



**Department of Industrial and Systems Engineering
Graduate Program Guide**

August 2023

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1. Purpose of this Guide

Welcome to the Department of Industrial and Systems Engineering (ISE) at Mississippi State University, one of eight engineering departments within the Bagley College of Engineering. The faculty and staff of the ISE department wish you success at every stage of your graduate program.

This guide is intended to provide information commonly needed by students to successfully navigate the ISE graduate programs. The policies and procedures provided in this guide govern our academic programs and describe the duties and responsibilities of ISE graduate students. These policies and procedures are in addition to and subordinate to those described in the *Graduate Catalog* (www.grad.msstate.edu). Any inconsistencies within this guide should be brought to the attention of the Graduate Coordinator. The Office of the Graduate School (OGS) website has additional information as well as links to all forms needed by ISE graduate students.

Each student is expected to be familiar with the contents of this guide. While this guide provides information developed through many years, it is ultimately the responsibility of the student to ensure that all program requirements are met in a timely fashion and in accordance with ISE and OGS policies and procedures.

2. Contact Information

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Here are people to contact with common problems:

Computer issues: ITS help desk <http://www.its.msstate.edu/support/helpdesk/>

Keys and administrative matters: Ms. Carol Ray

Offer letters, payroll, and tuition: Ms. Casey King

Academic issues or curriculum: your advisor or Dr. Maruf

Emergencies: Dr. Maruf or Dr. Babski-Reeves

3. General ISE Graduate Program Overview

Degrees Offered

The Department of Industrial and Systems Engineering offers the following degrees through both campus and distance education:

- Doctor of Philosophy in Industrial and Systems Engineering
- Master of Science in Industrial Engineering, Thesis Option
- Master of Science in Industrial Engineering, Non-thesis Option

The Ph.D. degree is a research-based advanced degree and serves to provide an in-depth study of a specific area of Industrial and Systems Engineering for multiple employment opportunities. The M.S. (Thesis Option) is a research-oriented degree and serves to prepare students for positions in industry or government or for further graduate study in industrial and systems engineering or related areas. The M.S. (Non-Thesis Option) is designed to prepare students for positions in business and industry that require graduate education.

Formal concentrations for the M.S. options are available in:

1. Human Factors and Ergonomics
2. Industrial Systems
3. Management Systems Engineering
4. Manufacturing Systems
5. Operations Research
6. Data Analytics

Although there are no concentrations in the Ph.D. program, the student can specialize in:

1. Human Factors and Ergonomics
2. Industrial Systems
3. Management Systems Engineering
4. Manufacturing Systems
5. Operations Research
6. Data Analytics

Class Offerings

The ISE department offers a number of graduate-level classes spanning the six areas of specialization identified above (see Appendix A). Graduate-level classes are either 6000- or 8000-level classes. Classes that are 6000-level classes are considered split-level classes, meaning that upper-level undergraduate students (juniors and seniors) also enroll in these classes. By university policy, graduate students are required to complete additional requirements (additional homework assignments, increased test difficulty or length, completion of a project or literature review, etc.) to earn graduate credit for these classes. Classes that are 8000-level are considered full graduate-level classes, meaning only graduate students can normally enroll in these classes.

Graduate Faculty

All full-time, tenure-track faculty serve on the ISE graduate faculty listing. The role of the graduate faculty is to advise students through the program and to serve as research advisors for M.S. thesis and Ph.D. students. All incoming students are assigned an advisor, typically the graduate coordinator, upon admission into the program. If the student has been offered an assistantship, the advisor will be the recruiting faculty member. Students are encouraged to contact their advisor or the graduate coordinator upon admission to discuss enrollment in classes for their initial semester. A listing of current graduate ISE faculty is provided in Appendix F.

4. Gaining Admission to the ISE Graduate Program

This section is intended to help prospective students successfully navigate the application process.

Applying to the ISE Graduate Program

The Office of the Graduate School (OGS) is responsible for the application process for all academic departments at Mississippi State University. The application form and required documentation can be found on their website (www.grad.msstate.edu). There is an “Apply Now” button. In general, students should submit the following materials (subject to change) though other forms may be required by the OGS and ISE department:

1. Statement of purpose—describing why the student wishes to undertake graduate study, what area they are most interested in pursuing, and any faculty they are most interested in working with.
2. Official transcripts—from all schools attended.
3. Letters of recommendation (3)—it is preferred that two of the three come from academic references.
4. TOEFL or related scores—required for all international students from universities where English is not the primary language spoken.

Because Mississippi State University uses centralized processing of graduate applications, all questions pertaining to the application process and all application materials should be directed to the OGS. The ISE department has been assigned a point of contact for admissions to assist students with such questions. The point of contact can be found on the Graduate School website under “Contacts us” or above under “Contact Information.”

After applying, students are assigned a nine-digit MSU ID number that begins with 9 (e.g., 999-999-999) and an MSU netID (initials and number; e.g., abc000). Prospective students can check the status of their application at any time by logging into the system. Admission decisions are made independently of funding decisions. Therefore, admission to the program does not mean funding is available or will be offered. The OGS notifies students of admission decisions, not the ISE department or the ISE Graduate Coordinator. Therefore, direct all questions regarding decision notifications to the OGS, as the ISE department or graduate coordinator cannot and will not release that information.

The following sections describe various aspects of the application and review process.

Review of Applications

These deadlines differ from university published deadlines and are specific to the ISE department (see deadlines on the OGS website at <https://www.grad.msstate.edu/students/admissions/deadlines>). The

OGS will provide all complete, submitted applications to the department for review. Applications received by the department are typically reviewed in batches, so it may take several weeks for a particular student’s application to be processed. Notification of admission decisions is made by the Graduate School.

Admission Requirements

Detailed admission requirements for admittance to Mississippi State University can be found on the OGS website. The ISE department adheres to all of these guidelines in addition to the expected minimum performance levels listed below (Table 1). Students failing to meet these minimums may be denied admission. Automatic rejection will apply for any Ph.D. student applying without Calculus I and II on their transcripts.

Table 1. Entrance Minimums

	M.S.	Ph.D.
Minimum GPA	3.00/4.00	3.50/4.00
TOEFL/IELTS	79/6.5	79/6.5
Calculus I and II	Program Specific	Required on Transcript

It is expected that all incoming students will have earned baccalaureate degrees in engineering, physical sciences, mathematics, or other related majors with strong mathematical backgrounds and business or social science backgrounds. Entering graduate students are assumed to have or will obtain, within 2-3 semesters, competence in calculus, statistics, and computing.

English Requirements for International Students

All incoming international students must have taken the internet-based TOEFL (iBT) or IELTS before applying for admission to MSU. In most cases, an internet-based TOEFL (iBT) score of at least 79 (6.5 on IELTS) is required for regular admission into ISE. Exceptions to this policy include those students who have a degree from a university in an English-speaking country (<http://catalog.msstate.edu/graduate/admissions-information/application-process/#applicationtext>). If the student scores 79 or above, no further English as a Second Language (ESL) is required. If they score below 79, they must take English courses as specified in the MSU Graduate School Bulletin if admitted into the program. Please see <http://catalog.msstate.edu/graduate/admissions-information/application-process/#englishlanguagetestscorerequirementstext> for English language test score requirements and related outcomes.

Note to international graduate students: You must be a full-time student each semester. This is a requirement of the Immigration Service and is being routinely checked by our Registrar's Office. This requires that you take at least 9 hours per semester (6 hours in summer) or be taking all of the remaining hours to meet degree requirements.

Transfer Credit for Previous Graduate Coursework

MSU policy states that students may request the use of previous graduate coursework to count towards the completion of the ISE graduate degree. The procedures for requesting transfer credit differ for the M.S. and Ph.D. programs. Students should note that transfer credit is not automatic, and the student is responsible for requesting transfer credit.

For the M.S. program, MSU allows students to transfer up to 12 credit hours of graduate coursework

towards the completion of the M.S. thesis or non-thesis degree. A formal Transfer Approval form (found on the OGS website) must be submitted to receive credit. These courses, if approved, will appear on the student's Program of Study, and therefore are subject to all policies for courses taken at MSU. All courses may be transferred contingent on the approval of the graduate committee. Transfer courses can be used as equivalent courses offered by MSU, and the equivalent course will be noted on the Transfer Approval form, or for courses not offered by MSU noted as "No equivalent MSU course" on the Transfer Approval Form. Students should only submit this document with the approval of their advisor (non-thesis) or their advisor and committee (thesis).

For the Ph.D. program, MSU allows no more than ½ of the coursework credit-hour requirement for the degree to be fulfilled by past graduate coursework. Therefore, for the ISE Ph.D. program, no more than 24 hours can be fulfilled in this manner. These classes are subject to approval by the advisor, the student's dissertation committee, and the Graduate Coordinator. For graduate credit hours not earned as part of a degree, the process is identical to that identified for the M.S. program (no more than 12 hours, cannot be more than 8 years old at the time of graduation, and a transfer approval form must be used).

Transfer credit will not be awarded for research, internships, courses graded pass/fail, or coursework in which a grade lower than B was earned. Continuing education credits, correspondence, extension, or in-service courses and/or workshops also cannot be used as transfer credit hours. For more information regarding transfer credit hours, students should refer to the Graduate Catalog on the OGS website.

Direct Admit to the Ph.D.

Extremely qualified students with a baccalaureate degree(s) but no master's degree may apply for direct admission to the Ph.D. program. These applicants are subject to the same review process as all Ph.D. applicants. If accepted, the student will complete their Ph.D. program in the usual manner (described in later sections of this document). If rejected from direct admission to the Ph.D. program, students may still be admitted to the M.S. program at the department's discretion.

Assistantship Information

It is the goal of the Department of Industrial and Systems Engineering to provide financial assistance to each graduate student who desires such assistance, and all students receiving admission to the department will be considered for financial assistance. However, the financial resources of the department are limited. For this reason, the department has established several guidelines for awarding assistantships. Assistantships are offered on a competitive basis. Generally, those students with the best academic records are given top priority, though other factors are also considered. These factors include, but are not limited to, student motivation, effort, attitude, research aptitude, computer skills, contribution to the department through participation in student organization activities, and English competency.

All incoming and/or current students are automatically considered for assistantships unless they indicate that they do not need funding. No separate assistantship application is required. Faculty interested in providing funding to a specific student will contact them directly.

Because of the limited funds available, students are expected to complete their programs in a timely manner (see the flow charts later in this document). This means that students can receive funding for a limited time, the minimum time expected to complete their degree. Therefore, students should plan accordingly to meet all graduate program requirements in a timely manner.

Types of Assistantships Available. Graduate assistantships are typically limited to on-campus students and can take the form of Graduate Teaching Assistantships (GTAs), Graduate Research Assistantships (GRAs), and Graduate Service Assistants (GSAs). Additionally, wage positions may be available on a limited basis.

GTAs are limited and are often associated with large service classes taught by the ISE department (e.g., Engineering Economy). GTAs are offered to students by the Department Head and generally involve serving as a grader, a laboratory assistant, or an instructor of record. In general, GTAs carry a fixed stipend and 100% of tuition; fees and insurance will be the responsibility of the student. GTAs may be full-time or part-time appointments.

GRAs are generally offered to students by faculty members holding extramural research grants. The stipend associated with these varies depending on the budget associated with that grant and typically includes a waiver of 100% of the tuition, fees, and health insurance.

GSAs are assigned outside of the department typically and can be associated with performing duties for other entities on campus (e.g., OGS student worker, residence hall advisor).

If graduate students are hired on a wages-only basis, the wage rate, hours of work, responsibilities, etc., will be defined by the individual directly supervising the student. Students are responsible for reporting hours worked to the department paying the wage. For the ISE department, students are emailed timesheets for the pay period and are required to type the hours worked, sign, and obtain the advisor's signature for that pay period. Holding over hours or submitting timesheets late may result in loss or delay of pay. Students should submit their timesheets by the date identified in the departmental email.

Opportunities for various funding sources can be found at <http://www.grad.msstate.edu/financial/>.

Income Taxes. The U.S. government and the State of Mississippi will levy taxes from your stipend, and you will need to file income tax returns (state and federal) each year that you receive assistantships.

Payday. All employees, full or part-time, are paid on roughly the 15th and last day of every month. Students are required to establish a checking account to allow for direct deposits of pay checks. Paper pay checks will **NOT** be issued. Students can view their deposit history through the MyState portal on the MSU website.

Workload. Assistantships are typically 20-hour appointments. This means students are expected to work 20 hours per week on the job they have been assigned. Coursework, other research, and thesis or dissertation work are in addition to this 20-hour commitment. Students receiving assistantships throughout the year are expected to remain on campus to participate and complete that work. Students who plan to leave for an extended time period will not be allowed to receive pay for that period unless deliverables are defined and can be provided to the advisor, graduate coordinator, department, and/or college, illustrating proof of work while not on campus. Exceptions to this include University-approved holidays—those dates for which the university is closed. Students should discuss arrangements for any time off in advance with their research supervisor.

