufficient flexibility so that the degree is tailored to your background and career objectives.

The non-thesis option is an excellent choice for most students. This option provides a solid background for students seeking industrial employment after graduation as well as those who wish to pursue the Ph.D. The thesis option is available if you have a very strong interest in research and you can identify a faculty member who agrees to be your major advisor.

We provide requirements for both the non-thesis and thesis options below. Additional information on course offerings at the graduate level can also be found at <https://regssb.bannerxe.clemson.edu/StudentRegistrationSsb/ssb/registration>.

5.1 Non-Thesis Option

This option is recommended for all master's students except those with special interests in research. The coursework associated with this option provides an excellent background both for students seeking industrial employment after graduation as well as those who anticipate entering a doctoral program. Students may consider further specializing by taking a group of classes from the Human Factors and Ergonomics concentration. However, this is not a requirement. The program requirements are below.

5.1.1 M.S. Non-thesis Program Requirements

All students pursuing the M.S. degree via the non-thesis option must satisfy these general requirements:

- 1) All M.S. non-thesis students must complete the following courses:
 - IE 8000 Human Factors Engineering
 - IE 8030 Engineering Optimization and Applications
 - IE 8090 Modeling Systems Under Risk *or* IE 8080 HF Research Design & Analysis
- 2) At least 30 semester credit hours of coursework in total must be taken.
- 3) At least 18 semester credit hours of coursework must be in IE.
- 4) At least 50% of the total graduate credit hours shown on the GS2 must be selected from 8000-level courses.
- 5) Courses taken outside of IE can be selected as follows:
 - All graduate-level courses in the College of Engineering, Computing and Applied Sciences
 - Graduate-level courses in Mathematics, Statistics, Accounting, Finance, Economics, Management, Psychology.
 - All other classes would need to be approved on a case-by-case basis.
 - No research or independent study credits from other departments are accepted.

Important Notes:

- Credit hours will not be given to both IE 8090 Modeling Systems Under Risk and IE 8080 HF Research Design & Analysis
- A graduate-level IE course (excluding IE 8900 credits) must be a minimum three-credit course.
- Research credits (IE 8910) or seminar courses will not count towards the non-thesis requirement.
- Students can enroll in a maximum of six credits of IE 6000 or IE 8900. These credits will count towards the non-thesis requirement.
- Master of Science (MS) students cannot enroll in Master of Engineering (MENG) courses (IE 8500-8590).

- Master of Science (MS) students cannot receive credit for IE 6880. This course is reserved for non-IE majors.

5.1.1.1 *Optional IE Concentrations:*

Students may elect to be in the Human Factors and Ergonomics (HFE) concentration. The following guidelines are provided as guidance for students with interest in this concentration.

5.1.1.1.1 *Human Factors & Ergonomics*

Students who select the Human Factors & Ergonomics (HFE) concentration must complete the following:

Human Factors & Ergonomics (HFE)	
1. Core 13 credits (required)	<ul style="list-style-type: none"> • IE 8000 Human Factors Engineering • IE 8060 Occupational Biomechanics and Physical Ergonomics • IE 8080 HF Research Design & Analysis • IE 8030 Engineering Optimization and Applications
2. At least one course (depth) 3 credits (required), select one of the following	<ul style="list-style-type: none"> • IE 8020 Design and Analysis of Human-Computer Systems • IE 8150 Research Methods in Ergonomics

The remaining courses to demonstrate breadth (14 credits; at least 1 from IE) should be determined by the student. However, below is a list of courses related to the HFE concentration.

