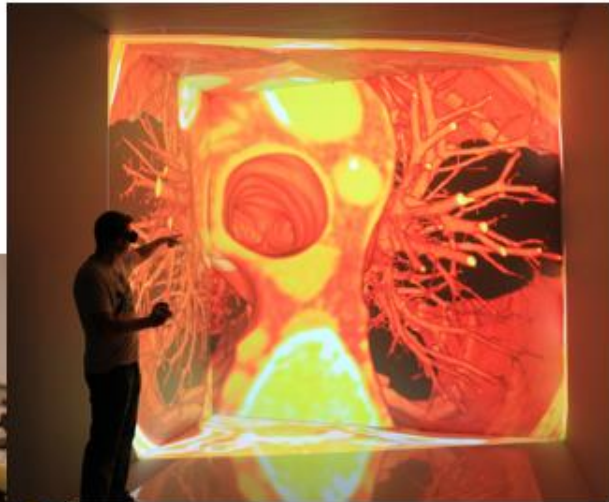


IOWA STATE UNIVERSITY

Department of Mechanical Engineering

Knowledge. Innovation. Leadership.

**Mechanical Engineering
Graduate Student Handbook**



2020-2021

**Department of Mechanical Engineering
Iowa State University**

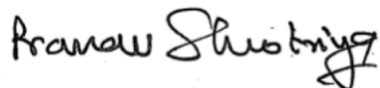
Last updated: June 15, 2020

Welcome to the Mechanical Engineering Graduate Program at Iowa State University. We are excited to have you join our vibrant program and are eager to help your graduate educational experience be an enjoyable and rewarding one.

This student handbook is provided to give you general guidance about practices, policies and procedures related to your graduate career in our department and University. It is in accordance with the Graduate College Handbook which provides more detailed information on policies and can be found online at <http://www.grad-college.iastate.edu/common/handbook/>.

Since our Graduate Program continually seeks to improve, some changes may occur between annual printings of this handbook. Consequently, you should stay in close communication with your major professor at all times to verify important curricular and policy issues. We also encourage you to bring questions, comments and concerns to the Graduate Programs Office at any time. We look forward to helping you during your tenure here.

Best wishes,



Pranav Shrotriya
Associate Chair for Graduate Studies
Director of Graduate Education
515-294-9719
shrotriy@iastate.edu

Mechanical Engineering Graduate Programs Office
2019 Black Engineering
<http://www.me.iastate.edu/graduate-program/>

Program Assistant II
Samantha Hirschman
515-294-0838
srhircs@iastate.edu

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CHAPTER 1 - STARTING OUT

1.1 Arrival and Check-in

Students should check in with the ME Graduate Programs Office by email once arriving in Ames. All international students should check in with the International Students and Scholars Office.

New students or returning students who have not previously worked for the university will need to complete all Onboarding tasks through Workday. They will need to complete their I-9 within three days of their hire date. It can be done ahead of time, but will have their position terminated if they do not complete their I-9 verification by the end of their 3rd day of work. The I-9 verification can be completed by going to the Human Resources Office, 3810 Beardshear Hall. For international students, this will be completed at the International Students and Scholars Office (ISSO).

Your first paycheck for your assistantship or fellowship can be between two weeks to a month after you arrive due to procedural delays. Please plan for finances accordingly. You are able to set up your net-ID and email account through the Acropolis page (<http://asw.iastate.edu>).

1.2 Orientations

New graduate students must attend several orientations during the week prior to start of classes. For new graduate students, the academic year begins with a mandatory ME Graduate Student Orientation event (usually the Friday before classes start) designed to introduce you to the M E department and its procedures as well as ease the transition to graduate study at Iowa State. This is a time to become acquainted with the Mechanical Engineering Graduate Program and its members, and to prepare for registration and the start of classes. Fall 2020 departmental orientation will take place online.

In addition to participating in the ME orientation events, students also will take part in the following orientation activities:

- TAs will attend the TA orientation seminars conducted by the [Center for Excellence in Teaching and Learning](#)
- International students should check with International Students and Scholars Office (ISSO) for additional orientations (<http://www.issso.iastate.edu>)

1.3 Safety Training

All M.S. and Ph.D. students **must complete** Basic Safety training presented by the [Environmental Health & Safety \(EH&S\)](#) during the week prior to start of classes. This is a mandatory training required under state and federal law for all new employees and for any employees who have not received prior ISU training. Students will be added to their major professor's Safety Training canvas course. The canvas course will outline the required safety assignments, based on the hazards identified by their major professor. Topics may include: OSHA Laboratory, Standard procedures, Material Safety Data Sheets, Prior Approval Procedures, Laboratory Hazards, Personal Protection, Housekeeping, Containers and Labeling, Hazardous Waste Disposal and Electrical Safety, and other necessary training to meet your research lab's specific needs.

1.4 FERPA Training

It is an Iowa State requirement that employees are required to complete the online [FERPA training](#) and confidentiality agreement in order to access ISU student academic information systems and before handling student records and information. All TAs must complete the training prior to beginning their appointment.

1.5 English Requirement

Students whose native language is not English MUST take a special examination called the English Placement Test (EPT) to assess suitability for classroom education at ISU. This test is held the week before classes start. Further information can be found at <http://engl.iastate.edu/ept/index.html>. Students not passing this exam are placed in one or more of the courses in English 101 during the pre-registration process at orientation. These courses may be taken on a pass-not pass basis.

In addition, international students having Teaching Assistantship (TA) appointments must also take the Oral English Certification Test (OECT) (<https://cce.grad-college.iastate.edu/speaking/oect-for-itas>). Successful certification is required to assume TA duties so we ask that all international students complete the OECT within the first year.

1.6 Transportation

All bicycles must be registered with the university's parking division. Bikes must be parked in the provided bicycle racks. Bicycle racks are located throughout campus. Bikes are not permitted inside any university buildings. Registration (free for bicycles) can also take place online at <http://www.parking.iastate.edu/permit/bike/>.

CyRide is the Ames bus system. Students can ride all CyRide routes free of charge upon presentation of a current ISU card. During the school year, buses leave from most locations every 10-20 minutes. Schedules are widely available throughout the campus. Further Cy-Ride information can be found at <http://www.cyride.com>.

Student parking permits can be purchased through the Parking Division. You can learn more information about your permit options at <http://www.parking.iastate.edu/permit>. A copy of the ISU Traffic and Parking Regulations can be obtained from Public Safety, Parking Division, 27 Armory (also available online at <http://www.parking.iastate.edu/about/>).

CHAPTER 2 – DEGREE PROGRAMS AND CURRICULUM REQUIREMENTS

Each program consists of its own degree requirements. For a complete list of approved courses for each of the degree programs, please consult the appendices for the corresponding program.

2.1 Curriculum Requirements

2.1.1 Masters of Engineering in Mechanical Engineering

A course-work only master's degree that is well suited for working professionals and individuals seeking additional education beyond a bachelor's degree to become an outstanding engineer. Includes the following requirements:

Degree Requirement	Credits	Description
Mechanical Engineering Core	15	Any 500 or above level ME course as well as specific non-ME courses approved by the graduate committee. These courses are grouped according to disciplinary area emphasis to help student decide which courses to take based on interest. Please see approved courses (Appendix A)
Mathematics/Statistics	3	Any 300-level or higher Math or Statistics class (EXCEPT Math 307 and Math 317) will count towards this requirement. Non-Math/Stat courses with strong math or statistics content that are approved by the graduate education committee may also count towards this requirement. (Appendix B)
Professional Development	3	See list for approved courses. (Appendix C)
Electives	9	Choose any courses that you feel would round out your education; these can be from Mechanical Engineering or outside the major.
Total:	30	

2.1.2 Master of Science (Thesis) in Mechanical Engineering

Emphasizes graduate research and culminates in the creation of a thesis and associated oral defense. Includes the following requirements (indicates available online):

Degree Requirement	Credits	Description
Mechanical Engineering Core	9	Any 500 or above level ME course as well as specific non-ME courses approved by the graduate committee. These courses are grouped according to disciplinary area emphasis to help student decide which courses to take based on interest. Please see approved courses (Appendix A)
Mathematics/Statistics	3	Any 300-level or higher Math or Statistics class (EXCEPT Math 307 and Math 317) will count towards this requirement. Non-Math/Stat courses with strong math or statistics content that are approved by the graduate education committee may also count towards this requirement. (Appendix B)
GR ST 565: Responsible Conduct of Research in Science and Engineering	1	Required Course
M E 600: Seminar Series	Required	M E 600 is required every semester
Electives	6	Choose any courses that you feel would round out your education; these can be from Mechanical Engineering or outside the major. Up to 6 credits of Independent Study (M E 590/690) may be included in the Program of Study. These 6 credits will by default count towards the elective requirements. As part of meeting their electives, students are encouraged to take at least one course that addresses skill sets aimed at professional development (e.g. teaching/research program building, project management, globalization, engineering law, communication etc.) for academia and/or industrial positions.
M E 699: Research	11	Required Course
Total:	30	

2.1.3 PhD Degree in Mechanical Engineering

The degree culminates with the successful defense of a dissertation. A minimum of 72 graduate credits must be earned for the Ph.D. degree with the following requirements (*indicates available online):

Degree Requirement	Credits	Description
Mechanical Engineering Core	18	Any 500 or above level ME course as well as specific non-ME courses approved by the graduate committee. These courses are grouped according to the emphasis of the disciplinary area, to help student decide which courses to take based on interest. Please see the approved courses
Mathematics/Statistics	6	Any 300-level or higher Math or Statistics class (EXCEPT Math 307 and Math 317) will count towards this requirement. Non-Math/Stat courses with strong math or statistics content that are approved by the graduate education committee may also count towards this requirement.
Communication	3	See the approved courses.
GR ST 565: Responsible Conduct of Research in Science and Engineering	1	Required Course
M E 600: Seminar Series	Required	M E 600 is required every semester until the semester after you successfully complete your preliminary exam.
M E 699: Research Credits + Elective courses determined by POSc	44	
Total:	72	

2.1.4 Advanced Manufacturing Graduate Certificate

Graduate certificate in advanced manufacturing seeks to provide students who have strong science, technology, mathematics and/or engineering backgrounds with additional graduate education in advanced manufacturing in order to address this important local and national need.