Termination of Pay. Fall-semester pay is terminated on December 31st unless otherwise stated. Spring-semester pay is terminated on May 15th unless otherwise stated. Summer-semester pay is terminated

on August 15th unless otherwise stated. If a student leaves the university prior to these dates, their pay is terminated on their last day on campus. Additionally, pay can be terminated at any point due to non-performance of duties, unsatisfactory academic performance, or other reasons that have been communicated to the student previously. The date at which a student's appointment is terminated may result in a proration of the tuition support, and students may be responsible for paying for a portion of the tuition at the standard rate based on residency.

International Students

Student Expenses. International students must certify access to a minimum of one year's estimated expenses. Students should complete the **Certification of Finances form** (<https://www.international.msstate.edu/offices/international-services-office/newly-admitted-international-students/i-20>) for International Graduate Students available on the OGS website.

Student Visa. Admitted students are responsible for maintaining legal status with the US Department of Homeland Security during the length of the graduate program. Students receiving funding from their home government or an international organization are typically issued a DS-2019 (J-1 exchange visitor visa certificate). If the student is to be funded by an assistantship, an I-20 will be issued. Details and FAQs relating to international student visa issues can be found at <https://www.international.msstate.edu/offices/international-services-office/newly-admitted-international-students/visa-application>.

Estimated Costs of Graduate Education

The fee schedule for on-campus and distance students, both in-state and out-of-state residents, is set by the Office of the Controller. Students should visit <http://www.controller.msstate.edu/accountservices/tuition/> to obtain the most recent cost schedule.

Housing and Area Information

Students are encouraged to visit the Department of Housing and Residence Life at <http://www.housing.msstate.edu/future/> for on-campus housing options. Apartment housing is also available and can be found by using standard search engines on the internet (e.g., Apartments.com). Students are responsible for finding and paying for their own housing.

5. Getting Through the Program

This section is aimed at helping students successfully navigate the ISE graduate program once they have been admitted. Throughout the student's study, **IT IS THE STUDENT'S RESPONSIBILITY** to see that he/she meets the Office of the Graduate School requirements for submission of a program, revisions of the program when necessary, and all other requirements of the Graduate School. It is **NOT** the responsibility of the advisor. In order to fulfill the program requirements (for example, core courses for options), it is vitally important that care be taken in course scheduling from the very beginning of the student's work at MSU (planning pages are provided in this document to aid in this process). The faculty advisors will attempt to give assistance in such long-term planning, but the ultimate responsibility still remains with the student. If the student writes a thesis as part of his/her graduate program, and the thesis advisor is different from the program advisor, the thesis advisor becomes the program advisor.

MyState Portal

The MyState portal is one of the most useful portals for faculty and staff at MSU. To access this portal,

simply find MyState on the university’s main web page (see image below). Students will be asked to login using their netID and self-selected password. This portal will provide all types of information, including registration, academic records, etc. Students will use this portal to obtain a parking decal, be able to sign up for the Maroon Alert System (to receive important messages regarding university business), and most everything else students need.



Communicating with Students

All communication with students will occur using the student’s assigned Bully email address (initials-number@msstate.edu – e.g., abc000@msstate.edu). The department will not keep a listing of work or other personal email addresses used or preferred by the students. Students may have their Bully mail forwarded to the account of their choice, but all critical communication from the department to the students will occur through this email address. For example, critical exam dates, job opportunities, assistantship opportunities, etc., will be conveyed to students using this email address.

Graduate Teaching Assistant Workshops

All incoming students offered a graduate teaching assistantship (GTA) must complete the MSU Graduate Teaching Assistant workshop. These are held in the Fall (August) and Spring (January) prior to the start of classes. Therefore, students should plan their arrival accordingly. Additionally, international students must attend the International Teaching Assistant Workshop.

Academic Integrity and Misconduct

MSU has an academic honor code (<http://www.honorcode.msstate.edu/>). All students are expected to uphold the ideals stated in this code and will sign graded assignments to this effect. Students should refer to this website for detailed information on the types of academic misconduct, the process for reporting and appealing academic misconduct, and examples of penalties for students found guilty of academic misconduct. Students should be aware that ignorance of the misconduct is not accepted as an excuse for engaging in academic misconduct activities.

Advisors

Being Assigned an Advisor. Students who are newly admitted to the program will be assigned to the Graduate Coordinator as a **temporary** advisor. Exceptions to this rule are incoming students who have been offered a research assistantship. Those students will be assigned to the faculty member that awarded the assistantship to that student. At any time, a student may view the name of their advisor via their Banner account.

Advising in the Initial Semester. After being admitted and deciding to attend Mississippi State, the student should contact the Graduate Coordinator (or advisor) via email or phone to discuss the student's background, goals and interests, and any missing prerequisites (more information is provided in a later section—Course Prerequisites). The Graduate Coordinator (advisor) will help the student choose a schedule for the first semester. Students will be released to register by the Graduate Coordinator (or advisor) and will be informed of the date and time when they may register for classes.

Prior to contacting the Graduate Coordinator (or advisor), students are encouraged to view the class schedule for the upcoming semester or the semester for which they will begin their program and select potential classes to take. Searching "class schedule" on www.msstate.edu or following this link https://mybanner.msstate.edu/prod/wwkschd.P_SelTerm will let students view all the course offerings at Mississippi State for upcoming and past semesters. Students should select the appropriate "Term" (Spring 2XXX, Summer 2XXX, or Fall 2XXX), the appropriate "Campus" (Starkville for on-campus students or Center for Distance Learning for distance students), the appropriate "Subject" (IE for Industrial Engineering, ST for Statistics, etc.), and the appropriate "Level" (graduate) in the upper portion of this page (see image below).

A listing of all class offerings for the criteria selected will be displayed. Note that all on-campus sections are numbered 01, 02, 03, etc.; and all distance sections are numbered 501, 502, 503, etc. The course number (e.g., IE 6153) is a hyperlink which will provide a description of the course, pre-requisites, and any associated laboratory components.

The image shows two screenshots from a university's Master Schedule system. On the left is the 'Search Filters' page, which includes dropdown menus for Term, Part of Term, Campus, Level, Subject, Course #, Type, Delivery, Instructor, Location, Days, and Seats, along with a 'View Sections' button. On the right is a course details pop-up window for 'IE 6513 501 CRN: 35136' in the 'Fall Semester 2022'. The pop-up includes tabs for Section Prerequisites, Section Restrictions, Course Equivalents, Section Fees, and Section Comments. The 'Section Prerequisites' tab is active, showing a table with columns: And/Or, Test Code, Test Score, Subject, Course, Level, Min Grade, and Concurrency. The table is currently empty with the message 'No prerequisites found.' and a 'Close' button at the bottom.

Advising in Subsequent Semesters. Approximately two weeks prior to pre-registration (see the advising Academic Calendar posted on the Mississippi State University main website), the ISE office will send an email to all students informing them of their advisor's advising schedule and how to schedule an appointment (e.g., SignUpGenius, email, telephone, etc.). This email is sent to the student's Bully mail (ab000@msstate.edu). On-campus students are expected to appear in person for their advising session. Distance students should either select an appointment time and discuss via phone class selections and other plans (exams, defenses, etc.) or discuss this information via email. Please discuss with your advisor their preferred method of advising contact.

All students are **required** to complete a draft Program of Study (POS) in consultation with their advisor. The draft POS will be placed in the student's departmental file to assist with advising.

Using Past Graduate Coursework towards Degree Requirements. Students are strongly encouraged to review the university requirements relating to this policy (see the Graduate Catalog or the section titled "Transfer Credit for Past Graduate Coursework" above). A brief summary is provided here to assist students with developing their POS.

Masters POS. Students may transfer 12 hours of graduate level coursework towards the degree requirements for an M.S. in Industrial Engineering at Mississippi State University, provided all other requirements for the M.S. POS are met (see M.S. program description). Transfer credit will require the completion of the "Transfer Approval Form" on the Graduate School webpage. Transfer classes will appear on the POS and are subject to the same time limits as coursework taken here at MSU (no older than 8 years at the time of graduation).

Ph.D. POS. Students may use up to 24 hours of graduate level coursework towards the degree requirements for a Ph.D. in Industrial and Systems Engineering at Mississippi State University, provided all other requirements for the Ph.D. POS are met (see Ph.D. program description).

Course and Program Pre-requisites

The student will be required to satisfy all prerequisites for any course (s)he takes. Additional

prerequisites will depend on the background of the student and the area of specialization selected, which are described in later sections of this handbook. Prerequisites may be satisfied by any one of the following means:

1. Appearance of an equivalent course on a transcript (transcript credit), **OR**
2. Passing the MSU course with a C or better, **OR**
3. Demonstrating, by examination, satisfactory competence in the area (grade of 80% or better required), OR
4. By petition based on experience in the subject area. Satisfaction of prerequisites by petition is limited to 6 hours.

Students are required to provide a syllabus for a course they believe is equivalent to a given prerequisite. That syllabus will be reviewed by a member of the department faculty, a determination of the equivalency made, and the student informed of the decision. In general, any equivalent course is any course in which there is at least an 80% overlap of topics covered. Any course not meeting this 80% rule will not be allowed to substitute for the course in question.

CANVAS Course Site

The ISE department liberally uses the CANVAS courseware to provide students with essential information regarding classes. You can access the CANVAS courseware by going to <https://canvas.msstate.edu/> and logging in using your netID and password. Individual faculty will provide additional details regarding the use of this site for their courses. At a minimum, students will have access to syllabi, course lecture notes, assignments, and other course information.

Performance

The Office of the Graduate School (OGS) prepares an Academic Standing Report at the completion of each semester. Students with grades of C or lower, with overall GPAs below the minimums (3.0 for M.S. students and 3.5 for Ph.D. students), or students receiving Fail or Unsatisfactory grades are identified. An email will be sent to the student and the advisor, notifying the student of their status.

In addition to the criteria defined in the current Graduate School Bulletin, unsatisfactory performance in the ISE graduate program is defined as any of the following:

1. Failure to maintain a 3.00 GPA (grade point average) in the M.S. program or a 3.30 GPA in the Ph.D. program.
2. Greater than 6 hours of C or worse in coursework taken while in the ISE graduate program (results in automatic dismissal from the program per university policy).
3. Failure of the qualifying exam (Ph.D. students only).
4. Failure of the preliminary exam (Ph.D. students only).
5. Failure of the comprehensive final exam (M.S. non-thesis option only).
6. Unsatisfactory evaluation of thesis or dissertation.
7. Failure of a required component of the program of study.

Any one of these will constitute the basis for review and possible dismissal. If the student drops six or more quality points below their required GPA (3.00 for M.S. or 3.30 for Ph.D.), the graduate coordinator will review the record along with the student's graduate advisor and committee, as appropriate, and will recommend a final course of action, which will be immediate dismissal or the establishment of a

probationary period in which corrective action must take place.

While on probation:

1. A student is not eligible to receive an assistantship appointment.
2. Students are required to raise their cumulative GPA to 3.00 for M.S. or 3.30 for Ph.D. by the end of the following semester of enrollment.

During the semester(s) in which students are on academic probation, on-campus students must enroll in 9 credit hours of coursework, and distance students must enroll in 3 credit hours of coursework. During this time, students cannot take a directed individual study.

In case of a dismissal from the graduate program, a student may appeal his/her academic status according to the following procedure (refer to the Graduate Bulletin for additional information):

- **Within four weeks of being notified of the official dismissal**, the student must present the request and related explanation in writing to the graduate coordinator. Supplementary information may also be provided to substantiate the student's request for reversal of the dismissal. The Graduate Coordinator will review the appeal along with the Graduate Curriculum Committee and render a recommendation to the Department Head in writing. The Department Head will make a final decision and will provide, in writing, the department-level decision.
- If the appeal at the departmental level is unsuccessful, a student may then appeal to the Associate Dean for Research and Graduate Studies for the Bagley College of Engineering.
- If the appeal at the college level is unsuccessful, the student may then appeal to the Office of the Provost.

M.S. Non-Thesis and Ph.D. Preliminary Exam

While additional details are provided later these requirements, they are introduced here as they are critical steps in the completion of a student's program. Both exams can be taken when the student is within 6 hours of completing their coursework (university policy). There is a 6-month time limit between the completion of the Ph.D. Preliminary exam and graduation. Therefore, students should take the exam no later than the semester before their planned graduation. The Office of the Graduate School publishes an academic calendar on their website listing all important dates. Students should be familiar with the calendar and ensure that they meet all deadlines. The M.S. non-thesis exam is only given in the Fall and Spring semesters. Therefore, students should plan accordingly so as not to have to remain in the program for an additional semester to take the exam. M.S. non-thesis exam can be waived for students maintaining a 4.0 grade point average on their first 24 credit hours (or for all courses being applied to the MS degree for students in the PhD program wishing to earn the MS degree along the way). Foundational courses (if taken) will be considered in the GPA calculation, though they cannot be used to fulfill degree requirements.

