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This manual provides information about the graduate programs in the *Industrial and Systems Engineering Department at Texas A&M University* to new and continuing graduate students. It establishes governing policies on a variety of topics including degree programs, q-drops, examinations, and financial assistance. Additional information is available in publications from the *University Office of Graduate and Professional Studies* and in the *Graduate Catalog*.

I. **GETTING STARTED**

A. **Registering for Classes**

1. The *Office for Graduate Programs*, located in Room 4060 ETB, assists new graduate students with initial course selection and with identifying potential faculty advisors. The *Graduate Program Coordinator*¹ can help with any of the administrative requirements related to your education at Texas A&M University.

2. The *Schedule of Classes* for each semester can be obtained through the *Howdy Portal* at https://howdy.tamu.edu. Registration is also accomplished through the *Howdy Portal* by utilizing the *Add/Drop Courses* link on the *My Record* tab.

3. When a class you want is filled, you must obtain written (or email) permission from the course instructor before you can be forced into the class by the *Graduate Program Coordinator*.

4. Registration for courses requiring an advisor (a 685 directed studies course, a 692 project course, a 684 internship course, or a 691 research course) must be approved through the *Graduate Program Coordinator*. Additionally, departmental approval is necessary if an industrial and systems engineering graduate student wishes to register in any undergraduate courses.

B. **Temporary Advisors**

A *temporary advisor* is a faculty member who provides direction during the time the student has no degree plan. When new students come to the department, they may or may not know the faculty. If they think they might want to work under the direction of a specific faculty member, then that faculty member can become the student’s temporary advisor. Or, if a new student already has a specific research interest, then the student should ask a faculty member -- in that

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¹ In academic year 2015-16, the ISEN *Graduate Program Coordinator* is Ms. Erin Roady.
specialty -- to act as a temporary advisor. In the absence of a faculty advisor, the department's director of graduate programs\(^2\) can act as the temporary advisor.

The basic function of the temporary advisor is to help students as they adjust to their responsibilities as graduate students. This initial period allows students to validate, change, or establish a direction for their graduate studies. Students should not feel obligated to choose the temporary advisor as chair of their advisory committee. (The advisory committee is discussed in the “Graduate Program Requirements” section.)

C. Graduate Offices and Desk Space

Limited office space is available for graduate students. Offices are assigned according to departmental teaching and research needs. Requests for office space should be made to the director of graduate programs by a student’s advisor.

D. Computer Facilities

The department maintains computers and facilities for industrial and systems engineering faculty, staff, and students. Microcomputers for student use are located on the third floor of the Emerging Technologies Building. New students should check with the IT office (Emerging Technologies Building, Room 3019 or Student Computing Lab Room 3005) for instructions on setting up an industrial and systems engineering computer account. All computer users are asked to avoid waste (e.g., unnecessary printouts, use of laser printer for draft documents, etc.) and to be considerate of others using the facilities. The department uses a “card swipe” system to control entry into the computer rooms, so students will need their university identification for access to use the departmental computers. Each person entering the computer room after hours must use their own identification to gain access. Please comply with the rules and polices established for these facilities.

The university has several computer centers available to all students. Some of the centers with easy access to students from ETB are the ones located in Room 021 WERC, Room 133 in Blocker, and in the Student Computing Center (SCC) next to Evans library. The computer center in Teague is also a graphics lab for students needing support with graphics output, color slides, etc.

E. Travel and Leave Requests

Some students might have to travel on university business (usually because of a research project). Before traveling on university business, a travel and leave request must be submitted and approved. Reimbursement for travel expenses requires an account number that can be obtained from either the research supervisor or the advisory committee chair. The amount of expenses that can be paid by the university depends on the type of research contract and the trip’s destination. Check with the financial management staff regarding allowable expenses and

\(^2\) In academic year 2015-16, the ISEN Graduate Program Director is Dr. Yu Ding, taking the official title of Associate Department head for Graduate Affairs.
procedures for approval. Travel and leave must be approved before leaving or expenses cannot be reimbursed and insurance coverage is jeopardized. After the trip, a travel voucher must be filed to justify the claimed expenses.

F. Mailboxes

Each graduate student is assigned a mailbox. Mailboxes are located in the 4th floor hallway adjacent to the Grad Student Offices/Lounge area in 4050. Important university correspondence is delivered to student mailboxes, so students should be in the habit of checking their mail at least once per week, if not more often. The address for receiving off-campus mail is:

[Student Name]
Industrial and Systems Engineering Department
Texas A&M University
3131 TAMU
College Station TX 77843-3131

For on-campus mail, the address for the Industrial and Systems Engineering Department is Mail Stop 3131. Boxes for outgoing mail (off-campus and on-campus) are next to the copier across from the department head’s office. Off-campus mail requires correct postage.

Mailbox assignments change each semester to accommodate new students and clear out the boxes of those who have graduated. Please check the numbered list on the side of the mailbox wall each time you check your mail to ensure that you are looking in the correct box.

G. Common Areas

Graduate students have free use of the kitchen and dining area located in Room 4050. Please clean up after yourself and remove old food from the refrigerator regularly. Also note that all desks (cubicles, along the walls, anything with a number tag in the corner of the desk) in 4050 are by assignment only, though the eating area and end tables are open-use. Graduate students also have use of the lobby seating area, outdoor common areas, teaming areas throughout the building, and may request the use of IE-controlled conference rooms. There is also a small kitchenette located on the third floor across from the computer lab. Free day-use lockers are also located next to the third floor computer lab.

H. Payment of Fees

Fees can be paid by mail, through the Howdy Portal or in person at the General Services Complex, Suite 2801. The waiver of out-of-state fees is automatically made for fellowship and eligible scholarship students. Please note that the University does not accept Visa payment cards at this time.

I. Emergency Loans

Short-term loan funds at Texas A&M University have been established to provide assistance to
students who experience temporary financial difficulty in connection with educational or educationally related expenses. Additional information can be found at the Student Financial Aid website https://financialaid.tamu.edu.

II. GRADUATE PROGRAM REQUIREMENTS


The university has designated certain course numbers to be reserved for specific purposes. ISEN 691 is for thesis or dissertation research; ISEN 692 is for research/projects for non-thesis degrees; ISEN 685 refers to a directed studies course; ISEN 681 is a seminar, in which faculty and students present their research results; and ISEN 684 is for an industrial internship. The courses ISEN 681, 684, 691 and 692 are taken on a pass/fail basis with a final grade of “S” (satisfactory) or “U” (unsatisfactory). In ISEN 685 students must be given a letter grade; therefore, at the start of the semester, it is important to know what is expected for the semester’s work (see page 19) and a syllabus must be provided by the instructor to the Graduate Program Coordinator. A grade of “I” (Incomplete) in ISEN 685 is appropriate only for sickness or other extenuating circumstances.