The students will be required to take four courses with emphasis on advanced manufacturing and design innovation concepts. All the courses will be offered through engineering online education to accommodate off-campus students.

Degree Requirement	Credits	Description
Courses	12	<p>Four courses, or 12 credits, from this list:</p> <p>Advanced Manufacturing courses</p> <ul style="list-style-type: none"> • ME 520 Material and Manufacturing Considerations in Design • ME 521 Mechanical Behavior and Manufacturing of Polymers and Composites • ME 527 Mechanics of Machining and Finishing Processes • ME 528 Micro/Nano Manufacturing <ul style="list-style-type: none"> • IE 545 Rapid prototyping and manufacturing • IE 546 Geometric variability in manufacturing • IE 549 Computer aided Design and Manufacturing • IE 543x Wind Energy Manufacturing • IE 642 Simultaneous Engineering in Manufacturing Systems <p>Design Innovation courses</p> <ul style="list-style-type: none"> • ME 523X Creativity and Imagination for Engineering and Design • ME 517 Advanced Machine Design • ME 525 Optimization methods for Complex design • ME 557 Computer Graphics and Geometric Modeling • ME 564 Fracture and Fatigue of Materials • ME 625 Surface Modeling

2.2 Learning Outcomes

2.2.1 Master of Engineering

Graduates with a Master of Engineering in Mechanical Engineering will be able to

1. Demonstrate a broad knowledge in the field of Mechanical Engineering.
2. Develop and demonstrate through their coursework a deep understanding and expertise in one or more areas of Mechanical Engineering specialization.
3. Discuss and apply an understanding of the current literature in mechanical engineering and related disciplines.
4. Develop the ability to communicate technical material to broad range of audiences through oral and written presentations.
5. Understand and be able to identify their post-graduation career options: industrial or entrepreneurial.
6. Demonstrate a commitment to the thoughtful consideration of fundamental principles of ethical professional conduct.

2.2.2 Master of Science

Graduates with a MS in Mechanical Engineering will be able to

1. Demonstrate a broad knowledge in the field of Mechanical Engineering.
2. Demonstrate a deep understanding and expertise in one area of Mechanical Engineering specialization.
3. Develop and demonstrate through their research projects a strong theoretical and/or experimental and/or computational background.
4. Discuss and apply an understanding of the current literature in mechanical engineering and related disciplines.
5. Conduct independent research project that addresses problem in the area of mechanical engineering.
6. Organize results into a coherent thesis and may produce scholarship (articles and/or books and/or conference paper) that appear in peer-reviewed venues.
7. Develop the ability to communicate technical material to broad range of audiences.
8. Present and defend their research findings effectively through oral and written presentations and through the development of supporting materials.
9. Understand and be able to identify their post-graduation career options: industrial, entrepreneurial, and academic.
10. Demonstrate a commitment to the thoughtful consideration of fundamental principles of ethical professional conduct.

2.2.3 Doctor of Philosophy

Graduates with a PhD in Mechanical Engineering will be able to

1. Demonstrate a broad knowledge in the field of Mechanical Engineering.
2. Demonstrate a deep understanding and expertise in one or more focus areas of Mechanical Engineering.
3. Develop and demonstrate a strong theoretical and/or experimental and/or computational background through their research projects.
4. Discuss and apply an understanding of the current literature in mechanical engineering and related disciplines.
5. Identify fundamental research problems and propose innovative solutions to these problems.

6. Plan and execute an original research project, analyze the relevant findings, and organize their results into a coherent argument.
7. Organize research findings into a coherent thesis and will produce scholarship (articles and/or books and/or conference paper) that appear in peer-reviewed venues.
8. Present and defend their research findings effectively through oral and written presentations and through the development of supporting materials.
9. Effectively communicate in written, verbal, and nonverbal methods to a broad range of audiences, including the ability to describe complex and technical materials or concepts.
10. Demonstrate an understanding of current societal issues, particularly related to the mechanical engineering field.
11. Demonstrate a commitment to the thoughtful consideration of fundamental principles of ethical professional conduct.
12. Understand and be able to identify their post-graduation career options: industrial, entrepreneurial, and academic.

2.2 Graduate Minor in other disciplines

Students pursuing a mechanical engineering graduate degree may also pursue a minor in any discipline that has approved to grant a graduate degree. Pursuing a minor may be advantageous for students working on interdisciplinary projects with a particular emphasis on another specific discipline. A student may not minor and major in the same field. In all cases:

- the student must receive approval from and meet the minimum requirements established by the program offering the minor,
- a graduate minor must be comprised of graduate or undergraduate courses designated as appropriate by the program offering the minor,
- the student must have a minor representative on the POS committee,
- on that committee, the major professor and the representative from the minor field may not be the same person, and
- a minor must be approved by the POS committee, declared on the POS, and listed on all examination reports and the “Application for Graduation” form in order to be eligible to appear on a student’s transcript after graduation.
- a minor cannot be added to a degree that has already been received.
- For a master’s degree: A graduate faculty member from the minor program must serve on the POS committee and the final oral examination must test for the minor.
- For a Ph.D.: A graduate faculty member from the minor program must serve on the POS committee; the preliminary oral and final oral examinations must test for the minor. A minor cannot be added to a program of study after the preliminary oral examination is taken.

2.3 Graduate Minor in Mechanical Engineering

Students pursuing graduate degree in other discipline may pursue a minor in mechanical engineering. On completion of the following requirements, their degree certificate will state the minor in mechanical engineering.

General requirements: To obtain a graduate minor in mechanical engineering, students must

- Have a ME faculty as the minor representative on the POS committee
- Student pursuing a masters’ degree should complete three courses for ME core course list with at least one course from ME Department
- Students pursuing a PhD degree should complete four graduate-level ME courses.
 - For Ph.D. students, all minor requirements must be completed before taking the preliminary examination.

2.4 Special Graduate Majors and Degree Programs

Opportunities also exist for majoring in more than one area of study (co-major, concurrent major or double degree). Please consult with the Graduate College Handbook for detailed requirements. It is an expectation that students will discuss such options in consultations with their major professor.

2.4.1 Co-Major

A co-major is a program of study for a single degree in which the requirements for two separate majors are met. A single degree is granted when the student fulfills the requirements of both majors. The program of study (POS) committee will include co-major professors, each of whom represents one of the co-majors. Both co-chairs must be members of the graduate faculty. The same person, if a faculty member in both majors, will be allowed to serve as major professor for both majors. A preliminary oral examination and research work for the Ph.D. degree should be related to both majors. Students declaring co-majors must satisfy requirements established by each major as monitored by the representatives on the program of study (POS) committee and the DOGEs of the two majors. If approved by the committee, a course that meet the requirements of each major can count for both. A co-major cannot be added after the preliminary oral examination has been taken.

2.4.2 Concurrent

The details for all of these concurrent programs are located in “Chapter 4” of the [Graduate College Handbook](#). There is one form located at the Graduate College website on the forms page that will be used for the admissions and concurrent enrollment process.

2.4.2.1 Graduate in Concurrent Undergraduate

Graduate students interested in enrolling in a concurrent undergraduate program should contact the Office of Admissions (100 Enrollment Services Center) to obtain admission information (even if previously admitted as an undergraduate). An “Application for a Graduate Student Wishing to Pursue a Concurrent Undergraduate Degree” form is on the Graduate College website.

Students in concurrent degree programs may, subject to Program of Study committee approval, double count up to 6 ISU credits for both a bachelor’s degree and master’s degree.

The requirements are below:

- The student must be formally admitted both as a graduate student and as an undergraduate student.
- Official enrollment and fee payment will be as a graduate student.
- Credits transferred from the graduate permanent record to the undergraduate permanent record are no longer available for use on a graduate program of study.
- Complete the undergraduate application process. Applications are available at <http://www.admissions.iastate.edu>.

2.4.2.2 Undergraduate in Concurrent Graduate Programs

The minimum requirements for admission to the concurrent program are generally the same as those required for full admission to the Graduate College. (Also, since these students have not received their undergraduate degrees, they must be making good progress toward a

bachelor's degree.) Mechanical Engineering offers the BS-MS concurrent degree track as well as the BS-MBA in partnership with the College of Business.

Program requirements

- Up to two semesters of concurrent enrollment are allowed.
- Students must take at least 3 credits of graduate course work each semester during concurrent enrollment.
- Students can count up to 6 credits for both the bachelor's and master's degrees.
- Concurrently enrolled students who are classified as graduate students pay graduate tuition and fees and are eligible for graduate assistantships. The students have the flexibility to decide when to be classified as graduate students. Please discuss with the graduate program office.

Admission requirements

- You must have a minimum cumulative GPA of 3.0.
- Students must be within 18 credits of completing the requirements.
- An ME professor must agree to serve as your major professor.

Application procedure

To obtain the new form, undergraduate/graduate concurrent applicants need to complete the form for "Concurrent Enrollment for Undergraduate/Graduate Degrees" on the Graduate College website.