- IE 6300 Human Factors Engineering in Healthcare
- IE 6510 Investigating Human Error in Complex Systems
- IE 6890 Industrial Ergonomics and Automation
- IE 8010 Design and Analysis of Human-Machine Systems
- IE 6910 HF in Device Design/ Analysis
- IE 6910 Cognitive Systems and Resilience Engineering
- IE 8020 Design and Analysis of Human-Computer Systems
- IE 8110 Human Factors in Quality Control
- IE 8120 Work Science and Design
- IE 8160 Research Methods in Collaboration
- PSYC 8100 Research Design & Quantitative Methods I
- PSYC 8110 Research Design & Quantitative Methods II
- PSYC 8130 Research Design & Quantitative Methods III
- PSYC 8220 Human Perception & Performance
- PSYC 8350 Human Factors in Psychology
- PSYC 8620 Organizational Psychology
- PSY 8730 Structural Equation Modeling
- CPSC 6140 Introduction to Human Computer Interaction
- CPSC 6110 Virtual Reality Systems
- HCC 8310 Fundamentals of Human-Centered Computing
- HCC 8330 Research Methods for Human-Centered Computing

- HCC 8810 Measurement & Evaluation of HCC Systems

Note

- 1) Occasionally, the Department offers new courses listed as IE 6910 or IE 8930. These courses, may count towards the HFE concentration. Please contact the Graduate Coordinator for more information.

5.1.2 Becoming a non-thesis student

When a student selects the non-thesis option, he or she should construct a plan of study. Students may complete their degree in as few as three academic semesters (or one calendar year if courses are taken during the summer), but many students opt to spread their coursework across four academic semesters. Please refer to the Graduate School's documentation for a complete discussion about the submission of the GS2 or GS2-14 Plan of Study forms.

5.2 Thesis Option

The thesis option requires successful completion of a thesis in addition to the credit requirements described below. If you wish to pursue this option, you must first find a faculty member who has research interests consistent with yours and who will agree to be your major advisor.

5.2.1 M.S. Thesis Program Requirements

Students pursuing the M.S. degree via the thesis option must satisfy the requirements listed below.

- 1) All M.S. thesis students must complete the following courses:
 - IE 8000 Human Factors Engineering
 - IE 8030 Engineering Optimization and Applications
 - IE 8090 Modeling Systems Under Risk or IE 8080 HF Research Design & Analysis
- 2) At least 6 semester credit hours of thesis research (IE 8910) must be taken.
- 3) At least 24 semester credit hours of coursework (exclusive of any thesis research) must be taken.
- 4) At least 15 semester credit hours of coursework (exclusive of any thesis research) must be in IE.
- 5) At least one-half of the total graduate credit hours shown on the GS2 (exclusive of any thesis research) must be selected from 8000-level courses.
- 6) The student and major advisor shall select specific courses that support the thesis research.
- 7) M.S. thesis students may elect to be in the Human Factors and Ergonomics (HFE) concentration (see concentration requirements in section above). If a concentration is selected, then at least 6 semester credit hours of thesis research (IE 8910) must be taken as part of the remaining breadth credit hours.

Important Notes:

- Students must have an approved program advisory committee on file to enroll in thesis research hours (IE 8910).
- Thesis students cannot count IE 8900 credits towards their degree.
- Master of Science (MS) students cannot enroll in Master of Engineering (MENG) courses (IE 8500-8590).

5.2.2 Becoming a thesis student

You and your major advisor select the remaining members of the advisory committee and develop a plan of study. Besides the core subjects, the remaining hours are selected to support the research as

well as to augment your background. In addition, thesis research represents an original contribution to the selected field of study; hence, the program of study will also include at least 6 semester credit hours of thesis research.

Once you have decided to pursue the thesis option, identified a major advisor and advisory committee, and defined the plan of study, you must complete Form GS2. An approved GS2 formalizes the requirements for the degree. Please refer to Graduate School documentation for a complete discussion about the submission of the GS2 or GS2-14 Plan of Study forms.

After a thesis topic is selected, you must schedule a thesis proposal presentation to your advisory committee. You must provide the committee with a thesis proposal document at least 10 calendar days prior to the presentation. GS-Research Approval form should be submitted to the graduate school once the thesis proposal is approved by the advisory committee.

Prior to graduation, you must schedule your thesis defense. You must provide the committee with a final thesis document at least 10 calendar days prior to the presentation. Upon successfully defending your thesis, your advisor must complete form GS7-M and file it with the Graduate School.