ISEN 689 refers to "Special Topics" courses and usually covers developing research areas. Each time a new ISEN 689 course is taught, it has a different title that begins with "Special Topics in ...." When making out degree plans, it is important to use the exact title of the course as it is listed; otherwise, the Office of Graduate and Professional Studies will assume you never took the course.

J. Departmental Prerequisites

The prerequisites listed below are intended to ensure an adequate background in mathematics, computing, and engineering prior to pursuing graduate studies in industrial and systems engineering. In addition to departmental prerequisites, there may be prerequisites required by individual graduate advisory committees and by course instructors. Courses have been identified by their titles in the Texas A&M University Course Catalog. If you did your undergraduate work elsewhere, read the course description to assess if the course you took at another institution could qualify.

1. Two courses of engineering calculus: (MATH 151 and 152),
2. Two additional mathematics courses that require differential equations and linear algebra: (MATH 308 and 304),
3. A course of mechanics or calculus-based physics: (PHYS 218),
4. A course in calculus based probability and statistics: (STAT 601),
5. A course in scientific programming or computing: (CPSC 206).

No prerequisite course may be taken on a pass/fail basis, and students must average a “B” or
better in their prerequisites with no single grade being less than a “C.” Students with a cumulative grade point ratio for their prerequisites of less than a 3.0 will be placed on probation. If a student makes less than a 3.0 for prerequisite work while on probation, the department will ask the Office of Graduate and Professional Studies to remove him/her from the department’s graduate program. Although graduate courses may be taken before all prerequisite requirements have been satisfied, students must make significant progress each semester towards satisfying their prerequisites.

Most applicants lacking the prerequisite background are denied admission. Some applicants lacking the required prerequisites may be granted admission but with prerequisite courses required and identified at the time of admission. The assignment of these courses is made on the basis of transcripts and other evidence presented with the application. Because transcripts and records often do not clearly indicate course content, some prerequisite course assignments may be inappropriate. If an entering student feels this is the case and has proper documentation of course content, then the director of graduate programs can waive the course requirement. If a student claims to know the subject matter in a given prerequisite, but a transcript does not support that claim, then the student may request a waiver of the prerequisite course and take an appropriate graduate level course. If the student successfully passes the graduate level course, the prerequisite will be waived, and the graduate course may be used on the degree plan if it is acceptable to the student’s advisory committee.

K. English Language Proficiency

The University requires, for non-U.S. citizens/lawful permanent residents whose native language is not English, either a TOEFL score of at least 80 (IBT or equivalent CBT/PBT score), no more than 2 years old at the time of entrance, or an IELTS total band score of 6.0, no more than 2 years old at the time of entrance, or a GRE-Verbal score of at least 146 (400 on old test score range), no more than 5 years old at the time of entrance, or a final degree certificate and final transcripts from a 4-year bachelor’s program, completed in its entirety in the United States. The Office of Graduate and Professional Studies also requires that all non-U.S. students be verified for English language proficiency. Verification is accomplished by meeting the admissions standards of the TOEFL or GRE-verbal tests; thus, if an applicant is admitted below the university requirements, the student must either retake the TOEFL/IELTS/GRE and receive the required test scores after being admitted, or pass the English language certification (described next).

Texas A&M also requires that students be certified for English language proficiency before they can be a teaching assistant, and the department requires that all Ph.D. students (non-U.S. citizens/permanent residents) whose native language is not English be certified for English language proficiency within one year of their term of entrance. The university administers an English Language Proficiency Exam (ELPE) to students before each semester and several times throughout each school year. Certification for English language proficiency is achieved by passing the reading, listening, composition, and oral portions of the ELPE or receiving a grade of “A” or “B” in the associated 300- or 400- level English Language Institute (ELI) course(s). Students register for the ELPE online at http://dars.tamu.edu/Testing/ELPE. Any necessary ELI courses are to be paid for by the student. ELI credit hours are in addition to the 9 hours required
for full-time enrollment and, if on an assistantship, are not covered under the tuition payments made on behalf of the department.

_Not making suitable progress towards required English proficiency is grounds for termination of financial support made through teaching assistantships, research assistantships, scholarships, or fellowships._

L. Degree Plans and the Advisory Committee

The degree plan is the official document establishing a student's advisory committee and the specific courses required for the degree. Please note that students pursuing a Master of Engineering (ME) degree and Master of Science (MS) degree non-thesis option (including both MS in INEN and MS in ENSM) only require a Chair or Advisor, not a full committee, although upon the student’s request and agreed by the chose faculty members, a full committee can be formed as well. This Chair is automatically the Graduate Program Director, but the student may choose another faculty member to serve as their Chair, if desired by both parties. Master of Science (MS) degree thesis option students require at least 3 members including a Chair from ISEN, another member or Co-Chair, and a member from a non-ISEN department. Doctoral (PhD) students must have at least 4 members, following the basic guidelines for a MS student, with the addition of another member. The degree plan is the only document that officially qualifies the transfer courses from other universities that count toward the student's degree. The specific guidelines for degree plans are given under the "Master's Degrees" and "Doctoral Degrees" sections. This is overview of the steps for establishing a degree plan:

1. During the first semester, choose a direction for your emphasis within the department (i.e., decide on the specific degree in which you are interested and which aspect of industrial and systems engineering you want to emphasize with your electives or research). To help you in choosing a specific research direction, if applicable, the Industrial and Systems Engineering web page (http://engineering.tamu.edu/industrial) contains a listing of the faculty, their research and teaching interests, course descriptions, and a description of the major research initiatives within the department.

2. Discuss with one or more faculty members within the department your career objectives and what his/her degree plan and research requirements are. The process of establishing a degree plan is, in part, a search for compatibility between your career goals and the faculty member's research philosophy.

3. When you have determined the professor you would like as your advisor, ask that faculty member if he/she will serve as the chair of your advisory committee. Once an advisor is established, discuss with the advisor other individuals who could potentially serve as members of the committee.

4. Courses and committee members for the degree plan are entered on-line (https://ogsdpss.tamu.edu). Care must be taken in filling out the forms properly
especially with respect to the names of 689 courses) to ensure that the Office of Graduate and Professional Studies (OGAPS) has proper records. General course requirements, other than your committee’s, are listed in the following sections of this document under the particular degree of interest. It is important to remember that committee members may have requirements in addition to the departmental requirements.