The process works as follows:

1. A student will contact the graduate department of choice and provide that program with the items needed for an admissions decision, along with the partially completed concurrent form.
2. The faculty member who will serve as the major professor should send an email to the ME Graduate Programs staff.
3. The program will make an admissions recommendation and the DOGE will sign the form, indicating the admissions status and term/year of admission.
4. The form will then be provided to the Undergraduate Department Chair for review and after, to the Undergraduate College Dean.
5. The student will receive an email from the Graduate Programs staff when the form is ready for pick up.
6. The form must be delivered to the Graduate College, which will review the admissions recommendation and make an admissions decision.
7. The Office of Admissions will communicate the official decision on the application to the applicant and programs. The Office of Admissions will notify the Office of the Registrar of the new graduate concurrent status.
8. All other requirements for the concurrent degree (double-counting courses, transfer of credits, etc.) remain the same.

Additional information:

- The graduate degree or graduate certificate will be awarded only at the same time as, or after, the undergraduate degree is conferred.
- A student in a bachelor's and master's concurrent degree program cannot be pursuing a Ph.D. degree until the bachelor's degree is awarded.

2.4.3 Double Degree

A double degree requires fulfillment of the requirements for two graduate majors for which two differently named master's degrees and two diplomas are granted at the same time. For double degrees, the final project (thesis or creative component) must integrate subject areas from both departments. Students should reference the Graduate College handbook for proper procedure.

2.5 Online Learning Students

All the policies and procedures for the graduate program apply to students in the online learning program. The Engineering/LAS Online Learning staff and our Grad Programs Staff will be happy to assist you in preparing and routing forms for signatures.

2.6 Forms and Deadlines

It is your responsibility to fill out your forms and get signatures from your major professor first and then from your POS committee members (when necessary). Attach any required additional materials and submit the form to the ME Grad Programs Office Staff. Electronic documents are encouraged. Do not submit forms directly to the DOGE. The staff will verify all information and obtain the DOGE's signature. If information on the form needs to be clarified or changed, you will be contacted. The graduate programs staff will inform you when the form is ready to be picked up from the office.

Deadlines for degree requirements can be found on the Graduate College calendar: www.grad-college.iastate.edu/calendar. Please allow two days for processing and submit accordingly. Please treat the deadlines seriously. Failure to comply can and will result in delays to graduation, degree progress, and registration holds.

2.7 Failure to Maintain Academic Standing

Graduate students are expected to maintain a cumulative 3.00 grade point average on all coursework taken, exclusive of research credit. The Mechanical Engineering graduate program's policy for maintaining good academic standing is outlined below. The policies are in line with the Graduate College's policy.

2.7.1 Probation

New, first term, degree-seeking graduate students who fall below a 3.00 GPA at the end of their first semester at Iowa State University will be given a one term grace period to bring their grades back to a 3.00 GPA. Students may receive a warning letter from the Graduate College. While on academic probation a student will not be admitted to candidacy for a degree and if appointed to a graduate assistantship, the student will not receive a Graduate College tuition scholarship.

To insure that registration does not take place without a review by faculty in the program, the Graduate College places a hold on future registrations by a student on probation. Before a student on probation registers for each term, there must be a review of his or her record and the DOGE must recommend whether the Graduate College should permit further registration.

Before graduation is approved by the Graduate College, the student must complete all courses listed on the program of study with a minimum grade of C and have achieved a 3.00 GPA or

greater. Exceptions must be recommended in writing by the student's POS committee and DOGE and approved by the Dean of the Graduate College. Probationary status for more than two years is grounds for dismissal for failure to maintain academic standing.

CHAPTER 3 – THE GRADUATE PROGRAM OF STUDY AND COMMITTEE

In working towards a graduate degree, ME students must fulfill the requirements of both the Graduate College and the Department. These include selecting an advisory committee, developing a Program of Study, passing Qualifying (PhD only), Preliminary (PhD only) and Final Oral (MS and PhD only) Examinations, as well as, meeting coursework and other general requirements. (Graduate College requirements are discussed in more detail in the Catalog and the Graduate College Student Handbook (<http://www.grad-college.iastate.edu/common/handbook/>)).

3.1 Major Professor

Every graduate student must select a major professor to work with. The role of the major professor is to act as a mentor to the student in all aspects of graduate study including research and guide the student's professional development. Major professor will nominate students pursuing research based degrees (MS and PhD) for research assistantship and teaching assistantships. The graduated student should discuss their funding with their major professor.

Most students who have accepted assistantship positions have already selected a major professor as explained in the admission letter. If you have been assigned a temporary major professor (usually the Director of Graduate Education), you are encouraged to meet with our department faculty during the first semester and select a major professor by the end of the first semester in the program. Selection should be based on matching of research interests, expectations and personalities. A list of faculty and their research expertise is available on the website. Masters of Engineering students are typically assigned the DOGE as their major professor to help guide their course selections – however they may choose a different major professor.

3.2 Committee Selection

Each graduate student, in collaboration with his or her major professor, shall identify the faculty members to serve on an advisory committee, also called the Program of Study (POS) Committee. This committee guides and evaluates the student during the period of graduate study.

Normally the student will ask individual faculty members to serve on the committee after consultation with the major professor. After the selected faculty members have agreed to serve on the committee, this information can be entered into AccessPlus as part of the POSC process. It is strongly encouraged that a student's POS **be submitted no later than the end of the first year** of the student's graduate work. It is highly recommended that **Ph.D. students determine their committee within 6 months** of starting graduate work as they must have their POS committee determined before their Qualifying Exam. A student's POS must receive final approval by the Graduate College no later than the term before the preliminary oral examination (doctoral candidates) or final oral examination (master's candidates) and no changes should be made. In order for the committee to be approved in any

given term, the form must be submitted to the Graduate College by the [published deadline](#) for that term.

3.2.1 Master's Committee Makeup

For Master of Science students, the committee must have at least three faculty members with at least two members from the department and at least one member from outside your area of focus (preferably outside ME). Such faculty members must be members of the graduate faculty. Master of Engineering students will only list their major professor in their committee. The major professor is defaulted to the DOGE.

3.2.2 Doctoral Committee Makeup

For a doctoral student, the committee must have at least five faculty members with at least three members from the department and at least one from outside your area of focus (preferably outside ME). The faculty members must be members of the graduate faculty. It is recommended to have two members from outside your research area of focus.

3.3 Committee for ME Minor

If a graduate minor has been declared, a graduate faculty member from the minor program or interdepartmental minor must serve on the POS committee. The major professor and the representative from the minor field may not be the same person.

3.4 Committee for Dual Majors or Co-Majors:

Co-chairs are required in the following instances:

- When a student has a co-major, each of the major fields must be represented by a different major professor, which will require the designation of co-major professors. However, the same person, if a faculty member in both majors, will be allowed to serve as major professor for both majors.
- When master's or Ph.D. work is administered through a program in which the largest share of course credits is taken, but the research is conducted or shared with another program or major and also supervised by a graduate faculty member in that program, both the master's or dissertation supervisor and a member of the graduate faculty from the program in which the degree will be granted can be designated as co-major professors.
- An approved committee for a double degree must include co-major professors from each of the programs. Only certain programs have been approved for double degrees

3.5 Changes to Committee

Recommendations for changes in the POS committee for a master's or Ph.D. degree must have the approval of the student, major professor, DOGE, and all committee members involved in the change before seeking approval of the Graduate College. These changes must be submitted through their POSC in Accessplus and approved by the Dean of the Graduate College **before the preliminary or final oral examination is held.**

3.6 Program of Study and Committee (POSC) form

After you and your major professor decide whom you would like part of the committee, the student and the major professor develop a Program of Study. This is a list of the courses the student proposes to take during the period of graduate study. Courses that appear on the POS, and which are used to meet degree requirements, may not be taken in the pass-not pass

system, and all courses used to meet degree requirements must appear in the Catalog. The POS is prepared after consultation with the major professor. It is required for Ph.D. students, and recommended for M.S. students, that the student meet with the POS Committee to discuss the POS and the student's proposed research.

This POSC is submitted to the Graduate College after all members of the POS Committee, the student, and the DOGE have approved it. As per the graduate council guidelines, POS may not include more than three undergraduate classes- either up to three courses at 400 level courses or one 300 level and up to two 400 level courses. **It is recommended that the Program of Study be completed by the end of a student's first year of their graduate studies.**

For more information and help with your POSC, see the [Graduate College FAQs](#).

CHAPTER 4 – COURSES, CREDITS, AND GRADING

4.1 Registration for classes

Registration for classes must be done as soon as possible. Consult with your major professor regarding the courses you want to take for your first semester. Information on course offerings can be found on the online Schedule of Classes (<http://classes.iastate.edu/>). Students then register using the Accessplus registration system which is available on the ISU homepage (www.iastate.edu). Incoming students are encouraged to register for classes before arriving on campus. As a new student, enter your social security number (no hyphens) and month and day of your birth (mm/dd). International students who do not yet have a social security number should use the number assigned in the admission packet from the Office of Admissions. A \$20 late fee is assessed to students who wait until the first day of classes to register. The late fee goes up each of the following two weeks to a maximum of \$100.

It is important to register for classes early in the registration period. Students who have accepted assistantship offers must be registered for classes for the appointment to be electronically processed by the University (for stipend and tuition scholarships). Space may be limited in classes and the sooner you register, the better chance you have at taking the classes you need.

Please note all on campus MS and PhD students MUST register for ME 600 during every semester. Domestic students with graduate assistantships must adhere to the graduate college guidelines for minimum course requirements. International students with graduate assistantships must check their visa requirements for minimum course requirements. If visa requirements are less than those of the graduate college, students must follow the graduate college guidelines.

4.2 M E 600 - Mechanical Engineering Seminar Series

A hallmark of leading institutions in science and engineering research is technical seminar participation. The department hosts a series of seminars throughout the academic year which includes invited speakers who are leaders in fields related to mechanical engineering. Attending seminars benefits scientific and engineering students by expanding their horizons, learning about research at other venues and at the forefronts of a field and also provides opportunities to learn about effective (and non-effective) presentation techniques.