Theses and Dissertations

Theses and dissertations are research experiences that illustrate knowledge of and contribute to the advancement of the Industrial and Systems Engineering discipline. Students are encouraged to begin working on their thesis or dissertation within the second to third semester to ensure timely program completion. Additional details are provided later in this document on how to select a topic and the procedure for getting the topic or final research approved. As a general introduction, students should be aware that, in general, a **thesis** should be of sufficient scope to result in at least **one** high-quality journal publication and a **dissertation** should result in at least **two** high-quality journal publications.

Enrollment Expectations

All graduate students are expected to maintain continuous enrollment. This means they should be enrolled in classes every Fall semester and either Spring or Summer semester until graduation, at a minimum. Students who are not enrolled for three consecutive semesters, excluding summer semesters, are automatically dismissed from Mississippi State University by the Registrar and are required to apply for readmission to the Graduate School to complete their degree. Any associated fees accrued are the responsibility of the student. Students not enrolled for the current semester are not allowed to hold assistantships.

M.S. and Ph.D. Thesis/Dissertation Format Review

Students must enroll in a free, ungraded **LIB 9010** "ETD Formatting & Review" course on CANVAS in their final semester (i.e., the semester they intend to graduate) with either their M.S. or Ph.D. degree. This course is the only way to submit your thesis or dissertation. If you do not meet defense or submission deadlines, you will be required to enroll in this course in a later semester. Enrollment in the course without graduating more than twice will result in the student being charged a fee. The course is hosted by the Office of Thesis and Dissertation Format Review. You can learn more about it at: <https://www.library.msstate.edu/thesis>.

The major advisor, committee, Graduate Coordinator, and Dean must sign an Electronic Thesis and Dissertation Committee Approval (ETDCA) page that is available in the LIB 9010 course. Once the student has obtained signatures from the advisor and committee members, the student may request the signature of the Graduate Coordinator. To obtain the Graduate Coordinator's signature, the student must provide a copy of the following:

1. Signed signature page
2. Title page of the dissertation/thesis
3. Abstract of the dissertation/thesis
4. Completed and signed (by the thesis/dissertation advisor) Bagley College of Engineering Exit Survey (see <https://www.bagley.msstate.edu/grad/forms/>)
5. Completed ISE Exit Survey
6. Confirmation of publication requirement (more details are provided in a later section)
7. Copies of approval or approved forms from other university offices (e.g., Stamped Informed Consent documents from the IRB, IBC approval, IACUC approval)

Our BCoE Thesis/Dissertation Checklist can be found here: <https://www.bagley.msstate.edu/wp-content/uploads/Thesis-Dissertation-Checklist.docx>. The information that must be submitted to the Dean's Office to obtain Dr. Keith's signature (outlined on the checklist) should be submitted in one email to Ms. Erma Murry at murry@bagley.msstate.edu. **NOTE, Dr. Keith cannot sign off on the form until all of this information is received in one email.**

In general, the student should be prepared to:

1. Enroll in LIB 9010
2. Defend their Thesis/Dissertation
3. Complete all forms and gather signatures from committee members/major professor/graduate Coordinator
4. Complete the BCoE Exit Survey (see <https://www.bagley.msstate.edu/grad/forms/>)
5. Send all documents to Erma Murry at least 5 days prior to the OGS deadline (see <https://www.library.msstate.edu/thesis>)

6. Wait to receive an electronic version of the document that can be uploaded as directed in LIB 9010

Applying for Graduation

Once the student has completed all the requirements for the degree, the student may apply for graduation. Deadlines for applying for graduation are outlined in the Graduate School academic calendar. Please note that fees associated with applying for graduation increase as the semester continues. It is the student's responsibility to apply for graduation in a timely manner and pay all associated fees.

Graduate Degree Audit. The Graduate Coordinator receives a listing of all students who have applied for graduation each semester approximately 8 weeks prior to the completion of the semester. At that time, the Graduate Coordinator will review the student's file and transcript to ensure all forms have been submitted, and all university and departmental requirements have been completed. If there are missing forms identified, the student and advisor will be notified immediately and asked to submit them. If the student is missing a degree requirement (e.g., auditing of a class, pre-requisite, too many IE 7000 classes), the student and advisor will be notified immediately, and a plan will be developed to assist the student with graduation. Be advised that depending on what is found, graduation may be delayed.

Any keys checked out to students must be turned in prior to graduation. ***Any student not returning any keys will not receive their diploma until that key is returned.*** All keys should be turned in to the ISE office.

Graduation Ceremony. Graduation ceremonies are held in the Fall and Spring. Announcements regarding the date and time are provided by the university. Students attending graduation are responsible for renting all required robes, hoods, caps/tams, etc., as indicated in the graduation emails provided by the university. Ph.D. graduates will be hooded by their advisors. All diplomas will be mailed following the graduation ceremony after all degree requirements have been confirmed.

Departmental Resources

Computer usage. All on-campus graduate students will have access to research laboratories they are affiliated with, open departmental laboratories, and open computers located throughout the university (e.g., Library). Any departmental computer issues should be reported to Michael Lane or Richard Moore.

Keys and card reader access. All campus graduate students will have keycard (via your MSU ID card) access to McCain Engineering Building and laboratories that you have been granted permission to use by faculty directing research in those laboratories. Keys will be checked out on an as-needed basis for specific door or restricted access locations. All keys are the responsibility of the student holding them. If keys are lost, it should be reported immediately to departmental staff. Students will be responsible for costs associated with the rekeying of those doors and new keys. It is required that keys be returned to the department if you leave the country. The keys will be reissued upon your return.

All keys issued to you are for your use ***only***. You should never lend your key or MSU ID to another student to gain access to McCain or any of the rooms within McCain. Students found loaning their keys to other students, even other graduate students, will lose their keys and key-card access.

Building and laboratory security. McCain Engineering Building is locked on weekends and at night. As you leave and enter the building, be sure that all doors are locked behind you. **Never prop open the exterior doors.** If there is a security issue with McCain, please contact the MSU Police Department at 662.325.2121.

When working in laboratories, students are required to restrict access to the laboratories to other students working in that laboratory or other individuals as needed for research purposes. The department provides other options for students to hold group meetings or study sessions. Laboratories are to be used for research purposes. **Never prop open doors to laboratories.** The laboratories contain easily lifted, expensive equipment. Take your key/MSU ID with you every time you leave the laboratory to ensure that you can reenter upon returning. Students previously in the laboratory may leave before you return, thereby locking you out of the laboratory.

Use of departmental resources. All students have access to the internet either through departmentally owned computers or through the MSU wireless internet (while on campus).

Students on assistantships may use departmental resources (computers, printers, copiers, scanners, fax, office supplies, etc.) for official business associated with their assistantship. The use of departmental resources for personal reasons (including coursework or thesis/dissertation research) is strictly prohibited. MSU's Bagley College of Engineering has a laptop requirement for all students. Therefore, students should use their personal laptop, printer, scanner, etc.) for all non-assistantship related businesses. Students who use departmental resources for personal reasons will be required to reimburse the department at a rate determined by the department for abuse of these resources.

Student offices. The Graduate Coordinator will assign all new on-campus students desk space. Assignment of desks within research laboratories are the responsibility of the faculty directing that laboratory. Any student not assigned a desk, should contact the Graduate Coordinator immediately.

Faculty offices. All full-time tenure track faculty members have office space in 260 McCain Engineering Building. Many instructors also have offices within this office space, though other individuals affiliated with the ISE department may have office space in other locations. Faculty have several responsibilities, of which teaching, and research are only two. Students should respect faculty member office hours and should never enter a faculty member's office unless invited to do so.

Student Travel. Students may travel for university business for several reasons: presentation of research findings at conferences, meetings with research sponsors, data collection, etc. Details for MSU related travel can be found at <http://www.travel.msstate.edu/>. Students should work closely with their advisors when travel is required.

In general, travel within the U.S. requires approval from the department head or next highest official prior to taking the travel. Travel outside the U.S. requires approval of the University President **30 days** prior to the trip. A travel approval form will be submitted and signed by all required parties prior to travel or the travel expenses will not be reimbursed. Once the travel has been approved, please work with your advisor on the booking of any airline tickets. MSU is required to use the services of a travel agency except under specific circumstances. Students booking air travel without the use of the travel agency may not be reimbursed if these circumstances are not met. MSU also has strict policies on the use of rental cars, required receipts, etc. Again, review the policies on the Travel Office's website and discuss any travel with your advisor.

There are several sources to support student travel to conferences for presentation of research findings and professional development. If the student is presenting research findings related to an extramurally funded research project, the faculty member holding that grant typically is responsible for your travel expenses. If the student is presenting thesis, dissertation, course, or other departmental research, students should first apply for travel assistance from the OGS and then the Bagley College or department. Students should realize that all travel expenses may not be covered. Within the department, funds are awarded based on the following priority:

1. Full paper and full presentation at a national/international conference
2. Full paper and poster presentation at a national/international conference
3. Extended abstract and full presentation at a national/international conference
4. Extended abstract and poster presentation at a national/international conference
5. Abstract and full presentation at a national/international conference
6. Abstract and poster presentation at a national/international conference
7. Presentations at regional conferences.

Graduate Student Awards. The ISE department is proud to award the Outstanding M.S. student, Outstanding Ph.D. student, Outstanding distance graduate student, and Best Student paper award. These awards are awarded yearly (in the Spring) and carry a cash award. The process is through self-nomination, and the Graduate Coordinator will send the announcement out in January of each year. Qualifications for these awards are included in the announcement.

Distance Education

There are several useful resources to assist distance students. First and foremost, students are encouraged to visit the ISE department's webpage for departmental and distance education specific information. The Graduate Coordinator is also available at any time to answer questions or provide information to students. The Center for Distance Education (<http://distance.msstate.edu/>) is another resource that students can use for general MSU distance education information. The Bagley College of Engineering distance webpage (<http://www.bcolearning.msstate.edu/>) also is a useful source for general college of engineering distance education information.

Workload and extensions. The ISE faculty recognize that distance students often have full-time jobs and other responsibilities outside of class and work. Regardless, exam dates, homework due dates, quizzes, class projects, etc. will follow the same timeline as on-campus students and distance students should plan accordingly. Course instructors can approve extensions for extenuating circumstances if needed (e.g., prolonged travel); however, it is at the discretion of the course instructor whether to provide extensions or allowances.

The ISE department strongly encourages new distance students to enroll in only **one class** during their initial semester. This is to allow students to become accustomed with how classes are offered and the pacing of our distance classes.

Course Delivery. All classes are offered during the normal day (typically 8:00 am to 5:00 pm M-F). Any class offered via distance will be recorded in a technology classroom or using screen capture software. Distance students will download videos of classes at their convenience using either the CANVAS courseware site discussed earlier (see CANVAS *Course Site*), or through the MyMedia website (<http://mymedia.msstate.edu>). Both systems require students to log onto these sites using their netID

and password. Any technical difficulties should be reported to the Information Technology Services (ITS) help desk.

Performing Research. Thesis and dissertation research, and classroom research have identical requirements for both distance and on-campus students. As an MSU student, you will have access to many of the software programs (statistical, modeling, etc.) needed to complete your coursework or research either through ITS or the department. Classroom related research is governed by all federal, state, and university policies and regulations. Students should be familiar with these guidelines and when they are required to seek approval from other university entities (e.g., IRB for human subjects). Please see the Office of Research Compliance website for more information (www.orc.msstate.edu).

Thesis and dissertation research are typically conducted at non-MSU research facilities for distance students. Should the student request, or be required, to conduct research at an off-site research facility, appropriate certification must be completed prior to beginning the research process. It is typically not possible for faculty to loan distance students sophisticated equipment for their research. Thus, students should plan accordingly. Regardless, the expectation for distance student thesis/dissertation research is the same as for on-campus students.

6. Master of Science in Industrial and Systems Engineering Program

Admissions Requirements

Admission decisions for the M.S. program in ISE are based on several factors, including previous academic performance, standardized test scores, references, and relevant work experience. Typically, entering students should have a 3.00 out of 4.00 grade point average on their BS undergraduate degree. This grade point average is viewed as a guideline, rather than a strict requirement. Students with lower averages may still be eligible for admission based on outstanding qualifications in other areas. International students must have a minimum internet-based TOEFL (iBT) score of 79 (6.5 on IELTS).

Degree Requirements

Thesis Option. There is a **minimum** requirement of 24 semester hours of courses plus 6 thesis hours for the M.S. thesis option. The hours required of any student are a function of his/her background and goals; therefore, students should be prepared to complete additional coursework as needed to provide a proper foundation or understanding of their selected specialization area. Each thesis option program will contain at least 12 hours of the course work at the 8000 (full graduate) level (in addition to thesis credit hours). For this purpose, IE 7000 counts as an 8000-level course. Prerequisite hours and additional course requirements will be determined individually for each student depending on his/her background and goals.