M. Petitions

After the degree plan has been approved, it is still possible to change course selections. A petition to OGAPS accomplishes any variation to the degree plan. (Petitions may be completed on the same web site http://ogsdpss.tamu.edu.) Petitions are submitted online and then approved by all committee members. OGAPS petitions, once approved by the students’ advisory committee, are routinely approved by the department head as long as university and departmental guidelines are followed, and the change does not appear to be an attempt to solely improve the degree plan grade point ratio.

Petitions are also used to change departments and restructure committees. Once a committee is formed, petitions must be approved by all committee members (both old and new members, if the committee itself is changing) as well as the department head. If the petition includes changing departments, both department heads must approve it.

N. Committee Responsibilities

The student’s graduate advisory committee has the responsibility of assessing the appropriateness of the proposed degree program, research proposal, thesis or dissertation, and the final examination. In addition, the committee is expected to provide periodic advice and assistance to the graduate student. At the doctoral level, the committee also has responsibility for the Ph.D. preliminary examination and the Doctor of Engineering qualifying examination.

III. MASTER’S DEGREES

O. The Master’s Degree Plan

The department offers three master’s degrees: The Master of Science degree in Industrial Engineering (M.S. in INEN), the Master of Engineering degree in Industrial Engineering (M.Eng. in INEN), and the Master of Science degree in Engineering Systems Management (M.S. in ENSM).

The M.S. in INEN degree requires at least 32 hours when the thesis option is selected and at least 36 hours when the non-thesis option is selected. The M.S. in INEN is designed to prepare students for ISEN Ph.D. program in its Area 1 (Operations Research or related areas). The courses are theory and methodology oriented and many of the required courses are also Ph.D. qualifying exam courses in Area 1.
The Master of Science in Engineering Systems Management (M.S. in ENSM) serves the dual purposes of (a) train students to be industrial professionals; (b) prepare students to enter ISEN Ph.D. program in its Area 2 (system engineering and human factors). The courses in the program are less quantitative than those in M.S. in INEN. Several of the ENSM required courses are also Ph.D. qualifying exam courses in Area 2. The M.S. in ENSM degree requires 36 hours and is available to Distance Learning students.

The Master of Engineering in Industrial Engineering (M.Eng. in INEN) is a non-thesis option degree and designed to train students to be industrial professionals, and is suitable for students who want to enter industry or are already in industry. The courses in the program are application oriented. The M.Eng. in INEN degree requires 30 hours and is available to Distance Learning students.

The university allows a maximum of 12 hours of transfer credit. However, graduate courses taken at other universities are not automatically transferable. The department’s director of graduate programs in conjunction with the student’s graduate advisory committee will determine if the courses being considered for transfer were taught at an appropriate level and are complementary to the other courses on the degree plan. Also, individual faculty members may have degree requirements beyond those listed below; therefore, you cannot select courses for your degree plan without consulting your graduate advisory committee.

The chair of the advisory committee must be a member of the ISEN graduate faculty. The student’s advisory committee for the Master of Science degree thesis option must have at least two additional members; one member being from outside the ISEN graduate faculty. The advisory committee for the Master of Engineering degree and Master of Science degree non-thesis option do not require additional members. The default advisor for M.Eng. students and M.S. non-thesis option students is the director of graduate programs, though the student may select a different chair if he/she chooses.

Master’s students should submit their degree plans at the beginning of their second semester (or as soon as 9 hours have been completed, for those attending on a part-time basis, such as some Distance Learning students). Since degree plans are easily changed through petitions, students should not be too concerned about some uncertainty regarding specific courses. The Office of Graduate and Professional Studies will block students from registering once they have completed 9 hours as a master’s degree student without a degree plan on file.

The ISEN master degree program requirements are listed below under specific degree options. Please also refer to the Masters’ Degrees Checklists appended to this manual. A number of common rules applying to all the degree options are:

1. At most three hours of ISEN 685 can be used on a degree plan. If the independent study course ISEN 685 is used, a course syllabus of the material to be covered for the semester should be developed and given to the graduate program coordinator before registering for the class. A letter grade (not S/U grade) will be assigned at the end of the semester.

2. At most six (6) hours of 400-level undergraduate coursework can be counted towards
the degree and these may not be ISEN courses. Any undergraduate courses must first have the approval of the director of graduate programs.

4. International students on student visas are required to include two hours of ISEN 684 in a degree plan, although those hours cannot be counted towards a degree requirement. Including ISEN 684 in a degree plan is part of the requirements ISS considers when issuing a Curriculum Practical Training document. If the hours are not used before graduation, they may be removed via a petition.

5. The cross-listed section of ISEN courses (e.g., ISEN/CVEN 642) is considered as an ISEN course.

6. Only the ISEN prefixed special courses, in course numbers of 691, 692, 685, and 684, 681 are counted toward the degree requirement for any graduate degrees in ISEN department. Under special circumstances, when a special course out of ISEN in the aforementioned course numbers needs to be used on a degree plan, prior approval from the director of graduate programs must be obtained.

7. In addition to the departmental requirements listed below, a student’s advisory committee may require additional courses.

P. Master of Science Degree in Industrial Engineering – Thesis Option

1. The Master of Science Degree in Industrial Engineering - Thesis option must have at least 32 hours.

2. Required courses
   - ISEN 609 (ISEN 602 can be used to substitute ISEN 609);
   - ISEN 622;
   - ISEN 623;
   - STAT 610;
   - A minimum of two hours of ISEN 691.

3. Elective courses:
   - When both ISEN 609 and ISEN 602 are taken, both courses are counted toward the degree requirement. Under that circumstance, ISEN 602 is an elective course.
   - A total of 18 hours of elective courses are required, of which at most 9 hours can be out of the ISEN department (in addition to STAT 610). No minimum out-of-ISEN hours are required. The 18 hours can ALL be from ISEN, if desired.
   - A maximum of six (6) combined hours of ISEN 691 and/or ISEN 681 is allowed. ISEN 681 is optional, but if used, at most two hours are allowed.

4. Courses not allowed:
   - The following courses are NOT allowed on a MS INEN degree plan: ISEN 620, CSCE 601, STAT 601, STAT 630 and STAT 651.