4.2.1 Seminar requirements

Registered students must attend at least 4 technical on-campus seminars that are part of the Department of Mechanical Engineering Seminar Series (or co-sponsored by the Department of Mechanical Engineering). The graduate programs office will track this requirement. The course will be graded as satisfactory/unsatisfactory (fail). A fail will have adverse impact on your graduation. Failure to meet the requirement of seminar and learning community meetings will result in a failing grade.

This course will be a part of degree requirements for all graduate students as follows:

- a. **M.S. students:** Need to register every semester up to graduation. A student who is only registered for GR ST 680 is exempt from M E 600 for that semester.
- b. **Ph.D. students:** Need to register every semester until successful completion of preliminary examination. Ph.D. students are required to enroll in ME600 during the semester of their preliminary exam.
- c. **New M.S. & Ph.D. students:** Need to register their first term in the specified section for new students and must attend all Learning Community (MEGLC) meetings in addition to the regular attendance requirement. Read more about this learning community below.
- d. **Students in interdisciplinary programs (e.g. HCI and BRT):**
 - i. Students who are also obtaining a degree from ME (i.e. co-majoring in ME) will be required to complete the ME 600 seminar requirement in addition to the seminar requirements of their program with the following modification: These students need to attend at least 3 seminars that are part of the Mechanical Engineering Seminar Series (or co-sponsored by the Department of Mechanical Engineering).
 - ii. Students who only have ME as their home department (and are not obtaining an ME degree) do not have the ME 600 seminar requirement.
- e. **Concurrent BS/MS students** are required to enroll in ME600 once they enter graduate status.
- f. **Off-campus students** are required to enroll in ME600 online section but will have their attendance requirement excused.
- g. **Master of Engineering** are not required to enroll in ME600.

Peer presentation: Students are encouraged to present but are not required to do so during MEGSO-sponsored ME 600 seminars.

4.2.2 Course conflicts

Conflict with seminar time: Students who have a conflict with the seminar time or meeting the requirement for a particular semester must still register for the course AND inform the DOGE within the first two weeks of the semester. Conflicts will be addressed on a case by case basis.

4.2.3 Learning Community requirements

The Mechanical Engineering Graduate Learning Community (MEGLC) was established in the spring semester of 2012. The MEGLC is open to all first-semester graduate students enrolled in the Department of Mechanical Engineering and is organized by MEGSO in conjunction with the Mechanical Engineering Graduate Programs Office. The MEGLC aims to meet the following four objectives:

1. Help students transition to the expectations and responsibilities of the Department of Mechanical Engineering Graduate Education Program from other programs, schools, and cultures
2. Develop critical professional skills including communication, research, and teaching skills
3. Offer an environment for first-year graduate students to socialize and develop student-student and student-faculty relationships
4. Promote an environment that welcomes and nurtures diversity

Current structure of the MEGLC consists of weekly seminars during their first semester presented by senior-level graduate students, post-doctoral researchers, and guest speakers. Seminar topics include “Expectations of a Graduate Student,” “Designing a Program of Study,” “Individual Development Plan,” and “How to Communicate in the World of Academia.” These seminars will also help graduate students enhance professional skills through interactive involvement within seminars such as presentation of research. Additionally, the graduate students will have plenty of opportunity to advance networking skills through socializing with fellow graduate students and occasional faculty involvement. Attendance at the learning community seminars counts toward new students’ ME 600 grades and is tracked through the Graduate Programs Office. Students who have a conflict with the seminar time must provide the Graduate program proper documentation to verify the conflict. Conflicts will be addressed on a case by case basis.

4.3 ME 590/690 Independent Study

M E 590/690 will not have reference numbers listed in the Schedule of Classes. Students will see a message to ‘see department’. Students will obtain section and reference information after submitting an Independent Study Approval Form to the ME Graduate Programs office. Students should identify the specific course of ME590/690 based on the area of focus for the independent study. The form is on the ME Grad Programs website. Once the student has submitted their form, the student will receive an email from the Graduate Program office with the course section and reference number. ME 590/690 is for advanced independent studies and should be indicated by the problem supervisor. ME 590/690 cannot be counted toward the ME core requirements of a degree.

4.4 ME 599/699 Creative Component and Research

Creative component (M E 599) and research (M E 699) will not have reference numbers listed in the Schedule of Classes. Students will see a message to ‘see department’. Students can obtain section and reference information by sending an email to the Graduate Programs Office.

4.5 ME 697 Engineering Internship

Graduate students may go on internships or co-operative education jobs (also called Curricular Practical Training or CPT) during the summer of any other semester during their degree program. This is generally done after consulting with the major professor. Prior to going on internships or Co-ops, students MUST register for ME 697: Engineering Internship and submit the ME 697 Internship approval form to the Graduate Programs Office. The form is on the Mechanical Engineering Graduate Programs website. Once the student has submitted their form, the student will receive an email from the Graduate Program office with the course section and reference number.

4.5.1 Regulations

- You will need to complete an add/drop slip to register for M E 697 if it's after the first Friday of classes.
- While away from campus, please make arrangements for someone to pick up your mail at your campus mailbox. First class mail can be forwarded to you upon your request. Please notify the graduate programs staff if you would like first class mail forwarded.
- International students must meet with an International Students and Scholars (ISS) counselor regarding occupational or curricular practical training (OPT or CPT). If extending your internship, you must discuss ramifications with ISSO before completing the M E 697 form. The number of hours for your internship are determined by ISSO and your OPT/CPT.

4.5.2 Grades

After your internship, you are required to submit a 1 page summary of the work experience to the Grad Programs Office. Describe responsibilities and activities performed and provide a brief description of how the experience helped your professional development. You must include details on where you did the internship including names of supervisory personnel, what dates you were at the internship, a description of activities performed and a statement on how this experience benefited you.

4.6 Undergraduate Credits

Students who pursue a graduate degree in ME that have graduated with a Bachelor's at Iowa State University will be allowed to count up to six credits from their undergrad toward their graduate degree. The credits may be 300 or 400 level. The six credits will be counted toward the electives requirement. Restrictions for the number of undergraduate-level courses toward a graduate degree still apply.

4.7 Transfer Credits

At the discretion of the POS committee, and with the approval of the program and the Graduate College, graduate credits earned as a graduate student at another institution or through a distance education program offered by another institution may be transferred if the grade was B or better. Such courses must have been acceptable toward an advanced degree at that institution and must have been taught by individuals having graduate faculty status at that institution. If a student wishes to transfer credits from graduate courses taken at or through another university as an undergraduate student, it is that student's responsibility to provide verification by letter from that institution that those graduate courses were not used to satisfy undergraduate requirements for a degree. (Grades from courses taken at another institution will **not** be included in ISU grade calculations, nor will the grades display on an ISU transcript.)

Those who completed their bachelor's at Iowa State University may transfer up to nine credits from their bachelor's degree toward their master's or phd. These credits must be in addition to the undergraduate requirements.

A transcript must accompany the POS in order to transfer credits. The POS committee may ask for other materials, such as a course outline or accreditation of the institution, to evaluate the course. Transfer courses not completed when the POS is submitted must be completed before the term in which the student graduates. A transcript must then be submitted for review

and final approval. Transferred courses are added to academic record once POSC is approved.

Research credits earned at another institution are generally not transferred. In rare circumstances, the transfer of S or P marks may be accepted for research credits only. It is the responsibility of the POS committee to obtain a letter from the responsible faculty member at the other institution stating that research credits recommended for transfer with S or P marks are considered to be worthy of a B grade or better.

For all master's programs at Iowa State, at least 22 graduate credits must be earned at Iowa State. For all Ph.D. programs at Iowa State, at least 36 graduate credits must be earned at Iowa State.

4.7 Adding and Dropping Courses

After initial registration, adjustments to a student's schedule (e.g. course adds and drops, section changes and credit changes) can be made using AccessPlus until the end of the first week of classes. After the first week, all changes must be submitted on a Request for Schedule Change or Restriction Waiver form (better known as an Add/Drop Slip), which is available in the ME Grad Programs Office.

CHAPTER 5 – EXAMINATIONS

5.1 Ph.D. Qualifying Examinations

All Ph.D. students must pass a qualifying examination in order to pursue the Ph.D. degree. The purpose of the exam is to identify whether the student has technical foundation to pursue a Ph.D. and if possible, to identify weaknesses in the background that can be addressed. Students will have two attempts to pass the qualifying exam.

All Ph.D. students will demonstrate suitable **academic preparation** through obtaining an average GPA of 3.3 or better at least nine credits of ME-core coursework.

POSC committee of the students will make a recommendation on **their ability to conduct research** on the basis of a short document related to the Ph.D. student's field of study. The document will summarize the current understanding and may identify the need for planned research and knowledge gaps in the field. The student will submit the document to the POS committee and will defend it through an oral presentation.

Students entering without a Master's degree may complete an MS thesis and present it to the committee to obtain a recommendation on their **ability to conduct research**.

Students entering with a Master's degree should attempt the qualifier before finishing 15 credits of graduate study. Students entering without a Master's degree should attempt the qualifier before finishing 30 credits of graduate study.

The graduate committee will verify all qualifying exam recommendations during the month of December (Fall) and April (Spring) and report the qualifying exam decisions.

5.2 Ph.D. Preliminary Oral Examination

A student becomes a Candidate for the Doctor of Philosophy degree after successful completion of the Preliminary Examination. This is an oral examination conducted by the student's POS Committee; it is intended to assess whether or not the student: has met doctoral-level standards for general knowledge in mechanical engineering, in supporting

subject areas, and particularly in the student's area of expertise; has developed the capabilities or facilities needed to complete his or her research project; and can demonstrate the ability to use such knowledge and to orally communicate it to others.