The thesis option student will complete a thesis proposal meeting and must pass an oral defense of the thesis before being allowed to graduate. Additionally, **thesis students must submit at least one journal or conference paper FROM THEIR THESIS prior to graduation.** The Graduate Coordinator will not sign the thesis signature page until proof of paper submission is provided; thus, students will not be allowed to graduate until the publication requirement is met. Journal or conference paper submission from work **not a part of the thesis cannot** be used to satisfy this requirement.

Non-thesis Option. There is a **minimum** requirement of 30 course hours for the M.S. non-thesis option. The hours required of any one student are a function of his/her background and interests; therefore, students should be prepared to complete additional coursework as needed to provide a proper foundation or understanding of their selected specialization area. Each non-thesis option program will contain at least 12 hours of the course work at the 8000-level. For this purpose, IE 7000 counts as an 8000-level course. Prerequisite hours and additional course requirements will be determined individually for each student depending on his/her background and goals.

Additionally, non-thesis option students must pass a written and oral comprehensive examination on industrial and systems engineering. This exam is held each Fall and Spring semester. Students ***MUST*** be enrolled the semester they take the exam and this exam ***MUST*** be completed in a student's last semester. If a student plans to graduate in the summer, the exam may be taken in the preceding spring. An email requesting notification of a student's intent to take the exam is sent in the early part of each fall and spring semester. M.S. non-thesis exam can be waived for students maintaining a 4.0 grade point average on their first 24 credit hours (or for all courses being applied to the MS degree for students in the PhD program wishing to earn the MS degree along the way). Foundational courses (if taken) will be considered in the GPA calculation, though they cannot be used to fulfill degree requirements. See page 34 for a complete description of this requirement.

Other Requirements. In addition to the above, all graduate school requirements must be met. See the Graduate Catalog for further requirements. The actual courses taken are selected by the student and his/her advisor within the rules of the University and Department and are subject to approval by the Graduate Coordinator and the Graduate School. Additional requirements are:

1. No ISE graduate student may show ST 8114 or IE 6613 on their graduate Program of Study (POS).
2. No program can contain more than 15 hours of courses that are required in the Bachelor's degree curriculum. This applies to students who have not yet taken these courses as part of their baccalaureate degree. Any student who has taken the course, or an equivalent course, as part of their baccalaureate degree cannot use that course on their graduate program.
3. No program can contain more than 6 hours of Directed Individual Study (IE 7000).

Transfer Credit Hours. Students entering the M.S. program with prior graduate degrees or course work may transfer up to 12 hours on their program of study, per university policy. Students should work closely with their advisor and committee to determine which courses are appropriate for transfer and fit within the university time limit for courses (courses may not be more than 8 years old at the time of graduation). Keeping in mind the program requirements above, students may not be able to transfer the full 12 hours.

General Summary of the M.S. Program

Pursuing a master's degree involves the following minimum steps:

Thesis	Non-Thesis
<ul style="list-style-type: none"> • Identification of thesis advisor (end of 2nd semester) • Submission of Program of Study (end of 2nd semester) and Committee Request form • Completion of 24 hours of coursework, 12 of which must be at the 8000 level • Completion of 6 hrs of IE 9000 Research/Thesis • Completion of thesis proposal defense • Completion of thesis final defense • Publication requirement • Satisfying MSUs degree requirements addressed in the Graduate Catalog 	<ul style="list-style-type: none"> • Submission of Program of Study (end of 2nd semester) • Completion of 30 hours of coursework, 12 of which must be at the 8000 level • Completion of the non-thesis comprehensive written exam • Completion of the non-thesis comprehensive oral exam • Satisfying MSUs degree requirements addressed in the Graduate Catalog

All program requirements must be completed within 8 years of the student's initial semester in the program.

Concentration Options

For both the thesis and non-thesis options, the following concentration options (printed on the final transcript) are available for both on-campus and distance learning:

- 1) Human Factors and Ergonomics

- 2) Industrial Systems
- 3) Operations Research
- 4) Management Systems Engineering
- 5) Manufacturing Systems
- 6) Data Analytics

Requirements for each of these options are presented below.

Human Factors and Ergonomics

This concentration option is designed for students who wish to develop skills in Human Factors and Ergonomics (HFE). Students in this option will be exposed to both a breadth and depth of HFE principles and practices.

Concentration Foundational Requirements (do not appear on the POS):

- MA 1713, 1723, 2733, 2743 (Calculus I, II, III, IV)
- IE 3123 Industrial Ergonomics or equivalent
- IE 6613 Engineering Statistics I or equivalent

Program Requirements (Thesis Option):

IE 6773	Systems Simulation I	3
IE 6623	Engineering Statistics II	3
At least 3 HFE ISE courses		9
At least one non-HFE ISE course		3
At least one course from Mathematics (MA) or Statistics (ST)		3
At least one course from a supporting area (Biological Engineering [ABE], Psychology [PSY]), Kinesiology [KI], Mechanical Engineering [ME], Mathematics [MA], Statistics [ST], etc.)		3
IE 9000	Thesis in ISE	6
Total Hours		30

A thesis and an oral comprehensive examination in defense of the thesis are required.

Additional requirements are:

1. A minimum of 12 hours coursework must be at the 8000-level or higher.
2. No ISE graduate student may list ST 8114 or IE 6613 on his/her graduate program
3. No program can contain more than 15 hours of courses that are required in the bachelor's degree curriculum
4. No program can contain more than 6 hours of Directed Individual Study (IE 7000).

The thesis-option Master of Science in Industrial Engineering requires at least 24 credit hours of coursework above the baccalaureate degree.

Program Requirements (Non-Thesis Option):

IE 6773	Systems Simulation I	3
IE 6623	Engineering Statistics II	3
At least 3 HFE ISE courses		9
At least two non-HFE ISE course		6
At least two courses from Mathematics (MA) or Statistics (ST)		6
At least one course from a supporting area (Biological Engineering [ABE], Psychology [PSY]), Kinesiology [KI], Mechanical Engineering [ME], Mathematics [MA], Statistics [ST], etc.)		3
Total Hours		30

A written and oral comprehensive final exam on the coursework. At least 12 hours for the M.S. non-thesis degree must be from 8000-level courses or above. The specific courses required depend upon the student's area of concentration. IE 9000 Research/Thesis does not apply to non-thesis students.

Additional requirements are:

1. No ISE graduate student may list ST 8114 or IE 6613 on his/her graduate program.
2. No program can contain more than 15 hours of courses that are required in the bachelor's degree curriculum.
3. No program can contain more than 6 hours of Directed Individual Study (IE 7000).

The non-thesis Master of Science requires at least 30 credit hours of coursework above the baccalaureate degree.

Industrial Systems

This concentration prepares the student for general ISE work. It is designed to allow the student a high degree of flexibility in selecting a program that meets his/her needs. For example, the student might choose to specialize in one or more areas of ISE (e.g., quality engineering, etc.), or choose a broad program covering several ISE fields.

Concentration Foundational Requirements (do not appear on the POS):

- MA 1713, 1723, 2733, 2743: Calculus I, II, III, IV
- Computer Programming Proficiency
- IE 3123 Industrial Ergonomics
- IE 3913 Engineering Economy I
- IE 4333 Production Control Systems I
- IE 4613 Engineering Statistics I

Program Requirements (Thesis Option):

IE 6773	Systems Simulation I	3
Courses to be selected by the student along with the academic advisor and graduate program committee		21
IE 9000	Thesis in ISE	6
Total Hours		30

The thesis-option Master of Science in Industrial Engineering requires at least 24 credit hours of

coursework above the baccalaureate degree. Note that the selection of courses for this option is left up to the student, subject to the general requirements stated previously and to the approval of the student's graduate program committee. If a student has completed any program requirement course as part of a previous degree, these classes must be replaced with other classes.

Program Requirements (Non-Thesis Option):

IE 6773	Systems Simulation I	3
Courses to be selected by the student along with the academic advisor and graduate program committee		27
Total Hours		30

A written and oral comprehensive final exam on the coursework. At least 12 hours for the M.S. non-thesis degree must be from 8000-level courses or above. The specific courses required depend upon the student's area of concentration. IE 9000 Research/Thesis does not apply to non-thesis students. Note that the selection of courses for this option is left up to the student, subject to the general requirements stated previously and to the approval of the student's graduate program committee. If a student has completed any program requirement course as part of a previous degree, these classes must be replaced with other classes.

Management Systems Engineering

The Management Systems Engineering (MSE) concentration option is designed for the student who wishes to increase his/her understanding and capability in the engineering management area. The philosophy behind this option is that students can be provided with knowledge that will enable them to apply an engineering approach to problems involved in the design and operation of management systems. A student electing this specialization would normally expect to move into a career in management following an initial assignment as an engineer or management trainee.

Concentration Foundational Requirements (do not appear on the POS):

- B.S. in engineering from an ABET-accredited program or permission from the MSE Committee
- IE 3913 Engineering Economy I
- IE 4613 Engineering Statistics I

Program Requirements (Thesis Option):

IE 6513	Engineering Administration	3
IE 6533	Project Management	3
IE 6573	Process Improvement Engineering	3
IE 8583	Enterprise Systems Engineering	3
IE 8913	Engineering Economy II	3
Non-MSE graduate-level IE courses (see Appendix A)		6
Courses to be selected by the student along with the academic advisor and graduate program committee		3
IE 9000	Thesis in ISE	6
Total Hours		30

The thesis-option Master of Science in Industrial Engineering requires at least 24 credit hours of coursework above the baccalaureate degree. If a student has completed any program requirement course as part of a previous degree, these classes must be replaced with other classes keeping in mind that thesis students must have ≥ 6 hours of non-MGT ISE courses.

Program Requirements (Non-Thesis Option):

IE 6513	Engineering Administration	3
IE 6533	Project Management	3
IE 6573	Process Improvement Engineering	3
IE 8583	Enterprise Systems Engineering	3
IE 8913	Engineering Economy II	3
Non-MSE graduate-level IE courses (see Appendix A)		6
Courses to be selected by the student along with the academic advisor and graduate program committee		9
Total Hours		30

A written and oral comprehensive final exam on the coursework. At least 12 hours for the M.S. non-thesis degree must be from 8000-level courses or above. The specific courses required depend upon the student's area of concentration. If a student has completed any program requirement course as part of a previous degree, these classes must be replaced with other classes keeping in mind that non-thesis students must have ≥ 9 hours of non-MGT ISE courses.

Manufacturing Systems

The Manufacturing Systems (MFG) concentration is designed for the student who wishes further work in the design, analysis, and control of manufacturing systems.

Concentration Foundational Requirements (do not show on the POS):

- B.S. in engineering from an ABET-accredited program or permission from the Manufacturing Systems Committee
- Computer Programming Proficiency
- IE 4333 Production Control Systems I
- IE 4613 Engineering Statistics I

Program Requirements (Thesis Option):

IE 6653	Industrial Quality Control I	3
IE 8333	Production Control Systems II	3
IE 6773	Systems Simulation I	3
At least two of the following:		6
<ul style="list-style-type: none"> • IE 6193 Automotive Engineering • IE 6353 Materials Handling • IE 6373 Automation • IE 6923 Six Sigma Methods and Projects • IE 6543 Logistics Engineering 		

<ul style="list-style-type: none"> • IE 8353 Manufacturing Systems Modeling • IE 8773 Systems Simulation II • IE 8990 Advanced Data Analytics for Complex Systems • IE 6573 Process Improvement Engineering • IE 6673 Reliability Engineering 	
Non-manufacturing graduate-level IE courses (see Appendix A)	6
Courses to be selected by the student along with the academic advisor and graduate program committee	3
IE 9000 Thesis in ISE	6
Total Hours	30

The thesis-option Master of Science in Industrial Engineering requires at least 24 credit hours of coursework above the baccalaureate degree. If a student has completed any program requirement course as part of a previous degree, these classes must be replaced with other classes keeping in mind that thesis students must have ≥ 6 hours of non- MFG ISE courses.

Program Requirements (Non-Thesis Option):

IE 6653 Industrial Quality Control I	3
IE 8333 Production Control Systems II	3
IE 6773 Systems Simulation I	3
At least two of the following:	6
<ul style="list-style-type: none"> • IE 6193 Automotive Engineering • IE 6353 Materials Handling • IE 6373 Automation • IE 6923 Six Sigma Methods and Projects • IE 6543 Logistics Engineering • IE 8353 Manufacturing Systems Modeling • IE 8773 Systems Simulation II • IE 8990 Advanced Data Analytics for Complex Systems • IE 6573 Process Improvement Engineering • IE 6673 Reliability Engineering 	
Non-manufacturing graduate-level IE courses (see Appendix A)	6
Courses to be selected by the student along with the academic advisor and graduate program committee	9
Total Hours	30

A written and oral comprehensive final exam on the coursework. At least 12 hours for the M.S. non-thesis degree must be from 8000-level courses or above. The specific courses required depend upon the student's area of concentration. If a student has completed any program requirement course as part of a previous degree, these classes must be replaced with other classes keeping in mind that non- MFG ISE courses, and non-thesis students must have ≥ 9 hours of non-MFG ISE courses.