In addition to notifying the Graduate School, the candidate should also reach out to the Graduate Student Services Coordinator for a template to announce the defense within the department. The candidate should populate the template with appropriate information and provide it back to the Graduate Student Services Coordinator to announce the defense to the department.

5.3 Internship Track

The Internship Track is recommended for all master’s students interested in obtaining practical world experience in industry during either a fall or spring semester during graduate studies. This track can be pursued in conjunction with either the Non-Thesis or Thesis Option and/or the HFE concentration. Students seeking summer internship opportunities are not required to choose this degree option. The coursework associated with this option provides an excellent background both for students seeking industrial employment after graduation as well as those who anticipate entering a doctoral program. If a student chooses to enroll in Curricular Practical Training (CPT) in either a fall and/or spring semester, this option must be chosen, and the student must register for INT 8010 or COOP 6010 (the selection of which course is appropriate depends on the length and scope of the CPT) for zero credits during the corresponding fall/spring semester. Students in a full time CPT position (>20 hours week) are eligible to take up to 1 additional course concurrent with their CPT opportunity in Fall and Spring semesters. In the summer, students may take up to 2 courses over the course of summer regardless of weekly CPT working hours. When enrolling in the internship track, please let the graduate program coordinator know when asking them to fill out the IS 130 form. For students that will pursue internships during the summer, no course registration is required. Below is a table with some sample plans for students selecting the internship track.

Option	First Fall Semester	First Spring Semester	Summer	Second Fall Semester	Second Spring Semester
1	3 courses	3 courses	CPT + 1 online course	CPT + INT 8010	3 courses
2	3 courses	3 courses	CPT	CPT + INT 8010	4 courses

3	3 courses	3 courses	CPT	3 courses	CPT + 1 traditional or hybrid course
4	3 courses	3 courses	CPT + 2 courses	CPT + 1 course	CPT + 1 traditional or hybrid course

5.3.1 *Becoming an internship student*

Typically, students decide in their 3rd or 4th academic semester (fall or spring) to pursue this degree option. Further, students opting for this degree option must be in good academic standing and not on probation (i.e., hold a cumulative GPA ≥ 3.0). Approved registration in INT 8010 will confirm selection of the internship option. Students not pursuing this option will not be permitted to register for INT 8010. The student's plan of study should also be updated accordingly. Please refer to the Graduate School's documentation for a complete discussion about the submission of the GS2 or GS2-14 Plan of Study forms.

5.4 **Enrollment in IE 8900 and IE 6000**

Students may be invited to join the research team of a faculty member and conduct a limited scope research project that counts as a maximum of three credit hours in any semester. Invitations to participate are extended by individual faculty to students whom they judge to be qualified. Each student is limited to a maximum of six credits of IE 8900.

Undergraduate students who are pursuing the BS/MS option and are members of the Honors College can take up to six credits of IE 6000. IE 6000 is intended to serve as the equivalent experience of an honors thesis for these students. Since it falls short of the traditional M.S. thesis, these credits will instead count towards the non-thesis requirement only.

5.5 **Students Enrolled in the BS/MS Option**

Students in the BS/MS option may count up to 12 credits of graduate IE courses towards both their BS and MS degrees. Since the 6000-level of a required 4000-level class is not eligible, students frequently capitalize on this opportunity by taking the 6000-level of an IE technical elective while an undergraduate because that same course will count towards the BS degree and towards their MS degree in IE at Clemson. There are three important requirements associated with this program:

- 1) To be eligible, the student must have completed the bachelor's curriculum through the junior year (minimum 90 credits) and have a minimum overall grade-point ratio of 3.4.
- 2) All other requirements presented in Section 5.1.1 still hold.
- 3) The combined bachelor's/master's degree (documented on [GS6-Bachelor-to-Graduate](#)) must have a minimum combined total of 150 credit hours. This total may contain a maximum of 6 credit hours of thesis research and all credit hours to be included from courses taken after receiving the baccalaureate degree must be in 6000 or higher-level courses.

Students in the BS/MS option immediately become Master's students upon completion of their BSIE degree.