A written research proposal, prepared by the student should be given to the committee at least two weeks in advance of the examination. The proposal should present the significance of the problem and the objectives of the research, a review of the present state of knowledge in the area, a description of the research plan, results to date, and plans for completing the project. The format for this proposal may be similar to that used for the final dissertation. A committee member who does not receive the dissertation or thesis at least two weeks before the preliminary examination may cancel the examination.

Students should attempt the Preliminary Exam within one year of passing the Qualifying Exam.

The Program of Study and Committee form (POSC) must be approved three months before the preliminary examination.

At least three weeks before the date of the Preliminary Examination, the student must submit the Request for Preliminary Examination Online Form to the Graduate College. This is an online form, available on the [Graduate College's website](#). Following successful completion of the Preliminary Examination, the student is formally admitted to candidacy for the Doctor of Philosophy degree.

A preliminary oral examination will not be scheduled for a student on provisional or restricted admission or on academic probation. Upon successful completion of the preliminary oral examination, the student is admitted to candidacy for the Ph.D. degree. If the graduate student fails all or part of the preliminary oral examination, he/she may be allowed to retake it.

Immediately following the preliminary oral examination, it is the responsibility of the POS committee to decide whether the student will be recommended for admission to candidacy and may continue to work toward the Ph.D. degree. All POS committee members must be present at the preliminary oral and sign the report form. In a preliminary oral examination, if one member of the committee votes not to pass the candidate, the student passes, but each member of the committee must forward to the Dean of the Graduate College in writing a justification for his/her vote. Upon request these letters will be made available to the committee at the time of the final oral examination. If more than one member of the committee votes not to pass the student, the candidate does not pass the examination. An explanatory letter must accompany the report form.

A minimum of 6 months must lapse between a student's Prelim Oral and their final oral. The preliminary oral examination must be passed at least six months prior to the final oral examination. In rare circumstances, an exception to the rule is allowed if a written request with extenuating circumstances signed by the major professor(s) and the program's DOGE is submitted and approved by the Dean of the Graduate College.

5.3 Final Oral Examination

As a part of the Final Oral Examination procedure, candidates for the M.S. or Ph.D. degree are expected to give a seminar to present and defend their research dissertation. This

Examination consists of a one-hour general presentation in a public seminar, followed immediately by a detailed examination by the candidate's POS Committee.

The M.S. or Ph.D. student must submit the Request for Final Examination Online Form to the Graduate College Office **at least three weeks before the examination**. This form is available on the [Graduate College's website](#). The Graduate College must approve changes in the membership of the Program of Study Committee before the Final Examination occurs.

Please also submit the details of your final oral examination – title of your dissertation, and time and location of the exam – to the graduate office to be included in the final exam announcements. All final examinations are generally open to the public.

Graduate students must register at Iowa State University for the equivalent of one credit, or for the R-credit course GR ST 680B (Examination Only) if no course work is needed, during the semester in which the final oral examination is taken. Taking only an R-credit course where the fee is not equivalent to the 1-credit minimum charge is not acceptable for the term of the final oral examination. If the examination is taken during the interim between terms (including the first day of classes), registration can be for either the term before or the term after the examination is held. International students, even those in their final term, must be registered full-time or previously approved by the International Students and Scholars (ISS) to reduce their course load.

5.4 Scheduling Conflicts, Committee Member Substitute or Attendance at Distance

The entire POS committee must be convened for the oral examination. Any request to change the makeup of the committee needs to be submitted in writing on the "Request to Change Committee Appointment" form to the Graduate College and approved by the Dean of the Graduate College **before** the preliminary oral examination is held. The request must be signed by the student, all committee members involved in the change, and the DOGE.

In some cases, it may only be possible to convene the committee in a timely manner if **one of the committee members** participates at a distance. This is permitted if the distance participation is agreeable to all committee members, if the mode of communication permits the full participation of the **committee member** at a distance, and if the Graduate College is **notified in advance** by submitting the online form "[Preliminary or Final Oral Examination with Committee Member at a Distance](#)", which is available at the Graduate College's website. The preferred method of distance participation is video conferencing, but speaker phone is acceptable in cases where visual presentation is not critical. The distant committee member must participate for the entire examination.

In some cases, it may only be possible to convene the committee in a timely manner if **one of the committee members** participates at a distance. This is permitted if 1) the distance participation is agreeable to all committee member; 2) the mode of communication permits the full participation of the **committee member** at a distance; and 3) the Graduate College is **notified before scheduling the examination** by submitting the form "Preliminary or Final Oral Examination with Committee Member at a Distance." The form is available on the Graduate College's web site. The preferred method of distance participation is video conferencing, but speaker phone is acceptable in cases where visual presentation is not critical. The distant committee member must participate for the entire examination.

Under rare circumstances, a graduate student may participate in his/her final oral examination at a distance. In the case of master's students, the Graduate College must be notified in advance of the examination in writing, with written approval of the major professor, the POS committee, and the program's DOGE. In the case of doctoral students, permission must be requested from the Graduate College, and the request must include a justification explaining the unusual circumstances that necessitate defense at a distance, approval of the major professor, the POS committee, and the program's DOGE.

Whenever a student defends at a distance, the entire POS committee is expected to be on campus and available at a single location to facilitate the formulation of an objective evaluation. Technical capability for real-time visual and spoken communication must be established. Graduate programs may establish a student fee for technical costs associated with videoconferencing. It is an expectation that students will participate in person. Only in rare circumstances will a student be allowed to participate at a distance due circumstances that involve an inability to travel (providing proper documentation) such as:

- International visa issues
- Serious health concerns
- Military service
- Legal reasons

5.5 Thesis or Dissertation Preparation

Theses and dissertations are prepared electronically according to the Graduate College Thesis Manual, available on-line at: <http://www.grad-college.iastate.edu/current/thesis/>. Students need to electronically submit to the ME Graduate Programs Office (DOGE) one electronic copy of their final thesis/dissertation prior to or along with submitting a Thesis/Dissertation Submission Form. Please consult with your major professor as to other copies that he/she may require you to submit.

CHAPTER 6 – ASSISTANTSHIPS

Assistantship appointments are determined by your major professor. The terms of your assistantship are described in the original offer letter and in the Appointment Form you have signed. Please note that students on assistantships must have a signed Appointment Form on file with the ME graduate programs office before the start of semester. The student's major professor will advise him or her of the duties of the appointment and the accountability procedure. Assistantship appointments are reviewed every semester and the student will be advised of the nature of the next semester's appointment prior to the end of the term of appointment.

6.1 Stipends

The Graduate College sets minimum stipend ranges for graduate students. The department may set a minimum stipend that is higher than the Graduate College. If your appointment is a Research Assistantship, your stipend will be set by your major professor.

Please refer to the Graduate College handbook for more specifics regarding assistantships, stipends, and tuition scholarships: <http://www.grad-college.iastate.edu/handbook/>

6.2 Tuition

Students on assistantship will also receive a tuition scholarship. MS students on 50% FTE (20 hours per week) appointments will receive a half-tuition scholarship and PhD students on a 50% FTE (20 hours per week) appointment will receive a full-tuition scholarship. MS students are responsible for the other half of tuition and fees. PhD students are responsible for paying their fees.

Graduate students on assistantship are assessed tuition at the full-time rate in the fall and spring semesters and per credit hour over the summer. During the summer term, most professors cover the equivalent tuition for the 1 required credit (50% for MS, 100% for PhD), but it is up to the discretion of the major professor if they would like to cover more.

6.3 Enrollment Requirements

Students on assistantship are required to register for at least one credit. All assistantship appointments are contingent on the availability of funds and maintaining satisfactory progress toward your degree.

6.4 Teaching Assistantships

It is the responsibility of the major professor to request a Teaching Assistantship position on behalf of the student. The departmental funds support the Teaching Assistantships and therefore the Manager for these appointments is the Director of Graduate Education. The department sets the stipend rate.

Students are assigned a course that they will be supporting for the semester. It is the responsibility of the TA to discuss with the course instructor what the responsibilities will be for the course.

6.4.1 Expectations

As a teaching assistant, the department has the following general expectations of you:

- Ensure expectations between you and your course instructor are clear- maintain clear channels of communication
- In general, TA obligations take priority over other obligations
- End-of-semester tasks and other obligations for your course assignment must be completed before planning for semester break
- Inform course instructors of intended absences ahead of time.
- Learn about the classroom culture in the USA (international students)

6.5 Absences from Campus

Arrangement for a leave of absence is made between the graduate assistant and that assistant's supervisor adhering to all grant and other funding source restrictions. When a graduate assistant needs to be absent either for personal reasons or illness, the supervisor should be understanding and accommodating to that need. At the same time, the graduate assistant should attempt to plan personal leave so that it does not interfere with or cause neglect of the duties associated with his or her appointment. Supervisors of graduate assistants are responsible for ensuring that their assistants do not exceed reasonable limits for leave.

CHAPTER 7 – EXPECTATIONS

7.1 Professional Ethics and Academic Integrity

Graduate students are expected to comply with the Faculty Statement on Professional Ethics (see Faculty Handbook, Section 7.2). It is imperative that every student understands the ethical standards of engineering science and conduct his or her scholarly activities accordingly.