Operations Research

The Operations Research (OR) concentration option is designed for the students who wish to develop skills in the use of Operations Research (OR) for systems analysis and design.

Concentration Foundational Requirements (do not show on the POS):

- MA 1713, 1723, 2733, 2743: Calculus I, II, III, IV
- MA 3113 Introduction to Linear Algebra
- Computer Programming Proficiency
- IE 6613 Engineering Statistics I

Program Requirements (Thesis Option):

IE 6733	Linear Programming I	3
IE 6773	Systems Simulation I	3
OR graduate level IE courses (see Appendix A)		6
Non-OR graduate-level IE courses (see Appendix A)		6
At least one graduate class from Computer Science (CSE), Mathematics (MA), or Statistics (ST)		3
Courses to be selected by the student along with the academic advisor and graduate program committee		3
IE 9000	Thesis in ISE	6
Total Hours		30

The thesis-option Master of Science in Industrial Engineering requires at least 24 credit hours of coursework above the baccalaureate degree. If a student has completed any program requirement course as part of a previous degree, these classes must be replaced with other classes keeping in mind that thesis students must have ≥ 6 hours of non-OR ISE courses.

Program Requirements (Non-Thesis Option):

IE 6733	Linear Programming I	3
IE 6773	Systems Simulation I	3
OR graduate level IE courses (see Appendix A)		6
Non-OR graduate-level IE courses (see Appendix A)		6
At least one graduate class from Computer Science (CSE), Mathematics (MA), or Statistics (ST)		3
Courses to be selected by the student along with the academic advisor and graduate program committee		9
Total Hours		30

A written and oral comprehensive final exam on the coursework. At least 12 hours for the M.S. non-thesis degree must be from 8000-level courses or above. The specific courses required depend upon the student's area of concentration. If a student has completed any program requirement course as part of a previous degree, these classes must be replaced with other classes keeping in mind that non-thesis students must have ≥ 9 hours of non-OR ISE courses.

Data Analytics

The Data Analytics (DAAS) concentration option is designed for students who wish to advance their careers in data analytics. The industry-relevant curriculum gives students the skills to extract valuable

insights from big data. In this program, students will learn expertise in statistical modeling, data management, machine learning, data visualization, and data-driven decision-making related to industrial engineering applications, to meet the growing needs of industry, not-for-profits, government agencies, and other organizations.

Concentration Foundational Requirements (do not show on the POS):

- MA 1713, 1723, 2733, 2743: Calculus I, II, III, IV
- MA 3113 Introduction to Linear Algebra
- Computer Programming Proficiency
- IE 4613 Engineering Statistics I

Program Requirements (Thesis Option):

IE 6623	Engineering Statistics II	3
IE 6683	Machine Learning with Industrial Engineering Applications	3
IE 8623	Adv Data Analytics	3
At least three ISE elective courses in Data Analytics. See academic advisor for a list of approved electives.		9
At least one graduate class from CSE, ECE, or Math/Stat		3
Courses to be selected by the student along with the academic advisor and graduate program committee		3
IE 9000	Thesis in ISE	6
Total Hours		30

The thesis-option Master of Science in Industrial Engineering requires at least 24 credit hours of coursework above the baccalaureate degree.

Program Requirements (Non-Thesis Option):

IE 6623	Engineering Statistics II	3
IE 6683	Machine Learning with Industrial Engineering Applications	3
IE 8623	Adv Data Analytics	3
At least three ISE elective courses in Data Analytics. See academic advisor for a list of approved electives.		9
At least one graduate class from CSE, ECE, or Math/Stat		3
Courses to be selected by the student along with the academic advisor and graduate program committee		9
Total Hours		30

A written and oral comprehensive final exam on the coursework. At least 12 hours for the M.S. non-thesis degree must be from 8000-level courses or above. The specific courses required depend upon the student's area of concentration.

M.S. Program Timing Expectations

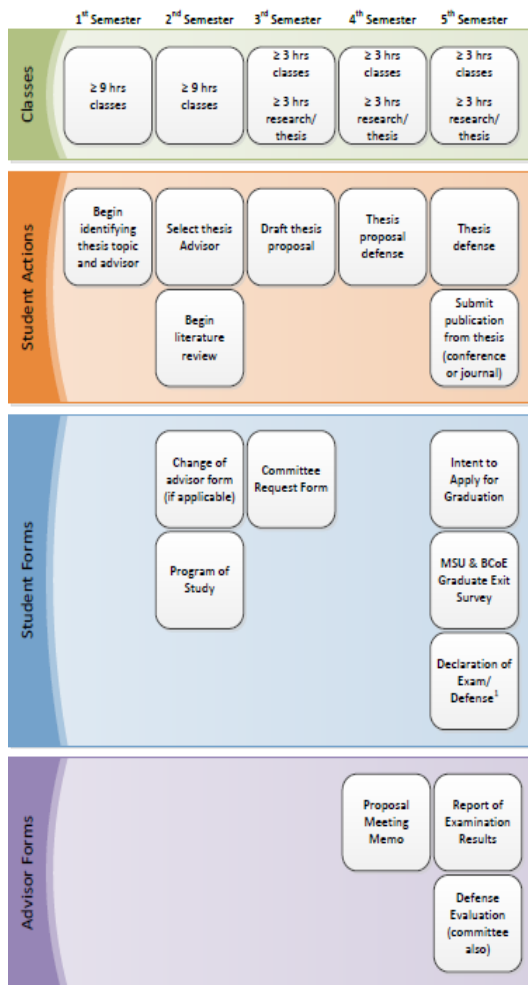
The Department of Industrial and Systems Engineering has developed flow charts to aid students in the completion of their M.S. program. Flow charts have been developed for both the thesis and non-thesis options for both on-campus and distance students. In general, it is expected that for on-campus

students, 4 semesters are required for the non-thesis option, and 5 semesters are required for the thesis. For distance students, it is expected that 8 semesters are required for both the thesis and non-thesis options. These timelines are dependent on the number of classes taken each semester and the progress on research.

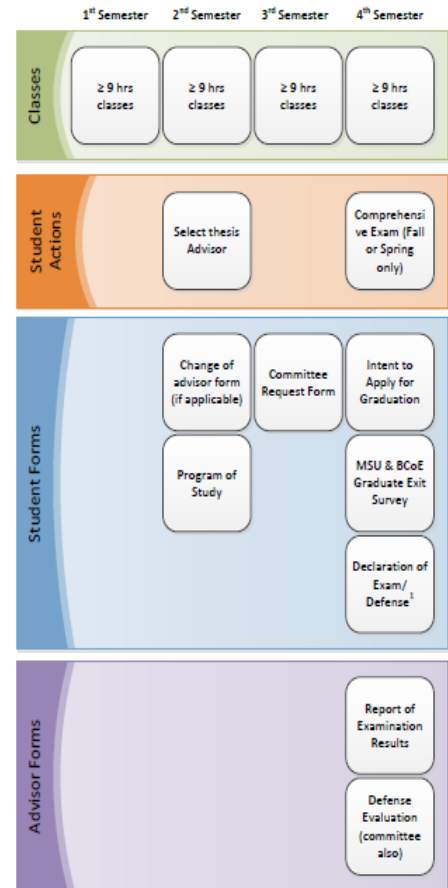
While many of the required forms that must be completed have been identified and included in the flow charts, it is the responsibility of the student to submit all required forms to the Graduate School and Library, excluding those required of the faculty (e.g., Report of Examination Results). The flow charts can be found in the following pages for expected student progress, milestones, and forms for the thesis/non-thesis options for both on-campus and distance students.

The audit sheet for the M.S. program is provided in the following pages as well.

MS Thesis Option—Campus 1



MS Non-Thesis Option—Campus 1



¹Must submit 2 weeks prior to exam/defense

MS Thesis Option—Campus 5 (BS in ISE or related field assumed)

	1 st Semester	2 nd Semester	3 rd Semester	4 th Semester	5 th Semester	6 th Semester	7 th Semester	8 th Semester
Classes	≥ 3 hrs classes	≥ 3 hrs classes	≥ 3 hrs classes	≥ 3 hrs classes	≥ 3 hrs classes	≥ 3 hrs classes	≥ 3 hrs classes	≥ 3 hrs classes
			≥ 3 hrs research/ dissertation	≥ 3 hrs research/ dissertation	≥ 3 hrs research/ dissertation	≥ 3 hrs research/ dissertation	≥ 3 hrs research/ dissertation	≥ 3 hrs research/ dissertation
Student Milestones		Begin identifying dissertation topic and advisor	Select dissertation advisor	Begin literature review		Draft thesis proposal	Thesis proposal defense	Thesis defense
								Submit journal or conference publication from thesis
Student Forms		Program of Study	Change of Advisor form (if applicable)		Committee Request form			Intent to Apply for Graduation
								MSU & BCoE Graduate Exit Survey
								Declaration of Exam/Defense ¹
Advisor Forms						Proposal Meeting Memo		Report of Examination Results
								Defense Evaluation (committee members also)

¹Must be submitted 2 weeks prior to oral defense

MS Non-Thesis Option—Campus 5 (BS in ISE or related field assumed)

	1 st Semester	2 nd Semester	3 rd Semester	4 th Semester	5 th Semester	6 th Semester	7 th Semester	8 th Semester
Classes	≥ 3 hrs classes	≥ 3 hrs classes	≥ 3 hrs classes	≥ 3 hrs classes	≥ 3 hrs classes	≥ 3 hrs classes	≥ 3 hrs classes	≥ 3 hrs classes
Student Milestones								Comprehensive Exam (Fall or Spring only)
Student Forms		Program of Study	Change of Advisor form (if applicable)		Committee Request form			Intent to Apply for Graduation MSU & BCoE Graduate Exit Survey Declaration of Exam/Defense ¹
Advisor Forms								Report of Examination Results Defense Evaluation (committee members also)

¹Must be submitted 2 weeks prior to oral exam

Procedure for Thesis Preparation and Oral Thesis Defense

The following information is to be used as a guide to describe the general process of a thesis oral defense. All the required forms the student and advisor are responsible for are not identified here (see the Graduate Catalog for a listing of all required forms).

1. With the consent and advice of the student's major professor, the student selects a tentative thesis topic (2nd semester). See Appendix B for detailed guidelines for selection of a thesis topic.
2. The student and major professor tentatively identify committee members (see Appendix D), and the student asks each potential committee member if they are willing to serve on the students' committee.
3. The student prepares a typed thesis proposal describing the proposed work. The proposal is expected to include a detailed review of the relevant literature with a complete reference list, a detailed research plan, and should clearly indicate the contribution to the knowledge base that will be made with the successful completion of this research. The proposal will not be considered complete without a list of relevant, reviewed references.
4. The major professor approves the proposal and copies are submitted to the committee members, in general, 2 weeks prior to the Thesis Proposal Defense.
5. A Proposal Defense meeting is held in which the student presents their proposal and answers questions (typically, 1-2 hours are set aside for proposal defenses). The committee decides if the topic is suitable and of sufficient scope, and if revisions to the proposed methods are required. If the decision is favorable, the advisor will submit a Proposal Notification Form to the Graduate Coordinator, and the student will begin the research pending any requirements specified by the committee (e.g., submission of revised methods, completion of pilot study, and completion of additional coursework).
6. The major professor guides and directs the thesis research and initial thesis writing. Other committee members are also available for guidance and advice. The major professor may schedule a progress meeting with the committee when the research is well underway. **The student should become thoroughly familiar with the Library Thesis and Dissertation Guide and should adhere to the specified format when writing the thesis.** There are workshops held through the library to aid in the development of the final document.
7. The major professor approves a final draft of the thesis, and the student submits copies to the committee members. The student schedules the oral thesis defense with the committee members, and notification of the date of the defense must be submitted to the Graduate Coordinator and Graduate School a minimum of 2 weeks prior to the defense. Copies of the thesis must be submitted to the committee members at **least one week prior to** the scheduled oral date. No oral will be scheduled during dead days or the final examination period.
8. Committee members read the draft and submit suggestions for changes and/or additions to the student (usually after the oral defense).
Note: With the permission of the committee, the student may take the oral, based on the draft version of the thesis, which is originally submitted to the committee.
9. The oral defense begins with a presentation by the student (15-30 minutes) of the thesis work, followed by questions on the thesis. Again, typically 1-2 hours is allotted to the final thesis defense.
10. The student leaves the room, the committee decides on a pass, fail, or retest, and the student is informed of the decision. It is the firm policy of this department that students who do not perform well on the oral will not be passed. The committee will have the option of failing these students or requiring a retest. In the case of a retest, the student must again appear for an oral

questioning no sooner than two weeks following the original oral. This procedure may be repeated at the option of the committee.

11. In consultation with the major professor, the student makes the changes and/or additions required by the committee.
12. A copy of the thesis is submitted to the Library for format approval and all other forms associated with submitting the thesis are submitted to the Library.