5.6 **Changing Degree Program to the PhD Program**

If at any time during their master's study a student wishes to pursue a PhD degree in the IE department, the following procedure must be followed:

- 1) The student must submit a complete application package at <https://www.clemson.edu/graduate/admissions/index.html> (see section 2.1 for additional details).
- 2) The Graduate Committee may vote to waive the application fee for the student.
- 3) Graduate Committee will vote (yes or no) on admitting the student to the PhD program, effective the next long semester after the semester in which the application is submitted.

- 4) The Graduate Coordinator will notify the student of the application decision and if successful, will complete the GS14 form to convert the student from MS to PhD classification at the beginning of the next semester.
- 5) If the student starts in the PhD program in a Spring semester, they may select to take the Qualifying exam at the end of the same semester in May although they do not have to do so.

5.7 Procedures and Deadlines

There are some deadlines internal to the IE Department, as well as University and Graduate School deadlines. University and Graduate School deadlines can be found at:

<http://www.clemson.edu/graduate/students/deadlines.html>.

Students must make sure they are aware of and follow Graduate School deadlines, as failure to do so can delay graduation.

In addition, guidance on the formatting and submission process of theses and dissertations can be found at:

<http://www.clemson.edu/graduate/students/theses-and-dissertations/index.html>.

6 THE MASTER OF ENGINEERING DEGREE

The Master of Engineering (MEng Online) degree is a terminal master’s degree developed exclusively for working professionals seeking advanced education while remaining a full-time employee. The MEng is a coursework-only degree delivered exclusively online. The program consists of 10 courses that the students take in lockstep fashion over a 30-month period: one course at a time, three courses per year. New cohorts begin in May of each year and no other entry is allowed.

6.1 MEng Online Courses

The program consists of 10 classes:

IE 8500	Foundations of Supply Chain and Logistics
IE 8510	Descriptive Analytics
IE 8520	Prescriptive Analytics
IE 8530	Foundations of Quality
IE 8540	Supply Chain and Logistics Modeling I
IE 8550	Supply Chain and Logistics Modeling II
MGT 8560	Business Fundamentals for Supply Chain Management
IE 8570	Health, Safety and the Environment
IE 8580	Case Studies in Supply Chain and Logistics
IE 8590	Capstone Design Project

Students in the MEng Online program cannot enroll in courses associated with the M.S./Ph.D. program.

6.2 Process and Procedures

6.2.1 Schedule of courses

Classes will be offered in the following sequence with “May” representing the semester between May through August, “August” representing the semester between August through December and “January” representing the semester between January through May.

Year	Semester starting month	course
Year 1	May	IE 8500

	August	IE 8510
Year 2	January	IE 8520
	May	IE 8570
	August	IE 8530
Year 3	January	IE 8540
	May	MGT/ IE 8560
	August	IE 8550
Year 4	January	IE 8580
	May	IE 8590

6.2.2 *Appeals process*

Appeals for waivers to any of these policies and procedures are made to the MEng Program Coordinator. Students should outline the nature of their appeal and the desired outcome in writing and submit the document to the MEng Program Coordinator. A meeting of the MEng Committee will be held, and the decision will be communicated to the student in writing.

6.3 **Applying to the MEng Online Program**

Directions on how to apply can be found at

https://www.clemson.edu/cecas/departments/ie/academics/meng/cost_admissions.html

6.3.1 *Admission requirements*

Minimum requirements to be considered for admission to the MEng Online program are:

1. An undergraduate degree from a 4-year university.
2. Three years creditable experience after the undergraduate degree has been obtained.
3. Letter of recommendation from a supervisor indicating you are person who is highly motivated, organized and is a top candidate for this program.
4. Either calculus courses taught for engineering or a business calculus course plus a statistics course. Topics that should be covered in these classes can be found on the Master of Engineering website.

6.3.2 *Transfer credits*

The MEng has some unique features and is also a degree that is taught in lockstep fashion, so each course utilized information taught in all previous courses. As such, students are not permitted to transfer courses from other Universities.