Q. Master of Science Degree in Industrial Engineering – Non-Thesis Option

1. The Master of Science Degree in Industrial Engineering – Non-thesis option must have at least 36 hours.
2. Required courses
   • ISEN 609 (ISEN 602 can be used to substitute ISEN 609);
   • ISEN 622;
   • ISEN 623;
   • STAT 610;

3. Elective courses:
   • When both ISEN 609 and ISEN 602 are taken, both courses are counted toward the degree requirement. Under that circumstance, ISEN 602 is an elective course.
   • A total of 24 hours of elective courses are required, of which at most 9 hours can be out of the department (in addition to STAT 610). No minimum out-of-ISEN hours are required. The 24 hours can ALL be from ISEN, if desired.
   • ISEN 681 cannot be used towards a degree requirement. At most three hours of ISEN 692 are allowed.

4. Courses not allowed:
   • The following courses are NOT allowed on a MS INEN degree plan: ISEN 620, CSCE 601, STAT 601, STAT 630 and STAT 651. As a non-thesis degree option, ISEN 691 is not allowed.

R. Master of Science in Engineering Systems Management (ENSM)

1. The Master of Science in Engineering Systems Management must have at least 36 hours.
2. Course requirements in three blocks:

   Block A: Four courses covering systems engineering
   1. ISEN 613 (data analytics)
   2. ISEN 625 (simulation)
   3. ISEN 640 (system thinking)
   4. ISEN 641 (system engineering tools)

   Block B: Four courses offering engineering management
   1. ISEN 608 (project management)
   2. ISEN 663 or ISEN 689 (engineering management)
   3. ISEN 667 (engineering economy)
   4. ISEN 669 (engineering decision tools)

   Block C: Four elective courses, which can be ALL from ISEN or ALL out of ISEN or any combination of ISEN and out-of-ISEN courses.

3. Courses not allowed:
   • CSCE 601 and STAT 651.
   • A student who has taken ISEN 622 and ISEN 623 cannot count ISEN 620 towards their degree requirement.
• STAT 610 or STAT 630 is allowed, but not both.
• ISEN 681 cannot be used towards a degree requirement.
• ISEN 692 is allowed, up to 3 hours.
• As a non-thesis degree option, ISEN 691 is not allowed.

5. Master of Engineering in Industrial Engineering

1. The Master of Engineering Degree in Industrial Engineering must have at least 30 hours.

2. Course requirements in three blocks:

   Block A: Four courses covering the breadth of industrial engineering
   1. ISEN 601 or ISEN 615 (logistics and inventory control)
   2. ISEN 614 (quality engineering)
   3. ISEN 630 or ISEN 631 (human factors)
   4. ISEN 667 (engineering economy)

   Block B: Three courses covering common modeling techniques and tools
   1. ISEN 613 (data analytics models and tools)*
   2. ISEN 620 (optimization models and tools)
   3. ISEN 625 (simulation models and tools)
   *ISEN 609 can be used in place of ISEN 613.

   Block C: Three elective courses. These courses can be ALL from ISEN or ALL out of ISEN or any combination of ISEN and out-of-ISEN courses. When both ISEN 609 and ISEN 613 are taken, both are counted towards the degree requirement. Under that circumstance, ISEN 609 is treated as an elective course.

3. Courses not allowed:

   • CSCE 601 and STAT 651.
   • ISEN 622 and 623 can be used to substitute ISEN 620 but once ISEN 622 and 623 are taken, ISEN 620 are then not allowed on the same degree plan.
   • STAT 610 or STAT 630 is allowed, but not both.
   • ISEN 681 cannot be used towards a degree requirement.
   • ISEN 692 is allowed, up to 3 hours.
   • As a non-thesis degree option, ISEN 691 is not allowed.

4. Students may be exempted from the final exam by submitting a petition to the OGAPS and obtaining their committee chair’s and departmental approval (must have a 3.0 GPR).
The final exam (also called a comprehensive exam, viva, or oral exam) must be scheduled at least 10 working days prior to taking the exam. It is the student's responsibility to find an acceptable date and time for the exam by communicating with their committee members. After a time has been agreed upon by the committee members, the student should contact the graduate program coordinator for preparation of the required OGAPS form at least 10 working days prior to the scheduled exam. OGAPS will send the graduate program coordinator notification that the exam is permissible, as well as the form to report the results of the exam. It is also helpful, as a follow-up, for the student to personally remind each committee member of the exam the day before it is scheduled.

Questions during the exam may be over courses on the degree plan (including ISEN 684, 685 or 692) or over material considered prerequisite and basic for all industrial engineers. It is also acceptable for a committee to require the student to give a short presentation over his/her specific area of emphasis, in which case, the committee members should have a report of the presentation before the day of the exam. For Master’s of Engineering students, with the committee’s approval, a student may petition the OGAPS for a waiver of the final Exam, applied for through the graduate program coordinator. OGAPS is also working out a process to allow the MS non-thesis option students to petition for the final exam waiver. This will include the ENSM students as well, since ENSM is a non-thesis option degree. The specific timing when this waiver option is available to students will be notified separately by the ISEN Graduate Program Office.

For MS-thesis option students, a copy of the thesis approved by the chair and in its final form should be available to the committee members two weeks prior to the examination date. We also suggest the student take the copy given to the committee members to the thesis office clerk and have a "rough draft" conference with the thesis clerk. The thesis clerk encourages such conferences, and it is helpful in avoiding problems later. The examination for the thesis option includes a formal presentation of the research and a thesis defense, as well as an examination over the course work. By committee agreement, the final exam for the thesis option may be waived if the student has an overall grade point ratio (GPR) of at least 3.5. The waiver of the final exam is requested via an Office of Graduate and Professional Studies form, provided by the graduate program coordinator. If the exam is waived, a formal presentation of the thesis research is still required; however, the presentation is then in the context of a report of research results instead of an exam. A student must have a GPR of at least 3.0 over all courses (including 400 level courses) taken during his/her graduate program as well as a 3.0 over the courses on the degree plan in order to take the exam. All courses on the degree plan must have been taken within seven years of the final exam. If the student does not pass the exam, the committee may permit the student to try one more time. If the committee so recommends, the student must take the second exam before the end of the next regular semester.

If circumstances arise such that a committee member cannot attend the exam, the committee member should find another member of the graduate faculty willing to serve as a substitute.
Substitutes are almost always permitted if the substitute is 1) a member of the graduate faculty, 2) there will be only one committee member absent, and 3) the absent member is not the chair.