Master of Science Non-thesis Option Comprehensive Exam

General Discussion of the Test. The Graduate Catalog states, "A final comprehensive examination is required of all degree candidates, except those in programs that do not vary from a required program of study (per Graduate Council, May 2004). The following policy requirements must be met (edits to the Graduate Catalog are made here for brevity. Please refer to the Graduate Catalog for the full description).

- Master's degree candidates are required to take an oral examination, a written examination, or both. M.S. non-thesis exam can be waived for students maintaining a 4.0 grade point average on their first 24 credit hours (or for all courses being applied to the MS degree for students in the PhD program wishing to earn the MS degree along the way). Foundational courses (if taken) will be considered in the GPA calculation, though they cannot be used to fulfill degree requirements.
- A student must be enrolled at MSU during the semester the exam is administered.
- The examination date must take place by the deadline found in the Graduate Academic Calendar.
- A student must have a 3.00 GPA on all coursework after admission to the program (i.e., program and non-program courses).
- The student must be within the last 6 hours or in the terminal semester (per Graduate Council, May 2006) of coursework, excluding internship/practicum courses (per Graduate Council, September 2004).
- The candidate's examination should demonstrate:
 1. the candidate's thorough familiarity with the literature in the major field;
 2. the relation of the special subject to allied subjects; and
 3. the level of general knowledge and training, including use of oral and written English.
- One negative vote **will not** constitute failure for a student on a preliminary/comprehensive examination. Two negative votes **will** constitute failure for a student on a preliminary/comprehensive examination (per Graduate Council, October 2005).
- A student who fails the comprehensive exam can apply to schedule another examination after a period of four months has elapsed from the date of the original exam. Two failures result in the student's removal as a master's degree candidate.

In accord with this requirement, the Department of Industrial and Systems Engineering requires that non-thesis degree candidates must pass a written and oral examination that will be given only in the Fall or Spring semesters to all students hoping to graduate prior to the next examination. The written examination consists of one four-hour session, and will be open book, open notes. Students may not loan or borrow materials during the examination. The oral examination will last no longer than 1 hour and is used to ask for clarification on student responses, and to allow the student to rectify missed questions. Students are expected to rework and submit new answers for those questions the student missed.

The questions will be reasonable. The faculty will write this exam, and they know what questions you should be able to answer and which you shouldn't. The faculty wants you to pass this exam. However, you should not take this to mean that you will pass regardless of your performance. Students must pass the written exam to schedule the oral exam. Any student who fails the written exam will need to retake the exam the following fall or spring semester. Typical exam questions will be similar to in-class and final exam questions for the courses in question.

Graduate students taking this examination should not fear this examination but should have a healthy respect for it. This means that they should expect to pass it. After all, having spent a year or more studying industrial and systems engineering at the graduate level, having paid attention in classes, having done extra reports and projects for graduate credit, having made B's or better in your classes, each graduate student should have confidence that he/she has knowledge of his/her field at the Master's level.

A healthy respect also means that the student should expect to prepare for this test, rather than walk in cold. After all, nobody has all the facts he/she has ever learned at his/her fingertips, and a thorough review is necessary in order to proceed with the test at the necessary pace.

The Test Itself. The written exam is composed of two sections: selecting **two** full-graduate-level classes (8000-level) and **two** graduate-level classes (6000-level) (for a total of **4** subjects). All course selections are subject to the approval of the Graduate Coordinator. This portion of the exam will last no longer than 4 hours. Additional details on each section are provided below.

Students must select two of the following classes as part of their exam:

1. Systems Simulation I
2. Linear Programming
3. Industrial Ergonomics
4. Engineering Economy I
5. Production Control Systems I
6. Engineering Statistics I

Full-graduate-level classes refer to any IE 8000-level class, including special topic classes, except those routinely taught by non-ISE tenure track faculty (denoted by a # in Appendix A). Students cannot select a course in which they are currently enrolled; and students cannot request a "double exam" (meaning two questions from one class). Students must select **two** IE 8000-level classes for which they have received a grade of B or better.

Graduate-level classes refer to any IE 6000 or IE 8000 classes, except those 6000 level classes that are listed as foundational classes or those routinely taught by non-ISE tenure track faculty. Again, students cannot select a course in which they are currently enrolled; and students cannot request a "double exam". Students must select two IE 6000 classes for which they have received a grade of B or better.

Written responses will be graded and a numeric or letter grade assigned. All grades will be translated into a letter grade A-F. These letter grades will be averaged GPA style (A grades will receive 4 pts, B grades 3 pts, C grades 2 pts, D grades 1 pt, and F grades no pts). The oral examination will be waived for students with a grade point average greater than or equal to 3.50 in the written exam. If a student fails to achieve this grade point average, the student must have to take an oral examination. **Students must receive a minimum of 2.60 GPA style average on the written exam to proceed to the oral exam.** Any

student receiving less than a 2.60 average will fail the written and will be required to retake the exam in the following Fall or Spring semester. The detailed MS non-thesis exam guideline is visualized in the below flow chart.

Non-thesis Exam Guideline

If the student has a GPA 4.0 up to 24 credit hours **Then**

Exam Waived (contact Dr. Maruf for requirements)

Else

Take the exam with 4 preferred Graduate-level courses
(2 classes at the 6000-level & 2 classes at the 8000-level)

If exam grade ≥ 3.50 **Then**

Oral Waived & PASS the Exam

Else

Attend the Oral Exam¹

If perform well in the oral² **Then**

PASS the Exam

Else

Retake the Exam

¹If the exam GPA is less than 2.60, then no oral exam will be scheduled and the student will have to retake the exam in the following Fall or Spring semester

²Evaluated by the committee

Specific Rules:

1. The student's committee is named by the Graduate Coordinator. All students taking the comprehensive exam in a given semester will have the same examining committee, though the composition of the committee will vary across semesters. The committee will consist of at least three ISE faculty with broad representation across the four main areas of Industrial and Systems Engineering (Human Factors and Ergonomics, Management Systems, Manufacturing Systems, and Operations Research). Students will be notified of the examining committee prior to the written exam.
2. The Graduate Coordinator will ask ISE faculty to develop and submit questions for the examination based on all student selections. Further, these faculty will grade all returned examinations for which they submitted a question.
3. A determination of pass or fail on the written is rendered in writing by the Graduate Coordinator along with the graded exams.
4. Students who pass the written exam will complete the oral exam. All students taking the oral exam will complete the exam on the same day, or across two days depending on examining faculty availability. All faculty may attend the oral defense, but those faculty not named to the examining faculty will not vote on the results of the comprehensive examination. Attendance of non-examining faculty is not expected unless requested by the Graduate Coordinator or other examining faculty.
5. Faculty may, at the student's request, meet to discuss the results of the written examination with the student. Note, however, that solutions or directions for correction are at the discretion of the faculty and likely will not be provided to the student. These meetings should take place prior to the oral.
6. The oral examination will be scheduled by the Graduate Coordinator and will be held prior to the deadline for submission of examination results set by the Office of the Graduate School.

Students completing the oral exam must submit a Declaration of Exam/Defense form to the Graduate Coordinator and the Graduate School no later than 2 weeks prior to the scheduled oral defense date.

7. The examining faculty may pass the student, recess the oral, or fail the student. Students may receive only 1 fail vote to pass the oral. If two or more fail votes are cast, the student will fail the examination and be required to take the exam in the following Spring or Fall. Per university policy, students are allowed only one re-take.

Procedures for the M.S. Non-thesis Comprehensive Exam. The following information is to be used as a timeline for the comprehensive exam.

1. An email is sent to each M.S. student early in the Fall or Spring semesters only, asking of intent to sit for the exam from the Graduate Coordinator.
2. The student, with assistance from their advisor, selects the topics the student wishes to be tested on.
3. The examination will be in one four-hour session, and will be open book, open notes. The students may not loan or borrow materials during the examination. The exam takes place in early to mid-September in the Fall and early to mid-February in the Spring.
4. The written examinations are graded and returned to the students, and decision regarding the pass/fail status of the written exam is rendered.
5. The Graduate Coordinator schedules the oral exam and students exam times. Typically, these will be held 4 weeks following the written (roughly early October or early March).
6. The oral examination will be limited to subjects covered on the written examination. Students are expected to have reworked any missed questions on the written prior to the oral defense. If desired the student can submit reworked solutions to aid in the oral portion of the examination.
7. The committee will determine whether the student passes or fails the oral examination.

7. Doctor of Philosophy in Industrial and Systems Engineering Program

Admission Requirements

Admission decisions for the Ph.D. program in ISE are based on several factors, including previous academic performance, standardized test scores, references, and relevant work experience. Typically, entering students with M.S. degrees should have a 3.50 out of 4.00 GPA on their M.S. work, while students entering with BS degrees only are generally expected to have a 3.50 GPA out of 4.00 for their last two years of their undergraduate program. These grade point averages are viewed as guidelines, rather than strict requirements. Students with lower averages may still be eligible for admission based on outstanding qualifications in other areas. International students must have a minimum internet-based TOEFL (iBT) score of 79 (6.5 on IELTS). Please find <https://www.grad.msstate.edu/students/admissions/test-scores-for-details-about> English language test score requirements and related outcomes. Additionally, **all students desiring admission to the Ph.D. program must have completed Calculus I and II prior to applying for admission.**

Program Foundational Requirements

The Department offers the Doctor of Philosophy in Industrial and Systems Engineering. It is the guiding philosophy of the Department of Industrial and Systems Engineering that a student who receives a doctorate through this department will be an Industrial and Systems Engineer. This means that all students will satisfy at least the foundational courses listed below. (NOTE: These requirements must be satisfied prior to completing the program, but, with the exception of Calculus I and II, do not have to be met prior to entering the program).

MA 1713, 1723, 2733, 2743: Calculus I, II, III, IV

Computer programming proficiency

IE 3123: Industrial Ergonomics

IE 3913: Engineering Economy I

IE 4333: Production Control Systems I

IE 4613: Engineering Statistics I

Other Requirements. In addition to the above, all graduate school requirements must be met. See the Graduate School Bulletin for further requirements. The actual courses taken are selected by the student and his/her advisor within the rules of the University and Department and are subject to approval by the Department and the Graduate School. Additional requirements are:

1. No ISE graduate student may show ST 8114 or IE 6613 on their graduate program.
2. No program can contain more than 15 hours of courses that are required in the Bachelor's degree curriculum. This applies to students who have not yet taken these courses as part of their undergraduate degree. Any student who has taken the course, or an equivalent course, as part of their undergraduate degree cannot use that course on their graduate program.
3. No program can contain more than 6 hours of Directed Individual Study (IE 7000).

Program Core Requirements

A doctoral program in Industrial and Systems Engineering will contain, at a **minimum**, 48 hours of formal

course work at the 6000-level or higher (beyond the bachelor’s degree), and 20 hours of dissertation credit. At least 24 hours of coursework should be at the full-graduate level (8000-level, or IE 7000). Further, the student’s program must include:

- ≥ 30 hours of coursework in ISE (from at least two different areas of ISE);
- ≥ 6 hours of coursework in a discipline other than ISE;
- ≥ 20 hours of dissertation credit (IE 9000);
- Other work specified by the student's committee.

As part of their program, all ISE Ph.D. students will be required to take IE 6623: Engineering Statistics II, and IE 6773: System Simulation I. A planning page for the Ph.D. program is provided on the next page. Ph.D. students are required to complete a dissertation proposal meeting and must pass an oral defense of the dissertation before being allowed to graduate. Additionally, Ph.D. **students must submit 2 journal papers from their thesis prior to graduation.** To receive the Graduate Coordinator’s signature on the signature page, students must provide **proof of two journal submissions from the dissertation work.** Journal paper submissions from work not a part of the dissertation, while strongly encouraged, **cannot** be used to satisfy this requirement. The overall Ph.D. requirements are summarized as follows:

IE 6623	Engineering Statistics II	3
IE 6773	Systems Simulation I	3
Courses to be selected by the student along with the academic advisor and graduate program committee		36
Coursework in a discipline other than ISE		6
IE 9000	Dissertation in ISE	20
Total Hours		68

- ≥ 30 hours of coursework in ISE (from at least two different areas of ISE);
- ≤ 24 hours of transfer credit hours if applicable (pending approval from the major advisor and graduate coordinator)
- ≥ 24 hours of full-graduate level coursework (8000-level or IE 7000)
- Publish **two** journal articles from the dissertation chapters

Transfer Credit Hours. Students entering the Ph.D. program with prior graduate degrees or coursework may **transfer up to 24 hours** on their program of study. Students should work closely with their advisor and committee to determine which courses are appropriate for transfer. Keeping in mind the program requirements above, students may not be able to transfer the full 24 hours. (See complete details in Transfer Credits earlier).

Procedures for the Doctor of Philosophy Program

The student bears the responsibility for the progress of their program, including submission of proper forms, timing of examinations, preparation of examinations, insuring the meeting of deadlines, and completion of all requirements.