Scientists and engineers, who commit unethical acts, whether from carelessness, ignorance, or malice, quickly lose the respect of the scientific community. Scientific misconduct includes such activities as:

- Falsification of data, ranging from fabrication to deceptively selective reporting, including the purposeful omission of conflicting data with the intent to falsify results
- Plagiarism: representation of another's work as one's own
- Misappropriation of the ideas of others: unauthorized use of privileged information
- Misappropriation of funds or resources for personal gain
- Falsification of one's credentials

In addition to scientific misconduct, graduate students are held accountable to the academic dishonesty policy. Academic dishonesty occurs when a student uses or attempts to use unauthorized information in the taking of an exam; or submits as his or her own work themes, reports, drawings, laboratory notes, or other products prepared by another person; or knowingly assists another student in such acts. Such behavior is abhorrent to the university, and students found guilty of academic dishonesty face suspension, conduct probation, or written reprimand. Instances of academic dishonesty ultimately affect all students and the entire university community by degrading the value of diplomas when some are obtained dishonestly and by lowering the grades of students working honestly. Examples of specific acts of academic dishonesty include, but are not limited to the following:

- Obtaining Unauthorized Information. Information is obtained dishonestly, for example, by copying graded homework assignments from another student, by working with another student on a take-home test or homework when not specifically permitted to do so by the instructor, by looking at one's notes or other written work during an examination when not specifically permitted to do so.
- Tendering of Information. Students may not give or sell their work to another person who plans to submit it as his or her own. This includes giving their work to another student to be copied, giving someone answers to exam questions during an exam, taking an exam and discussing its contents with students who will be taking the same exam, or giving or selling a term paper to another student.
- Misrepresentation. Students misrepresent their work by handing in the work of someone else. The following are examples: purchasing a paper from a term paper service; reproducing another person's paper (even with modifications) and submitting it as their own; having another student do their computer program; or having someone else take their exam.
- Bribery. Offering money or any item or service to a faculty member or any other person to gain academic advantage for oneself or for another is dishonest.
- Plagiarism. Unacknowledged use of information, ideas, or phrasing of other writers is an offense comparable with theft and fraud, and it is so recognized by the copyright and patent laws. Literary offenses of this kind are known as plagiarism.

At ISU, these acts are taken very seriously and constitute “academic misconduct”. Individuals found guilty of academic misconduct may suffer a variety of penalties up to and including expulsion from the university. Academic dishonesty is considered a violation of the behavior expected of a student in an academic setting as well as a student conduct violation. A student found guilty of academic dishonesty is therefore subject to appropriate academic penalty, to be determined by the instructor of the course, as well as to penalty under the university student conduct regulations.

If a graduate student is accused of academic dishonesty relating to conduct of a sponsored research project, the matter will be handled in accordance with the university's “Policy on Academic Misconduct” (see Faculty Handbook, Section 7.2.2.3). In issues regarding conduct of research, graduate students are held to the same standards as faculty. Otherwise, the matter will be handled in accordance with the processes under the “Academic Life” section of the ISU Catalog.

If a student is aware of a potentially unethical situation, he or she should seek the advice of a trusted professor. Students may also contact the Director of Graduate Education (DOGE). All such discussions with the DOGE are considered and treated as confidential. It is very important to protect the rights of the individual whose actions are questioned. Frivolous accusations of misconduct and vicious spreading of rumors are just as unethical as fabrication of data or plagiarism.

7.2 General Expectations as a Graduate Student

You are responsible for developing your educational program to best meet your career and educational goals. Many of us are here to help you in this process, but we expect you to take the lead in your education. We expect that you will:

- work independently and responsibly in your area of research and show initiative
- ensure expectations between you and your major professor are clear through constant and clear communication
- broaden and enrich your education by attending talks and seminars in the department and on campus
- be aware of degree and assistantship requirements and deadlines and file paperwork in a timely manner
- represent yourself and the program with highest standards of integrity, ethics and professionalism

CHAPTER 8 - COMPLETION OF PROGRAM

Before graduation, MS and PhD students must prepare a thesis or dissertation. The student and major professor must determine whether or not the results are to be published and what the student's responsibilities are in the publication process. Excellence in research is best exemplified in the form of publishable research and/or patent applications. It is normally expected that the student will at least complete the draft of one or more research (journal) papers prior to graduation. Besides thesis and research paper preparation, the student has other responsibilities.

The laboratory and office space occupied by the student should be left clean, with all equipment left or returned to storage in good condition. The student and major professor will decide to what degree experimental apparatus will be disassembled.

If termination is at some other time than the end of an appointment period, notice of resignation must be sent to the Graduate Programs Office, with approval from their major professor.

8.1 Application for Graduation

Application for graduation should be made by the end of the third week of the semester in which the student expects to receive the degree. To apply for graduation, the student is required to log into their AccessPlus account and submit the electronic Application for Graduation form. Before submitting this form, a student must have submitted the "Program of Study" form and had it approved by the Graduate College. The student must also have been fully-admitted to a program and met the Graduate English requirement (for nonnative English speakers). Graduation will be delayed if the "Application for Graduation" form filing deadline is not met. If it becomes apparent that a student cannot graduate during the indicated term, he/she should withdraw the application through AccessPlus. The student must then submit a new application for the next planned term of graduation. Upon submitting the application for graduation, all thesis students will be charged a one-time, nonrefundable \$145 thesis fee by the Graduate College. This fee will be billed to each thesis student's university bill to cover thesis review and processing, thesis technical assistance, and printing and binding fees for the ISU library copy.

8.2 Graduation Student Approval Form

After the Final (oral) Exam, the student must complete a Graduation Student Approval Form. Individuals from various offices sign this form to indicate that the student has completed the degree requirements and has met all other obligations to be eligible for the degree. The Graduate College will send this form along with their final oral forms to the student and the student's major professor.

8.3 Check-Out Procedure

Each graduate student must arrange a check-out procedure within his or her group as established by the major professor. Students employed by other centers, institutes, or laboratories within the university must also comply with their check-out procedures.

Students should also return all keys issued to them. In addition, students who were issued a purchasing card must return the card to the main office (2043 Black).

8.4 Employment

Prior to graduation and departure, most students will be seeking employment. Employer representatives visit campus all during the year, but the prime interviewing season begins at the end of September and continues into January and February. Students should visit the Engineering Career Services Office for further information.

Many companies offer interview trips to prospective employees. Students should check with their major professor and supervisor (if a teaching assistant) before going on interview trips.

CHAPTER 9 - OUTSTANDING GRADUATE STUDENT AWARDS

9.1 Research and Teaching Excellence Awards

The Graduate College and the Department of Mechanical Engineering sponsor two awards to graduate students for outstanding achievement in research and teaching:

9.1.1 Nomination Deadlines

Students self-nominate for these awards. The Graduate Committee reviews all nominees' application materials and selects the recipients. Students will receive notification by email regarding the exact deadline to self-nominate; however, nominations are typically due to the ME graduate programs office as indicated below:

Fall Semester	November
Spring Semester	March

9.1.2 Research Excellence Award

The purpose of these highly competitive awards is to recognize outgoing graduate students for outstanding research accomplishments as documented in resulting peer-reviewed publications, theses and dissertations. These students are also expected to be academically superior and able to not only do research, but develop a well-written product. The program is administered by the Graduate College with additional administrative support from the Graduate Student Senate. Awards are offered each semester and summer session, depending on departmental allocations and prior awards.

Each Research Excellence Award will consist of a letter of commendation from the ISU President, a certificate of achievement from the Dean of the Graduate College, and cords to be worn during the graduation ceremony. Recipients will be recognized in the ISU Commencement Program; documentation will also be made on each student's transcript. Each term a formal photograph will be taken of recipients with the ISU President, the Provost and/or the Dean of the Graduate College. This photograph will appear in Research and Graduate Education along with an accompanying article.

9.1.3 Teaching Excellence Award

The purpose of these awards is to recognize and encourage outstanding achievement by graduate students in teaching. The program is administered by the Graduate College with additional support from the Graduate Student Senate.

Each Teaching Excellence Award will consist of a letter of commendation from the ISU President, a certificate of achievement from the Dean of the Graduate College and cords to be worn during the graduation ceremony. Recipients will be recognized at the time of graduation – each will be given an honor cord, cited in the ISU Commencement Program and recognized during the ceremony. Documentation will be made on the student's transcript. Each term a formal photograph will be taken of recipients with the ISU President, the Provost and/or the Dean of the Graduate College. This photograph will appear in Research and Graduate Education along with an accompanying article.

9.2 Zaffarano Prize for Graduate Student Research

9.2.1 Award deadlines

Nominations are due March 1, to zaffaran@iastate.edu, Graduate College, 1137 Pearson Hall. Winners are notified mid-April and presented the award at the annual Sigma Xi banquet in April. The Graduate College in conjunction with Sigma Xi presents and at the bequest of Dr. Daniel Zaffarano (Vice President for Research and Dean of the Graduate College at Iowa State University from 1971-1988) present this annual to recognize superior performance in publishable research by an ISU graduate Student. A check for \$1,500 and a plaque will be presented to the winner. For the purpose of this award, publishable research is defined as work written and accepted for publication in a national or international refereed journal. Both the quality and the number of publications produced during the student's time at ISU will be considered. The awardees must either be currently enrolled at ISU for the Spring semester of the nomination, or have graduated in the 2 preceding semesters. In all cases he or she must be available to receive the award in person.

9.2.2 Nomination procedure

Major professors and faculty make nominations to the Dean of the Graduate College by March 1. Each nomination should include a professional resume with copies or reprints of all publications authored by the student while enrolled at ISU. When the student is not the senior author, a note of explanation by the major professor or coauthor describing the student contributions to the published work is needed. The nomination should also include a letter from the student's major professor and an endorsement from either the departmental chair or the director of graduate education (DOGE).

9.3 The Karas Award for Outstanding Dissertation

The Karas Award for Outstanding Dissertation has been established to recognize excellence in doctoral research at Iowa State University. Each year the two winners of this award become Iowa State University's nominees to the national competition for the Council of Graduate Schools (CGS)/University Microfilms International (UMI) Distinguished Dissertation Award. Awards are selected annually in two of the rotating four broad disciplinary areas announced by the Council of Graduate Schools. The deadline for the Karas Award competition is March 1, and the award amount will be \$1,000 for each dissertation award winner. Award winners are expected to be available to receive the award in person.