U. From the Master's to the Ph.D.

Students in a master’s program at Texas A&M University who wish to enter the Ph.D. program must submit a Letter of Intent that can be downloaded from the OGAPS web site located at http://ogaps.tamu.edu. In addition to the Letter of Intent, the student should also submit a Statement of Purpose, resume or CV, and ask his/her advisory committee members to write letters of recommendation. Students transferring from another department should also ask their department to send a copy of their academic file to the Industrial Engineering Graduate Programs Office. To be accepted into the Ph.D. program, the department requires students to have at least a 3.5 graduate GPR as well as positive letters of recommendation, reasonable GRE scores, and previous academic work consistent with the desire for a Ph.D. in industrial engineering.

IV. DOCTORAL DEGREES

V. The Ph.D. Degree

The Ph.D. degree is a research-oriented degree for students interested in a career in the academic community, in a consulting field, or in an industrial or service organization interested in advanced training. The research interests of the industrial and systems engineering faculty are grouped in four broad areas: human and organizational systems, manufacturing, operation research, and system informatics.

W. Ph.D. Course Requirements

- **Required Courses**: The courses required in the Ph.D. program are categorized in two areas:

  Area 1: ISEN 602, ISEN 622, ISEN 623 and STAT 611.

  Area 2: ISEN 616, ISEN 631, ISEN 640 and STAT 611.

  A student can petition the ISEN Graduate Committee to exempt all or any of the required courses if the student believes that he/she had taken the equivalent courses elsewhere and can pass the qualifying exams without taking these courses.

  Students can take the required courses in either area, but must take the whole set of courses in that area.

  In addition to the above courses, three hours of ISEN 681 are required for students on a Ph.D. degree plan.

- **Advanced Courses**: At least three (3) courses on a Ph.D. degree plan should be from a set of advanced graduate courses.
Each faculty member will have a list of graduate courses he/she (or together with other faculty who share common interests) deems as the advanced course set. A faculty member (or a group of faculty members acting together) should have his/her set of advanced courses on file with the ISEN director of graduate programs, so that the ISEN Graduate Program Office can determine that this requirement is satisfied before a Ph.D. degree plan is approved by the department.

- **Courses Not Allowed**: The following courses will not be allowed on a Ph.D. degree plan:
  - All undergraduate courses, except MATH 409, 446 and 447. Other 400-level courses may be permitted in cases where an equivalent graduate-level course is not available, subject to the approval of the director of graduate programs.
  - Prerequisite courses: ISEN 609, ISEN 620, CSCE 601, STAT 601 and STAT 651. STAT 610 or STAT 630 will be allowed, but not both.

X. **Number of Courses Required**

Students in both the 64-hour Ph.D. program (Master’s to Ph.D.) and 96-hour Ph.D. program (B.S. to Ph.D.) are required to take no fewer than 10 regular courses, plus three credit hours of ISEN 681 seminar, for a subtotal of 33 credit hours. This means that for students in the 64-hour degree program, they can use up to 31 hours of ISEN 691 research hours, and for students in the 96-hour degree program, they can use up to 63 hours of ISEN 691 research hours, towards their degree requirement.

Y. **Ph.D. Qualifying Exam**

Industrial and systems engineering Ph.D. students are required to qualify for Ph.D. study before filing a degree plan. The purpose of the qualifying exam is to assist both the department and the student in determining whether a student can be expected to perform at a sufficiently high level in advanced course work and research to complete the requirements for the degree.

The qualifying exam is comprised of the following

- Students will take three, two-hour written exams from either of the two areas:

  Area 1: three exams covering the following material:

  1. Stochastic processes (coverage of ISEN 602);
  2. Linear programming (coverage of ISEN 622);
  3. Nonlinear programming (coverage of ISEN 623).

  Area 2: three exams covering the following material:

  1. Systems engineering and architecture (coverage of ISEN 640),
  2. Cognitive systems engineering (coverage of ISEN 631),
  3. Design of experiments (coverage of ISEN 616).
• Students must take the qualifying exam within one year of entering the Ph.D. program. In the first attempt, students must take the three written exams all at once.

• The ISEN Graduate Committee decides on the outcome of a student’s qualifying exam by considering a range of factors, including the scores of the three written exams, performance on relevant course work and input from the student’s research advisor.

• Students are generally allowed to retake the written exams they did not pass in their first attempt, except that if a student fails all three qualifying exams on their first attempt, then the Graduate Committee has the discretion to disallow a student the second attempt and thus dismiss the student from the Ph.D. program effective the next regular semester.

• Students must retake the failed written exams at the next immediate opportunity the qualifying exam is offered.

• Students need a named advisor to fully pass the qualifying exam. Students passing the written portion of the exam but without a named advisor will be given a conditional pass. Under a conditional pass, the student would have a grace period of one regular semester to identify an advisor who is willing to work with her/him (filing the degree plan is preferred to be consistent with the university rule but not required). If the student cannot find an advisor within this time frame, the student will have to appear before the Graduate Committee on a semester-by-semester basis to explain their efforts in finding an advisor. The Graduate Committee will then determine, based on the feedback from the student, whether or not the student is allowed to continue in the Ph.D. program.

• Master’s students are required to seek permission from the director of graduate programs before taking the Ph.D. qualifying exam.

Z. Ph.D. Degree Plan

Students are expected to submit their degree plan by the first regular semester after the qualifying procedure has been satisfied. The chair of the advisory committee must be a member of the ISEN graduate faculty. A co-chair, if desired, may be from ISEN or from another department. The Ph.D. committee has a minimum of four graduate faculty members on the original degree plan with at least one from outside the department.

A Ph.D. degree for a student with a master's degree requires at least 64 hours, and no courses counted for credit toward the master's degree can be included in the 64 hours. Up to 12 credit hours of courses may be transferred to a Ph.D. degree plan if the advisory committee feels they aid in the academic objectives of the degree. At most three hours of ISEN 685 can be used in the category of regular course hours.

The Office of Graduate and Professional Studies will place a registration block on Ph.D. students after 36 hours have been completed if no degree plan has been filed.
AA. Preliminary Exam - Ph.D. Students

The preliminary exam may be scheduled when there are no more than six hours of course work remaining on the degree plan (excluding 681, 684, 691 courses). Students must complete the preliminary exam no later than the end of the semester after completion of all the course work on the degree plan. The Office of Graduate and Professional Studies must receive the results of the preliminary examination at least 14 weeks prior to the final exam date.

The exam consists of a written portion given by each member of the advisory committee (one member may waive the written portion) and an oral portion. The student should contact the graduate program coordinator (ETB 4060) to process the necessary paperwork for the exam. A form needs to be signed by the committee chair and the director of graduate programs when fixing the schedule and a memo will be prepared formally notifying the committee of the dates and times for the exam. The time between the first written exam and the time of the oral exam is 3 weeks or 15 working days. Deviations from this timeline need prior approval by the Department Head. It is also helpful, as a follow-up, for the student to remind each committee member about the exam the day before it is scheduled.