1. The Graduate Coordinator assigns the student to a **temporary** advisor, who will act as academic advisor to the student until a dissertation advisor is identified, who is to become the student's **permanent** advisor (Semester 2). In general, the Graduate Coordinator serves as the advisor for all incoming graduate students.
2. The student and dissertation director arrive at a mutually satisfactory tentative program and committee, calling upon the other faculty members and the Graduate Coordinator for assistance as appropriate (Semester 2).
3. When the student has completed, or is within six hours of completing, his/her coursework and has identified a tentative area for research, he/she must pass a preliminary examination. This examination will be both written and oral and is designed to determine the student's ability to perform scholarly work in Industrial and Systems Engineering and to indicate the possible need for further course work or other necessary preparation for conducting the dissertation research. The subject areas covered by the examinations will be selected by the committee. All portions of the written exam must be completed within a time frame specified by the committee, not to exceed two months. The oral examination will follow the written examination and will be used to clarify answers on the written examination, further investigate the student's knowledge, and discuss test results. **Students must complete their program within 5 years of the completion of this exam.**
4. The student must select and have approved a dissertation topic. The procedure requires the following three steps:
 - i. The student prepares a formal dissertation proposal outlining the proposed work. The proposal is expected to review the state of the art and should clearly indicate that a substantial literature search has been completed. See "Appendix D: Guidelines for Selecting Graduate Committees and for Writing Thesis or Dissertation Proposals" for proposal writing guidelines.
 - ii. The major professor approves the proposal and copies are submitted to the committee members.
 - iii. A proposal meeting is held. The student presents his/her proposal and answers questions. The committee decides if the topic is, or is not, suitable and makes suggestions on scope, solutions, etc.
5. **The student should become thoroughly familiar with the Graduate School Thesis and Dissertation Guide and should adhere to the specified format when writing the dissertation.** Upon completion of the dissertation and its review by the committee, the final oral examination is held. The examination is restricted to the defense of the dissertation, but the student must expect and be able to answer questions that test his/her fitness to do research in the area of the dissertation.

Procedure for Dissertation Preparation and Oral Dissertation Defense

The following information is to be used as a guide to describe the general process of a dissertation oral defense. All the required forms the student and advisor are responsible for are not identified here (see the appropriate flow chart above and the Graduate Bulletin for a listing of all required forms).

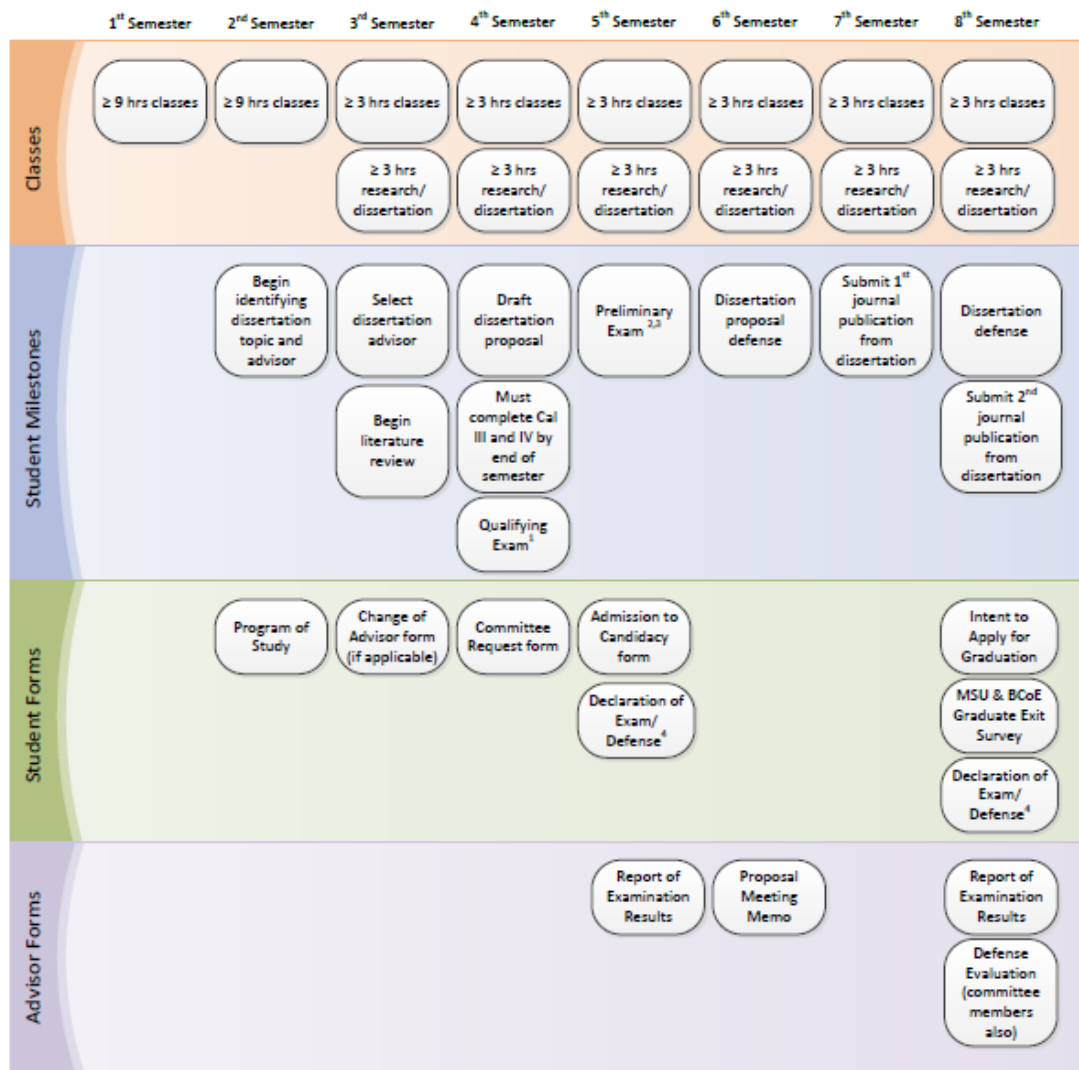
1. With the consent and advice of the student's major professor, the student selects a tentative dissertation topic (2nd semester). See Appendix B for detailed guidelines for selection of a dissertation topic.
2. The student and major professor tentatively identify committee members (see Appendix D), and the student asks each potential committee member if they are willing to serve on the student's committee.
3. The student prepares a dissertation proposal describing the proposed work. The proposal is expected to include a detailed review of the relevant literature with complete reference list, a detailed research plan, and should clearly indicate the contribution to the knowledge base that will be made with the successful completion of this research. The proposal will not be considered complete without a list of relevant, reviewed references.
4. The major professor approves the proposal and copies are submitted to the committee members, in general, 2 weeks prior to the Dissertation Proposal Defense.
5. A Proposal Defense meeting is held in which the student presents their proposal and answers questions (typically, 2 hours are set aside for proposal defenses). The committee decides if the topic is suitable and of sufficient scope, and makes suggestions of methods or procedure modifications, direction, analysis, etc. If the decision is favorable, the advisor will submit a Proposal Notification Form to the Graduate Coordinator.
6. The major professor guides and directs the dissertation research and initial writing. Other committee members are available for guidance and advice. The major professor may schedule a progress meeting with the committee when the research is well underway. **The student should become thoroughly familiar with the Graduate School Thesis and Dissertation Guide and should adhere to the specified format when writing the dissertation.** There are workshops held through the library to aid in the development of the final document.
7. The major professor approves a final draft of the dissertation, and the student submits copies to the committee members. The student schedules the oral dissertation defense with the committee members, and notification of the date of the defense must be submitted to the Graduate Coordinator and Graduate School a minimum of 2 weeks prior to the defense. Copies of the dissertation must be submitted to the committee members at **least one week prior to the scheduled oral date**. No oral will be scheduled during dead days or the final examination period.
8. Committee members read the draft and submit suggestions for changes and/or additions to the student (usually after the oral defense).
Note: With the permission of the committee, the student may take the oral, based on the draft version of the dissertation, which is originally submitted to the committee.
9. The oral defense begins with a presentation by the student (15-30 minutes) of the dissertation work, followed by questions on the dissertation. Again, typically a total of 2 hours is allotted to the final dissertation defense.
10. The student leaves the room, the committee decides on a pass, fail, or retest, and the student is informed of the decision. It is the firm policy of this department that students who do not perform well on the oral will not be passed. The committee will have the option of failing these students or requiring a retest. In the case of a retest, the student must again appear for an oral questioning not sooner than two weeks following the original oral. This procedure may be repeated at the option of the committee.
11. In consultation with the major professor, the student makes the changes and/or additions required by the committee.
12. A copy of the dissertation is submitted to the Library for format approval, along with all other required forms for dissertation submissions to the Library.

Ph.D. Program Timing Expectations

The Department of Industrial and Systems Engineering has developed flow charts to aid students in the completion of their Ph.D. program. Flow charts have been developed for both on-campus and distance students. In general, it is expected that for on-campus students, 8 semesters are required for program completion, 14 semesters are required for distance students to complete their program, and 12 semesters are required for direct admit to Ph.D. students to complete their program. The actual number of semesters required will be a function of the number of courses taken each semester and the student's ability to complete their dissertation research in a timely manner.

While many of the required forms that must be completed have been identified and included in the flow charts, it is the responsibility of the student to submit all required forms to the graduate school, excluding those required of the faculty (e.g., Report of Examination Results), to the department and college, and to the Library. The flow charts can be found in the following pages for expected student progress, milestones and forms for the Ph.D. program for both on-campus and distance students.

PhD—Campus 1 (MS in ISE or related field assumed)



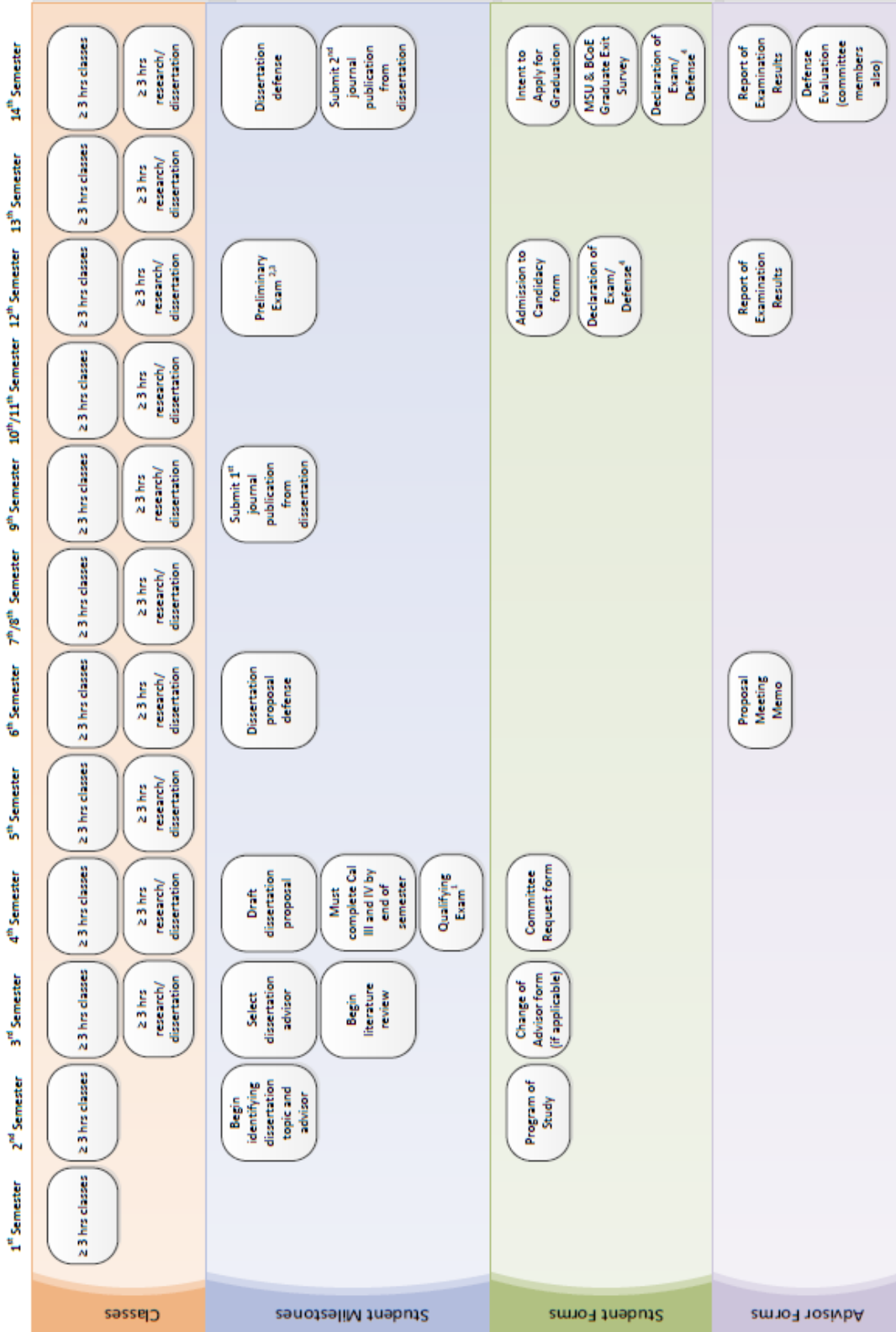
¹As needed

³Degree must be completed within 5 years from the completion of this exam

²Complete when within 6 hrs com completing coursework

⁴Must submit 2 weeks prior to exam/defense

PhD—Campus 5 (MS in ISE or related field assumed)