The date of the degree awarded, or the completion of doctoral degree requirements and dissertation, must fall within a two year timeframe of the award (e.g., for students providing a dissertation for the 2014 competition, the degree must have been awarded in the period from July 1, 2012 to June 30, 2014.) For students graduating after March 1, 2014, the dissertation must have been cleared through the Graduate College for submission to University Microfilms/Proquest prior to March 1. (If that student wins the award but does not meet all degree requirements before June 30, he/she must forfeit the award.) For more information please visit: <http://www.grad-college.iastate.edu/academics/awards/karas.php>

CHAPTER 10 – RESOURCES

10.1 Campus Contacts

Graduate College Student Handbook – <http://www.grad-college.iastate.edu/publications/gchandbook/>.

Graduate and Professional Student Senate – <http://www.grad-college.iastate.edu/gpss/>

University Catalog – <http://catalog.iastate.edu/>
Schedule of Classes - <https://classes.iastate.edu/>
Center for Excellence in Learning and Teaching (CELT) – <http://www.celt.iastate.edu>
Graduate College Career Services
College of Engineering Career Services
Center for Communication Excellence (CCE)
Ombuds Office - <http://www.ombuds.iastate.edu/>
Distance Education Resources – <http://www.distance.iastate.edu/>
International Students and Scholars Office – <http://www.isso.iastate.edu/>
Oral English Certification Test (OECT) – <http://www.grad-college.iastate.edu/speakteach/>
English Placement Test – <http://apling.public.iastate.edu/engl101.html>

10.2 ME Graduate Student Organization (MEGSO)

The ME Graduate Student Organization (MEGSO) was founded for the purpose of promoting interaction among the students of the department. The organization strives to create a friendly working atmosphere between students and faculty. MEGSO also promotes professional activities and interacts with faculty candidates.

Events during the year such as picnics, potluck dinners, bowling and field trips provide an excellent way for MEGSO members to interact in a social setting. MEGSO members show prospective graduate students around the campus and city during visits. Enrollment is currently limited to ME graduate students, although members are encouraged to bring guests to the functions. To participate in MEGSO, simply watch for an announcement as to when and where the meeting will be held. MEGSO also hosts a mandatory learning community for all new first year ME students.

10.3 Conference and Research-related Travel

For students planning on attending a conference, please stop into the main office to discuss what travel expenses can and cannot be reimbursed.

10.3.1 Travel Professional Advancement Grant (PAG)

Travel Professional Advancement Grant (PAG) forms are filled out by the grad student to request funding from the Graduate and Professional Student Senate (GPSS) to help support your trip expenses. Each graduate student is eligible to receive one Travel PAG per fiscal year (July 1 through June 30 – NO EXCEPTIONS). For more information please see the “PAG Funding” section on the GPSS website at <http://www.gpss.iastate.edu/students/pag/>.

Procedures for attending a conference are:

1. Check with your major professor regarding the conference you wish to attend. Obtain his or her approval before proceeding with the next step.
2. Fill out the ME Student Travel Form and turn it into the main office in 2043 Black Engineering
3. Fill out the PAG application.
4. Once the appropriate departments have reviewed the PAG, a copy will be returned to you indicating the amount of support for which you are eligible.

All forms mentioned above are located in the University Forms file in main office. Additional information about graduate studies at Iowa State University may be obtained from the Graduate College Website (<http://www.grad-college.iastate.edu>).

10.4 Mediation of Student Disputes and Grievances

When graduate students become involved in disputes with their mentors that cannot be resolved by direct communication, the Graduate Programs Office will serve as informal or formal mediator depending on the particular circumstances. Students should feel free to contact the DOGE should such disputes. All such conversations are strictly confidential and the DOGE will work with the student to help resolve the dispute. Several formal avenues of appeal are available to graduate students to handle grievances concerning grades and instruction and for grievances related to scholarly and professional competence. All procedures start at the department or program level and lead through a series of steps to higher appeal channels. All such grievance procedures must be initiated within 3 weeks after end of semester during which the alleged grievance occurred. The Mechanical Engineering's grievance procedure is outlined below. Information for appeals at higher levels can be found in the Graduate College Handbook.

10.4.1 Grievances about Grades and Instruction

Grievances arising out of classroom or other academic situations should be resolved, if at all possible, with the individual instructor involved. If resolution cannot be reached, the student should discuss the grievance with the instructor's department executive officer (chair) and submit it in writing to him or her. The department executive officer will discuss the grievance with the instructor involved and/or refer it to a department grievance committee. The department executive officer should respond in writing to the student within five class days. An academic grievance can be reported through this form:

<https://app.smartsheet.com/b/form/df04ffa21053428d9f626c5a96bd4d06>

10.4.2 Grievances Related to Scholarly and Professional Competence

Judgment of professional competence as demonstrated in such matters as qualifying, preliminary and final oral examinations, and other clearly stated program requirements concerning competence in the field of study is the responsibility of the academic program and Program of Study (POS) committee.

If a student feels that his or her scholarly or professional competence has not been evaluated fairly, he/she should first discuss the complaint with the person or persons most directly involved in the matter: a faculty member, major professor, POS committee, director of graduate education (DOGE), or department chair. If these discussions are unsuccessful and further adjudication is desired, the student may request (in writing) that the grievance be handled by the department grievance committee.

10.4.3 Department grievance committee

The DOGE shall appoint a grievance committee to handle student grievances. The committee will comprise of equal representation from faculty and graduate students. The DOGE will serve as a non-voting member of the committee. The committee shall review the grievance and present its recommendation in writing to the DOGE within one week after all necessary information is provided to them. The DOGE will then provide a written response to the student.

CHAPTER 11 – GENERAL INFORMATION

11.1 Office space

If available, office space is assigned by the department's space coordinators and must be requested on behalf of a student by their major professor. Laboratory space is the responsibility of your major professor.

Each graduate student is responsible for maintaining a neat and safe environment in the assigned office and laboratory as per campus regulations. Safety and housekeeping inspections are held frequently by the department safety officer and violations are dealt with severely.

11.2 Telephones

Local telephone calls, i.e. within Ames, may be made from the office telephones in Black. Dial 8 to get an outside line. ISU phone numbers (those with a 294, 296 or 572 prefix) may be reached by dialing the last number of the prefix and the last four digits. Long distance calls for research and professional purposes, such as university business, may be made from your office phone using an access code that you may obtain from your major professor, with permission.

11.3 Keys

Key request forms are available in the main department office (2043 Black). The department administrative assistant will assist you in filling the form and ordering your keys. Keys are issued to students for three, six or twelve months. If keys are required beyond the due date, a renewal key request may be submitted. Key authorization forms can be obtained from the Departmental Office, and then taken to the General Services Building where keys are issued. For entrance to the building and instructional labs (for TAs) please go to the Media Center in 2079 Black. Graduate students needing to switch keys with another graduate student should stop in 2043 Black and fill out a Transfer of Key Form. Any lost or stolen keys can be replaced for a fee.

11.4 Mail

Graduate students have mailboxes grouped by their major professors in 2019 Black. Personal mail should **NOT** be delivered to the department nor should personal outgoing mail be mailed from the department office.

11.5 Copiers

The copy machine in the Faculty Commons, 2013 Black, may be used for teaching or research-related material approved by your major professor; **they should not be used for personal use.** The copiers at the Library may be used for personal copying. **Students should use the copy centers on campus for copies of theses and dissertations.**

11.6 Purchase of Equipment and Supplies

The student must secure permission from their major professor before making any purchase. Additional required information includes the department account to charge the purchase to and a detailed business purpose (what you are buying and how it will be used.) There are resources on campus to obtain supplies for research including Central Stores and Chemistry Stores or online through CyBuy. Contact the main office for purchases outside the university.

Graduate students are responsible for their own office supplies. There are often old file folders available for student use from the main office if needed. Supplies for teaching purposes (for Teaching Assistants) can be obtained from the main office.

11.7 Other Services

The College of Engineering and other university centers or laboratories offer a variety of services to aid the graduate students. These include shops for construction of equipment and analytical laboratories. Arrangements for using these services must be discussed with the student's major professor.

Appendix A: Graduate Core Courses

*indicates available online

Course	Course Title	Emphasis Area					
		Energy	Systems	Computational	Fluids	Health	Multi-scale
ABE 504	Instrumentation for Agricultural and Biosystems Engineering	X	X			X	X
AERE 545	Experimental Flow Mechanics and Heat Transfer	X			X		
AERE 565*	Systems Engineering and Analysis		X				
CHE 508	Surface and Colloid Chemistry				X	X	X
CHE 510	Electrochemical Engineering	X			X	X	X
CHE 512	Electrochemical Methods of Analysis	X			X	X	X
CHE 540	Biomedical Applications of Chemical Engineering					X	
CHEM 512	Electrochemistry	X			X		
CHEM 513	Analytical Molecular and Atomic Spectroscopy	X					
EE 512	Advanced Electromagnetic Field Theory I	X		X			X
EE 529	Data Analytics in Electrical Computer Engineering		X	X			X
EE 531	Micro and Nano Systems and Devices		X			X	X
EE 547	Pattern Recognition		X	X			
EM 510	Continuum Mechanics	X			XX	X	X
EM 516	Mechanics of Deformable Solids	X				X	X
EM 517	Experimental Mechanics					X	X
EM 525*	Finite Element Analysis			X			X
HCI 522	Scientific Methods in Human Computer Interaction		X				
HCI 575	Computational Perception			X			X
IE 566	Applied Systems Engineering		X				
IE 572	Design and Evaluation of Human Computer Interaction		X				
IE 577*	Human Factors		X				
MATH 501	Introduction to Real Analysis		X				
MATH 510	Linear Algebra		X				
MATH 515	Numerical Analysis I						
MATH 516	Numerical Analysis II						
MATH 517	FINITE DIFFRNC MTHD						
MATH 519	MTHD APPLIED MATH I						
MATH 520	MTHD APPLIED MATH II						
MATH 525	Numerical Analysis of High-Performance Computing			X	X		