A student must have a GPR of at least 3.0 over all courses (including 400 level courses) taken during his/her graduate program as well as a 3.0 over the courses on the degree plan in order to take the exam. All requirements for the Ph.D. must be completed within four years of the exam, or the preliminary exam will have to be retaken. (This four-year limit is measured from the time when the oral preliminary exam is passed to the time when the thesis clerk in the library approves the dissertation.)

There are three possible outcomes:

1. The student passes,
2. The student passes but some additional requirements are added to the student's program to overcome a weakness uncovered during the exam, or
3. The student fails.

If the exam is failed, it can be repeated one time, with the graduate committee’s recommendation. All portions of the written exam must be passed before the oral exam is administered.

If circumstances arise where a committee member cannot attend the exam, the committee member should find another graduate faculty member willing to serve as a substitute. Substitutes are almost always permitted as long as there will be only one committee member absent, and the member absent is not the chair.

The approved proposal must be submitted to the Office of Graduate and Professional Studies at least 14 weeks prior to the date of the Final Examination (for which request paperwork is submitted 2 weeks/10 working days prior to the exam itself).
BB. The Proposal Presentation - Ph.D. Students

The industrial and systems engineering department requires a formal presentation of the proposal. The proposal presentation can take place after the student has passed the preliminary exam, but at the discretion of a student’s advisory committee, students can take the oral portion of the preliminary exam and proposal presentation at the same time. The proposal presentation serves three functions: (1) it helps to educate the student in the art of making professional presentations; (2) it provides an opportunity for the committee to determine if the student has enough knowledge to pursue research in the proposed subject area; and (3) it allows the committee to pass judgment on the suitability of the proposed research as a dissertation topic.

If the proposal presentation takes place after a student has passed his/her preliminary exam, the non-departmental members of the committee are not required to attend the proposal presentation, but they should be invited. Under all circumstances, all committee members must sign the proposal before it goes to the Office of Graduate and Professional Studies. The approved proposal must be submitted to the Office of Graduate and Professional Studies at least 4 weeks (20 working days) prior to the submission of the Request for the Final Examination (which is submitted 10 working days prior to the exam itself). If the preliminary exam and proposal are taken at the same time, then the 14 week minimum requirement before the Final Exam must be followed (see previous section covering Preliminary Exam).

The cover sheet and guidelines for the proposal may be obtained from the web site at http://ogaps.tamu.edu.

CC. Publication of Research

Work leading to the Ph.D. is designed to give the candidate thorough and comprehensive knowledge of the chosen professional field and training in research methods. With the help of the student’s advisory committee, the student is expected to prepare a paper (or papers) for submission to a professional journal before the final defense. In addition to successfully completing the degree plan coursework, students are expected to present their dissertation research in an ISEN 681 seminar, INFORMS or HFES student chapter seminar, or at a national conference.

DD. Final Exam - Ph.D. Students

The final exam (also called the final defense or, simply, the defense) for a Ph.D. student includes an open (public) presentation of research results and a closed examination of the dissertation. The final exam needs to be scheduled and copies of the dissertation -- approved by the chair -- must be provided to the committee at least two weeks before the exam. The copies of the dissertation given to the committee should be the final form. It is also a good practice to keep the committee informed of your research progress so that guidance is provided continually.
instead of as a surprise during the final exam. We also suggest that the student take a copy of the dissertation given to the committee to the thesis office in the library and have a rough draft conference with the thesis clerk. The thesis clerk encourages such conferences, and it is usually very helpful in avoiding later problems. It is the student's responsibility to find an acceptable time for the committee to meet. After a time has been agreed upon by the committee members and a meeting place determined, the student should contact the \textit{graduate program coordinator} for preparation of the final examination paperwork \textbf{at least 2 weeks or 10 business days} before the scheduled defense. The \textit{graduate program coordinator} will also prepare an announcement for the public presentation. \textit{OGAPS} will send the \textit{graduate program coordinator} notification that the exam is permissible and will include the form that must be returned after the exam. Since the final exam includes the formal public presentation of the dissertation research, it must be publicized throughout the department. It is also helpful, as a follow-up, for the student to remind each committee member about the exam the day before it is scheduled.

The final exam usually lasts two hours. It is the chair's responsibility to encourage questions and ensure that the presentation is conducted in a professional manner. A common practice is for the chair to introduce the topic and the student as would be done at a professional conference. It is also a good practice for the student to prepare a presentation that lasts no more than 30 to 40 minutes to allow time for questions. After the presentation, the committee meets in private with the student for the dissertation defense.

A student must have a GPR of at least 3.0 over all courses (including 300 and 400-level courses) taken during his/her graduate program \textit{as well as} a 3.0 in the courses on the degree plan in order to take the exam. All courses on the degree plan must have been taken within 10 years of the final exam. Also, the dissertation must be accepted by the thesis clerk in the library within one year of passing the final exam.

If circumstances arise such that a committee member cannot attend the exam, the committee member should find another graduate faculty member willing to serve as a substitute. Such requests are almost always permitted as long as there will be only one committee member absent and the member absent is not the chair.

\textbf{Outline of Ph.D. Study Timetable}

<table>
<thead>
<tr>
<th>Entrance of the program</th>
<th>Qualifying exam</th>
<th>Filing a degree plan</th>
<th>Preliminary exam</th>
<th>Proposal</th>
<th>Final exam (dissertation defense)</th>
</tr>
</thead>
<tbody>
<tr>
<td>\textit{within a year}</td>
<td>After qualifying exam, and at least 90 days prior to preliminary exam</td>
<td>6 hours of course work remaining on a degree plan</td>
<td>Can take place the same time as the preliminary exam</td>
<td></td>
<td>at least 20 working days but may take up to 30 working days</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>at least 14 weeks</td>
<td></td>
</tr>
</tbody>
</table>
EE. Doctor of Engineering Program

Students who prefer an industry-oriented doctoral degree, instead of a research-oriented degree, should consider the D.Eng. program which is administered through the Office of the College of Engineering. Students interested in the D.Eng. degree must be admitted first into a Ph.D. program and find a faculty member who will direct their committee. Students who fail the departmental qualifying exam are not eligible to transfer into the D.Eng. program. Information describing the Doctor of Engineering Degree can be obtained from the Engineering Academic and Student Affairs Office.

FF. Interdisciplinary Ph.D.