¹As needed

²Degree must be completed within 5 years from the completion of this exam

³Complete when within 6 hrs com completing coursework

⁴Must submit 2 weeks prior to defense/exam

8. Appendix

Appendix A: Industrial and Systems Engineering Graduate Course List

A comprehensive list of the graduate-level ISE courses can be found at

<http://www.catalog.msstate.edu/graduate/colleges-degree-programs/engineering/industrial-systems/#coursestext>

Appendix B: Guidelines for ISE Graduate Students Seeking a Thesis or Dissertation Topic

1. First consider the area of ISE that you find most interesting. All the graduate courses you have taken, are taking, or will take, offer possibilities for theses. So, to find a topic you will find interesting and enjoyable to work on, pick the area you most like.
2. Check the journals of the area in which you are interested. Try to pick specific subject matter in the area, such as scheduling in Production Control, and look through the journal articles published in this subject. Often, authors point out unanswered questions in their articles. An unanswered question is a potential topic. Also, a thesis can often be an extension of an article. If he/she makes restricting assumptions in his/her solution, you may be able to relax those assumptions as the basis for your research. If you do not know what the important journals are for your area, ask a professor who normally teaches in that area.
3. After completing the above process (both steps), visit with a professor who normally teaches in your area of interest. Take with you a list of literature reviewed, as well as any ideas you may have come across for possible topics. Sometimes a faculty member will have a topic in mind for a thesis or dissertation and is waiting for a graduate student to express an interest. But you cannot count on this! You are responsible for identifying a topic, and the professor's job is to provide you advice while you are determining a topic.

During this process, keep the following in mind.

1. You must find the topic.
2. No professor is required to direct your thesis or dissertation. It is solely his/her decision. Often, a professor may already have commitments that will not allow him/her to take on another thesis advisee.
3. You are responsible for your research and its progress. The professor will not (and should not) do your research, will not write your thesis, will not take the responsibility for your mistakes, nor is he/she responsible for seeing that you finish by the date you desire.
4. Do not use your advisor as your editor. If you know that you have writing and/or language issues, you should be prepared to pay for professional editing services. Advisors have the right to require you to have your document edited before they review it.
5. The date of completion is a function of how many hours you work on your thesis, the quality of work you do on your thesis, and how well your research goes. Research has unknowns. That is why it is research, and your advisor cannot determine how long it will take you to finish.

Appendix C: Minors in Industrial Engineering by Graduate Students from Other Departments

The Industrial and Systems Engineering Department requires nine hours of IE graduate courses for a minor at the M.S. level, and twelve hours of IE graduate courses for a minor at the Ph.D. level. The specific courses for the minor are to be approved by the ISE Graduate Coordinator and the student's ISE minor professor. If a minor is chosen, the student's graduate committee must include a representative from the minor field and the graduate coordinator from the minor field must sign approval of coursework.

Appendix D: Guidelines for Selecting Graduate Committees and for Writing Thesis or Dissertation Proposals

1. Selection of Graduate Committee Members

The Graduate Faculty of the Department of Industrial and Systems Engineering views the selection of a graduate committee as being among the most important decisions in a graduate student's career. The major professor is expected to provide a significant level of advice to the student in this matter. Although the faculty recognizes that it is generally desirable for the student to be well-acquainted with the committee members (e.g., through having taken courses from them), the most important consideration in the selection should be the technical assistance that the faculty members can provide during the course of the student's research. When seeking the Graduate Coordinator's approval when the committee is formed, the student should be prepared to justify the selection of each of the committee members.

Master's Program. Per the Graduate Catalog:

- For a master's degree committee, a minimum of three members are required and they must hold either a Level 1 or Level 2 Graduate Faculty appointment. One member may be a minor professor, if the student has a minor program.
- The major professor is chair of the committee, must hold Level 1 or Level 2 Graduate Faculty status, and must be from the student's major department/program.
- A limited number of Non-Graduate Faculty members may serve on a committee. Non-Graduate Faculty members are expected to have a graduate degree or commensurate expertise in the field of study. The decision regarding the qualifications of a Non-Graduate Faculty member to serve on a master's degree committee will be determined by the department/college.
- In all cases where the committee consists of numbers above the minimum, greater than 50% of the committee members must hold Graduate Faculty status.
- Non-Graduate Faculty committee members cannot serve as a major professor or committee chair.
- Non-Graduate Faculty committee members can serve as a co-thesis director of the research along with a Level 1 or Level 2 member of the Graduate Faculty for students in a thesis-option program. If this occurs, it is expected that the Non-Graduate Faculty committee member will have education and research expertise commensurate with Level 1 or Level 2 Graduate Faculty.
- The Committee Request is submitted to the Graduate School.

Doctoral Program. Per the Graduate Catalog:

- The doctoral student's committee will be composed of the chair and at least three members. If the student has a minor, the committee will be composed of at least five members: the chair, at least three members from the major field, and one minor member.
- The chair must hold Level 1 Graduate Faculty status and must be from the student's major department/program. A Level 2 Graduate Faculty member may serve as co-chair.
- Doctoral committee members will hold a Level 1 or Level 2 Graduate Faculty appointment.
- A limited number of Non-Graduate Faculty members may serve on a committee. Non-Graduate Faculty members are expected to have a graduate degree or commensurate expertise in the field of study. The division regarding the qualifications of a Non-Graduate Faculty member to serve on a doctoral degree committee will be determined by the department/college.
- In all cases where the committee consists of number above the minimum, greater than 50% of the committee members must be members of the Graduate Faculty.
- Non-Graduate Faculty committee members cannot serve as a major professor or committee chair.

- Non-Graduate Faculty committee members can serve as a co-dissertation director of the research along with a Level 1 member of the Graduate Faculty. If this occurs, it is expected that the Non-Graduate Faculty member will have education and research expertise commensurate with Level 1 Graduate Faculty.
- The Committee Request form is submitted to the Graduate School and the CAPP Compliance is complete when the preliminary/comprehensive examination is scheduled.

2. General Guidelines for Writing Thesis or Dissertation Proposals

The thesis/dissertation proposal should ordinarily contain at least the following:

1. Introduction (including an establishment of the need for the research)
2. Literature review
3. Detailed problem statement
4. Tasks to be completed, and expected methods
5. Timetable for tasks

Note that the thesis/dissertation proposal is not an additional requirement, but that it represents the initial work on the actual thesis/dissertation. That is, the proposal serves not just to organize and plan the work that is to be done, but it becomes the initial chapters of the thesis/dissertation itself. Also, it serves as an agreement between the student and the committee in that, if the proposal is approved, the thesis/dissertation is completed when the tasks outlined in the proposal have all been satisfactorily accomplished.

Appendix E: Important Names and Addresses

Office of Admissions

P.O. Box G
116 Allen Hall
Mississippi State, MS 39762
Phone: (662) 325-7400
Fax: (662) 325-1967

Housing and Residence Life

Mail Stop 9502
Herbert Hall
Mississippi State, MS 39762
Phone: (662) 325-3555
housing@saffairs.msstate.edu

Assistantships

Contact the ISE Department Head (see address below) for information.

International Admissions and Services

Mail Stop 9742
Floor 1 Montgomery Hall
Mississippi State, MS 39762
Phone: (662) 325-8929
Fax: 662-325-8583

Bagley College of Engineering

Dr. Jason Keith, Dean
Mail Stop 9544
250 McCain Building
Mississippi State, MS 39762
Phone: (662) 325-2270

Industrial and Systems Engineering Department

Dr. Kari Babski-Reeves, ISE Department Head and Associate Dean
Dr. Mohammad Marufuzzaman, Graduate Coordinator
Mail Stop 9542
260 McCain Building
Mississippi State, MS 39762
Phone: (662) 325-3865
Fax: (662) 325-7618

Appendix F: Industrial and Systems Engineering Graduate Faculty (By Concentration)

Human Factors and Ergonomics

- **Kari Babski-Reeves**, CPE, Associate Dean & Larry G. Brown Professor & Department Head
- **Lesley Strawderman**, PE, International Paper Chair, Professor
- **Reuben F. Burch V**, Jack Hatcher Chair, Associate Professor & Associate Director of CAVS
- **Daniel Carruth**, Assistant Research Professor
- **Adam Piper**, CSP, Teaching Professor

Management Systems Engineering

- **Brian K. Smith**, PEM, Associate Professor
- **Junfeng Ma**, Associate Professor
- **Seunghan Lee**, Assistant Professor
- **Jenna Johnson**, Assistant Teaching Professor

Manufacturing Systems

- **Linkan Bian**, Thomas B. & Terri L. Nusz Professor
- **Wenmeng Tian**, Associate Professor
- **Junfeng Ma**, Associate Professor
- **Brian K. Smith**, PEM, Associate Professor
- **Clayton Walden**, PE, Associate Professor and Executive Director of CAVS

Data Analytics

- **Linkan Bian**, Thomas B. & Terri L. Nusz Professor
- **Wenmeng Tian**, Associate Professor
- **Haifeng Wang**, Assistant Professor
- **Nazanin Morshedlou**, Assistant Professor
- **Junfeng Ma**, Associate Professor
- **Mohammad Marufuzzaman**, Associate Professor

Operations Research

- **Junfeng Ma**, Associate Professor
- **Nazanin Morshedlou**, Assistant Professor
- **Haifeng Wang**, Assistant Professor
- **Seunghan Lee**, Assistant Professor
- **Mohammad Marufuzzaman**, Associate Professor

Appendix G: Industrial and Systems Engineering Graduate Faculty

Kari Babski-Reeves, CPE, Associate Dean & Professor &

Department Head
Ph.D., Mississippi State University, 2000
Human Factors and Ergonomics
Occupational Safety and Health
Work Physiology
Biomechanics

Linkan Bian, Professor

Ph.D., Georgia Institute of Technology, 2013
System Informatics and Control
Reliability and Sustainability of Complex Systems
Data Mining
Advanced Manufacturing

Reuben F. Burch V, Associate Vice President for Research & Associate Professor

Ph.D., Mississippi State University, 2014
Human Factors and Ergonomics
Human-Technology Interaction
Wearable Technology Comfort and Fit
Workforce and Generational Cohort Traits

Daniel Carruth, Assistant Research Professor

Ph.D., Mississippi State University, 2008
Human Factors and Ergonomics
Cognitive and Behavioral Modeling and Simulation
Perception and Action
Human-System Interaction

Junfeng Ma, Associate Professor

Ph.D., Pennsylvania State University, 2016
Design and Manufacturing
Multi-Discipline Optimization
Decision Theory
Supply Chain Design and Management

Nazanin Morshedlou, Assistant Professor

Ph.D., University of Oklahoma
Complex systems resilience management
Network science
Humanitarian logistic
Intelligent post disruption analytics

Brian K. Smith, PEM, Associate Professor

Ph.D., University of Arkansas, 2011
Process Improvement
Healthcare Logistics and Scheduling
Quality Control
Decision Analysis

Lesley Strawderman, PE, Professor

Ph.D., The Pennsylvania State University, 2005
Human Factors and Ergonomics
Transportation Safety
Service Quality and Usability
Engineering Education

Wenmeng Tian, Associate Professor

Ph.D., Virginia Tech, 2017
Sensing and Analytics for Manufacturing Systems
Heterogeneous Data Fusion for Process Improvement
Statistical Quality Control
Variation Management for Complex Systems

Clayton Walden, PE, Executive Director of CAVS & Associate Professor

Ph.D., Mississippi State University, 2007
Engineering Management
Six Sigma
Lean Manufacturing

Haifeng Wang, Assistant Professor

Ph.D., SUNY-Binghamton University, 2019
Deep Learning with Optimization
Pattern Recognition in Image Data
Healthcare Informatics
Complex System Simulation

Seunghan Lee, Assistant Professor

Ph.D., University of Arizona, 2019
Stochastic Modeling
Simulation Analysis
Disaster Management
Homeland Security

Jenna Johnson, Assistant Teaching Professor

Ph.D., Mississippi State University, 2021
Lean and Six Sigma Methodologies
Quality Control
Small and Medium Enterprise Process Improvement
Engineering Education

Adam Piper, CSP, Teaching Professor

Ph.D., Auburn University, 2010
Occupational Safety and Health
Human Factors and Ergonomics
Assistive Technology & Rehabilitation Engineering
Biomechanics

Mohammad Marufuzzaman, Associate Professor

Ph.D., Mississippi State University, 2014

Stochastic Programming

Decomposition Methods

Machine Learning

Supply Chain Optimization