MATH 554	Introduction to Stochastic Processes		X	X			
MATH 561	Numerical Analysis I						
MATH 562	Numerical Analysis II						
MATH 645	ADV STOCHAST PROCESS						
MATH 646	Mathematical Modeling of Complex Physical Systems				X		
MATH 667	Computational Methods for Hyperbolic PDEs						
MATH 666	Finite Element Methods						X
ME 501	Biorenewable Resources	X					
ME 502X	Microfluidics and Nanofluidics: Theory, Design and Devices				X	X	
ME 510*	Economics and Policy of Engineering Energy Systems	X					
ME 511*	Advanced Control Systems Design		X				
ME 517*	Advanced Machine Design						
ME 518	Advanced Dynamics of Machinery		X				
ME 520*	Material and Manufacturing Considerations in Design						X
ME 521*	Mechanical Behavior and Manufacturing of Polymers and Composites						X
ME 525*	Mechanical Systems Optimization						X
ME 527*	Mechanics of Machining and Finishing Processes						X
ME 528*	Nano manufacturing and MEMS Technology						X
ME 530*	Advanced Thermodynamics	X			X		
ME 531*	Advanced Energy Systems and Analysis	X					
ME 532*	Thermodynamics of Compressible Flow				X		
ME 534X*	Energetic Materials Combustion and Systems						
ME 535*	Thermochemical Processing of Biomass	X					
ME 536*	Advanced Heat Transfer	X			X		
ME 538*	Advanced Fluid Flow	X			X		
ME 542	Advanced Combustion	X			X		
ME 543*	Random Vibrations		X				
ME 545*	Thermal Systems Design	X					
ME 546	Computational Fluid Dynamics and Heat Transfer I				X		
ME 547	Computational Fluid Dynamics and Heat Transfer II				X		
ME 550*	Advanced Biosensors: Fundamentals and Applications						
ME 552	Advanced Acoustics		X				
ME 556*	Machine Vision		X	X			
ME 557*	Computer Graphics and Geometric Modeling		X	X			
ME 561	Scanning Probe Microscopy						X
ME 563*	Nanomechanics						X

ME 564	Fracture and Fatigue						X
ME 566	Phase Transformation in Elastic Materials						X
ME 570X	Solid Modeling and GPU Computing			X			
ME 573*	Random Signals and Kalman Filtering		X				
ME 574*	Optimal Control		X				
ME 575	Introduction to Robust Control		X				
ME 576*	Digital Feedback Control Systems		X				
ME 577*	Linear Systems		X				
ME 578	Nonlinear Systems		X				
ME 580*	Virtual Worlds		X	X			
ME 584	Technology, Globalization, and Culture			X			
ME 585	Fundamentals of Predictive Plant Phenomics						
ME 591X	Probabilistic Engineering Analysis and Design			X			
ME 592X	Data Analytics and Machine Learning for Cyber-Physical Systems Applications.		X	X			
ME 625	Surface Modeling			X			
ME 632	Multiphase Flow	X			X		
ME 637	Convection Heat Transfer	X			X		
ME 638	Radiation Heat Transfer				X		
ME 647	Advanced Computational Fluid Dynamics				X		
MSE 510	Fundamentals of Structure and Chemistry of Materials						X
MSE 532	Microelectronics Fabrication Techniques						X
MSE 540	Mechanical Behavior of Materials						X
MSE 550	Nondestructive Evaluation						X
MSE 551	Characterization Methods in Materials Science						X
MSE 552*	Scanning and Auger Electron Microscopy						X
MSE 553	Physical and Mechanical Properties of Polymers						X
MSE 554	Polymer Composites and Processing						X
MSE 556	Biomaterials					X	
MSE 569	Mechanics of Composite and Combined Materials						X
STAT 587	Statistical Math						X

Appendix B: Approved Courses for Math/Stat Requirement

*indicates available online

Optimization (linear, nonlinear, and integer programming; global optimization methods)	
<ul style="list-style-type: none"> • IE 510*: Network Analysis • IE 534*: Linear Programming • IE 631: Nonlinear Programming • IE 632: Integer Programming 	<ul style="list-style-type: none"> • Econ 500/600: Quantitative Methods in Economic Analysis I/II • Econ 509: Applied Numerical Methods in Economics
Modeling and Simulation (physical modeling through differential equations and their solution, computer visualization)	
<ul style="list-style-type: none"> • AERE 572: Turbulence • CHE 545: Analytical and Numerical Methods • COMS 477/577: Problem Solving Techniques for Applied Computer Science • COM S 531: Theory of Computation • EM 425: Introduction to Finite Element Methods • EM/AERE 525*: Finite Element Analysis • EM 526: Boundary Element Methods in Engineering • Phys 480/481: Quantum Mechanics I/II • Phys 531: Statistical Mechanics • Phys 564: Advanced Classical Mechanics • Phys 591/592: Quantum Physics I/II 	<ul style="list-style-type: none"> • ME/AERE 546/547: Computational Fluid Dynamics and Heat Transfer I/II • ME/COMS/CPRE 557*: Computer Graphics and Geometric Modeling (Note: This course can be counted on a student's POS if they were admitted prior to Fall 2013.) • ME/AERE/EE/MATH 577: Linear Systems • ME 625: Surface Modeling • ME/AERE 647: Advanced High Speed Computational Fluid Dynamics
Mathematical Theory	
<p>Linear & abstract algebra, real & functional analysis</p> <ul style="list-style-type: none"> • AERE 501X: Advanced Engineering Analysis • EM 510: Continuum Mechanics • EE 570: Systems Engineering Analysis and Design • EE 674: Advanced Topics in Systems Engineering • Phys 534: Symmetry and Group Theory in Physics 	<p>Probability and Statistics (outside of statistics department)</p> <ul style="list-style-type: none"> • IE 513: Analysis of Stochastic Systems • IE 533: Reliability • Econ 500: Quantitative Methods in Economic Analysis I • Econ 509: Applied Numerical Methods in Economics • Econ 571: Intermediate Econometrics • Econ 671/672: Econometrics I/II

**Appendix C: Approved Professional Development Courses
Master of Engineering in Mechanical Engineering**

- ConE 380*: Engineering Law
- Econ 355: International Trade and Finance
- HCI 655: Organizational and Social Implications of Human Computer Interaction
- HG ED 561*: College Teaching
- IE 570*: Systems Engineering and Project Management
- IE 505X: Advanced Engineering Economy for Complex Engineering Projects
- IE 563: Engineering and Systems Management
- ME 584*: Technology, Globalization and Culture
- MGMT 472: Management of Diversity
- SCM 501*: Supply Chain Management
- Any foreign language courses (prerequisites may be needed which will not count towards the requirements)
- Other courses, as approved by the ME Department's Graduate Education Committee

*indicates available online

Appendix D: Approved Communication Courses

- [GR ST 529: Preparing Publishable Thesis Chapters](#)
- [GR ST 566: Communications in Science](#)
- [GR ST 569: Grant Writing](#)
- [GR ST 570: Teaching Practices](#)
- [ME 693: Entrepreneurship for Graduate Students in Science and Engineering](#)
- ME XXX: Broader Impacts
- ENGL 302: Business Communication
- ENGL 309: Proposal and Report Writing
- ENGL 310: Rhetorical Analysis
- ENGL 313: Rhetorical Website Design
- ENGL 314: Technical Communication
- ENGL 415: Business and Technical Editing
- ENGL 416: Visual Aspects of Business and Technical Communication
- ENGL 542: Document Design and Editing
- ENGL 549: Multimedia and Interaction Design
- SP CM 312: Business and Professional Speaking

Appendix E: Expected Fall 2020 – Spring 2022 Course Offerings

		Fall 2020	Spring 2021	Fall 2021	Spring 2022
Energy	ME 510 Economics and Policy of Engineered Energy Systems	X			
	ME 530 Advanced Thermodynamics	X		X	
	ME 531 Advanced Energy Systems		X		X
	ME 535 Thermochemical Processing/Biomass			X	
	ME 545 Thermal Systems Design		X		
	ME 585 Introduction to Predictive Plant Phenomics				X
	BRT 501 Fundamentals of Biorenewable Resources				X
Health	ME 550 Advanced Biosensors		X		
Fluids	ME 536 Advanced Heat Transfer		X		X
	ME 538 Advanced Fluid Flow	X		X	
	ME 542 Advanced Combustion			X	
	ME 548X Optics and Spectroscopy	X			
	ME 632 Multiphase Flow	X			
Multi-scale Engineering	ME 517 Advanced Machine Design	X		X	
	ME 521 Polymer and Composites		X		X
	ME 527 Mechanics of Machining and Finishing	X			
	ME 528 Nano Manufacturing			X	
	ME 561 Scanning Probe Microscopy				
	ME 563 Micro and Nanoscale Mechanics		X		
	ME 605X Broader Impacts of Science and Engineering				
	ME 562X Introduction to Tribology		X		
	ME 591X Probabilistic Engineering Design and Analysis				X

Systems	ME 511 Advanced Controls			X	
	ME 518 Robotics		X		X
	ME 592X Data Analytics and Machine Learning		X		X
Computational Sciences	ME 556 Machine Vision			X	
	ME 557 Computer Graphics and Modelling		X		
	HCI 571 Augmented Reality	X			
	ME 580 Virtual Environments				X
	ME 625 Surface Modelling			X	
	ME 570X Solid Modeling and GPU Computing	X			