The Doctor of Philosophy (Ph.D.) degree in Interdisciplinary Engineering (ITDE) was created to accommodate outstanding engineering students whose research interests cross engineering disciplines and/or college lines. Examples of previously awarded interdisciplinary topics include environmental engineering and public policy; and engineering and education.

A student applying to the Ph.D. program in ITDE must be a current Ph.D. student in a department within the Dwight Look College of Engineering. The ITDE program is administratively housed in the Dwight Look College of Engineering (CLEN) under the associate dean. Program information describing the Interdisciplinary Ph.D. Degree can be obtained from the Engineering Academic and Student Affairs Office.

V. FINANCIAL ASSISTANCE

There are four types of financial aid available to graduate students in industrial and systems engineering: fellowships, departmental assistantships, faculty research assistantships, and scholarships. To receive financial aid, students must be enrolled as full-time students. Faculty research assistantships are under the control of faculty members who have obtained research grants. The other three forms of financial aid are initiated within the department and are highly competitive and based primarily on the student's academic credentials. Departmental assistantships are only available to industrial and systems engineering graduate students.

The primary indicators for financial aid consideration of prospective students are the selection of previous courses taken and their associated grades, the reputation of the previous school, previous research work, the ability to help the department with its academic responsibilities, and letters of recommendation with strong preference given to students in the Ph.D. program. The GRE-verbal and TOEFL scores are also used as primary indicators of English language proficiency for a student who is a graduate of a foreign institution of higher education. Other scores from the GRE tests may be used as secondary indicators. Nominations for college and university fellowships are made using the same measures.
GG. Fellowships

The university and college offer several types of fellowships, and nominations of all qualified students are made automatically by the department. Fellowships are the most prestigious of the various forms of financial aid. Fellowships are primarily designed as a recruiting tool and are usually available only to new students.

HH. Scholarships

The department has a limited number of $1,000 per year scholarships given to qualified students. (These scholarships also include a waiver of out-of-state fees for the academic year so the recipients pay only in-state tuition and fees.) As with other forms of financial aid, they are awarded on a competitive basis according to the academic credentials of the students. The scholarships are given for one academic year only and are extended based on the same competitive basis as the original award.

II. Assistantships

Graduate assistantship positions require an average of 20 hours of work per week. Since most departmental assistantships are given to new students, the actual assignments are not made until the first day of classes and are based on the department’s academic needs. Thus, when a student receives an offer of a departmental assistantship, it is usually not known whether it is for teaching, non-teaching, or research until the beginning of the semester. When the assignment for the semester is made, the student will be assigned to work under the supervision of a faculty member. During the first week after assignments have been made, the student should make an appointment with his/her faculty supervisor to determine the semester’s work schedule. Since the assistantship is provided to the student for work to be performed, in some instances, the project work may not relate to the student’s research topic; thus, a graduate assistant must fully understand his/her dual role as a student and as an employee.

The university has a policy that a student with teaching responsibilities must attend an all-day teaching workshop conducted by the University Center for Teaching Excellence. Students may be asked to attend this workshop in preparation for future assignment possibilities. In addition, state law requires that a student whose native language is not English must be certified in English proficiency before being assigned any teaching function (certification is discussed in the “English Language Proficiency” section). Additional discipline-related training may be required.

JJ. Evaluation of Graduate Assistants

At the end of each semester, the performance of all graduate students supported by departmental funds (both research and teaching assistants) will be evaluated.

For teaching assistants, this evaluation may consist of:

1. Student evaluation forms, if appropriate (e.g. for TAs with lab sections).
2. An assessment of work performance by the student’s supervisor.
3. An assessment of the student’s academic progress by the chair of the student’s degree committee (if applicable) or by the directors of graduate programs (if the student has not yet filed a degree plan).

For research assistants, the evaluation is primarily based on an assessment of academic progress by the student’s academic supervisor. If the student’s academic progress or the performance on his/her assigned tasks is deemed inadequate, the graduate program director may recommend that departmental funding be discontinued.

KK. Insurance and Benefits

Students with a departmental assistantship or a faculty research assistantship which requires 20 hours per week are considered half-time employees. As such, they are entitled to medical insurance benefits, and the university contributes towards the insurance after the first 90 days has elapsed. Students should contact the business administrator to enroll in the insurance program. All students are required to have some form of health insurance coverage, and, depending on visa status, may be required to provide proof of coverage for all dependents.

VI. MISCELLANEOUS POLICIES

LL. Policy Regarding ISEN 681

ISEN 681 is a one-hour seminar course in which guests give presentations about topics of professional interest to industrial engineers. There are usually guests from outside the university making presentations each semester as well as many of the department faculty. Ph.D. students also present their research, usually during their final semester; thus, the seminar is an excellent means for other students to keep abreast of the research activities with Industrial Engineering. The seminar series is meant to be used by M.S. Thesis students and Ph.D. students as an avenue to familiarize themselves with research; therefore, Ph.D. students are required to register for the seminar for at least three semesters. M.S. students are encouraged to register but not required. The M.Eng. program and the M.S. ENSM program are not intended as research degrees and, therefore, seminars will not be counted for those degrees. Thus, students that are admitted to the M.S. in IE program and subsequently file an M.Eng. or ENSM degree plan will not be allowed to use the 681 hours that they have accrued. (Note that B.S. to Ph.D. students that file a M.Eng. degree plan to receive a Master’s degree during the extended Ph.D. process will apply their seminar credits to the Ph.D. degree and not use them during the M.Eng. process.)

MM. Policy Regarding ISEN 684

ISEN 684 is an industrial internship allowing graduate students to apply their course work to an industrial problem. When students are on an internship, there must be an academic component
to their work assignment that has been discussed with their advisor before registering for the course. At the end of the course, the student will deliver a written final report describing his/her experience, activities, and findings. The report should be similar in style and content to an internal company project report, and a grade of “S” or “U” will be given. A student may combine ISEN 684 and ISEN 692 or ISEN 691 hours at the discretion of the student’s committee and use the 692 or 691 hours to finish on campus a project started in industry. At the discretion of the advisor, an incomplete grade (“I”) may be given for the 684 until after the 692 project or 691 research is complete. The continuous registration requirement applies to ISEN 684 as well as to ISEN 691 and 692.

NN. Policy Regarding ISEN 685

ISEN 685 is a directed-study course designed to cover special topics not within the scope and format of thesis research or covered by another formal course currently offered in the curriculum. Therefore, the student must submit to the ISEN director of graduate programs a syllabus approved by the directing faculty member before enrolling in ISEN 685. The syllabus should provide a detailed description of the topic, list the resource material(s) to be used, identify the course deliverables, outline the method of evaluation, and list the number of credit hours assigned. At the end of the semester, a letter grade (i.e., other than S/U) should be assigned. A grade of I is appropriate only for medical reasons or for similar unforeseen circumstances. Depending on the topic chosen, it may not be appropriate for a student to take all planned credits in the same semester. In such cases, the total number of planned credits can be staged over more than one semester.

OO. Policy Regarding ISEN 691

ISEN 691 is used for faculty-directed research leading to a thesis or dissertation and may not be used by students in the Master’s of Science in Industrial Engineering Non-thesis, Master’s of Science in Engineering Systems Management, or Master of Engineering degree programs. The number of hours taken each semester should be proportional to the level of faculty and institutional support. Exceptions to this policy are (1) the student registers in absentia (i.e., the student is living outside of the College Station/Bryan area and will not be using university facilities), and (2) the student's final exam has already been scheduled for the first month of the semester. Note that grades of “I” may be carried over until the final exam, and the final grade is either an “S” or “U.” Also, the university’s continuous registration policy requires that if the coursework on the degree plan is complete except for ISEN 691, the student must be registered each regular semester until graduation.

PP. Policy Regarding ISEN 692

ISEN 692 is used for faculty-directed research and/or project work for a non-thesis degree. At the end of the course, the student will submit a written report covering the research and project work. The report should be similar in style (but not necessarily content) to a thesis. The number of hours taken each semester should be proportional to the level of faculty and institutional support. Exceptions to this policy are (1) the student registers in absentia (i.e., the
student is living outside of the College Station/Bryan area and will not be using university facilities), and (2) the student's final exam has already been scheduled for the first month of the semester. Note that grades of I may be carried over until the final exam, and the final grade is either an S or U. Also, the university’s continuous registration policy requires that if the course work on the degree plan is complete except for ISEN 692, the student must be registered each regular semester until graduation.

QQ. Q-Drop Policy

At most one Q-drop is allowed for students in the master’s program, and at most one Q-drop is allowed for students in the Ph.D. program, with the following exceptions:

1. Q-drops before the 12th class day of a regular semester or 4th class day for the summer are not considered as part of the limit. (This is 12 days into the semester, not 12 days of the course.)
2. If a degree plan has been filed before the semester starts, Q-drops for courses not on the degree plan will not count against the limit if the advisory committee chair requests the exception.
3. Q-drops for other extenuating circumstances will be considered on a case-by-case basis.

RR. Probation For Graduate Students

A student in the Ph.D. program is placed on probation when his/her cumulative GPR is below 3.0. If a student on probation has a semester with a semester GPR lower than 3.0, then he/she will be removed from our Ph.D. program.

Students in the master’s programs are subject to periodic reviews by the ISEN Graduate Committee. Students will be placed on probation, and could be subsequently removed from our graduate programs, if the Graduate Committee does not believe that the student has a reasonable chance of graduating from our program with a degree.
To help in filling out a degree plan, checklists have been designed by which students can verify that departmental requirements have been satisfied. Copies of the checklists are located on the department’s web page (http://ise.tamu.edu/academics.htm) and in the ISEN Graduate Program Office.
Master of Engineering in IE Degree Checklist
(For those entering in the Fall 2014 or later terms)

Instructions: The purpose of this checklist is to help you insure that your degree plan satisfies university and departmental policies. Additional university requirements can be found through the OGAPS website.

A. Required Breadth Courses: 12 hours
   (i) ISEN 601 _____ – or – ISEN 615 _____
   (ii) ISEN 614 _____
   (iii) ISEN 630 _____ – or – ISEN 631 _____
   (iv) ISEN 667 _____

B. Required Modeling Technique and Tool Set Courses: 9 hours
   (v) ISEN 613 _____ – or – ISEN 609 ______
   (vi) ISEN 620 _____
   (vii) ISEN 625 _____

C. Elective Courses: 9 hours (These can be graduate courses taken either from ISEN or any other department. ISEN 692 is optional, but if used, may be used up to a maximum of 3 hours. ISEN 685 is optional, but if used, may be used up to a maximum of 3 hours.)

   __________               __________               __________

D. International Students Only:
   Industrial internship - ISEN 684: 2 hrs, 1 hr per semester _____
   (2 hours are required to be included in the degree plan for administrative purposes, but students are not required to use them. If used, does not count towards the minimum degree requirements of 30 hours. If not used, they will be removed before graduation.)

Notes: 1. A non-thesis degree requiring at least 30 hours.
   2. 691 is not allowed and 681 hours will not count towards a degree requirement.
   3. Graduate courses NOT allowed: CPSC 601 and STAT 651.
   4. Generally, no undergraduate courses may be on degree plan. But with prior approval of ISEN Graduate Program Director, up to 2 non-ISEN undergraduate (400-level) courses may be used.
   5. ISEN 620 may not be used with ISEN 622 or ISEN 623; STAT 630 and 610 may not be on the same degree plan.
   6. The cross-listed sections of ISEN courses (e.g., ISEN 642) are considered as ISEN courses.
Instructions: The purpose of this checklist is to help you insure that your degree plan satisfies university and departmental policies. Additional university requirements can be found through the OGAPS website.

A. Required Courses: 12 hours
   (i) STAT 610 _____
   (ii) ISEN 622 _____ and ISEN 623 _____
   (iii) ISEN 602* _____ and/or ISEN 609* _____

* If intending to sit for the PhD qualifying exams in Area 1, we recommend taking ISEN 602 in addition to, or in place of, 609 as the subjects covered on the qualifying exam for PhD entry are 602, 622, and 623. If you do not intend to continue on to PhD study, then 609 is acceptable. Both may be taken, but in that case, one is used as an elective.

B. Elective Courses: at least 24 hours for non-thesis option, at least 18 hours for thesis option
   (At most, 3 courses/9 hours may be taken from non-ISEN departments. ISEN 685 is optional, but if used, may be used up to a maximum of 3 hours. ISEN 692 is also optional, but if used, may be used up to a maximum of 3 hours, for non-thesis option students only.)

________                      ________                       ________                        ________
________                       ________                       ________                        ________

C. Thesis Option Students Only: ISEN 691** (2-6 hrs) _____ ISEN 681 (0-2 hrs) _____
   (**At least 2 hrs of ISEN 691 are required. ISEN 681 is optional. The total number of combined ISEN 681 and 691 hours cannot exceed 6. At least 2 hours of ISEN 691 are in addition to the ISEN elective hours above in part B.) Thesis proposal required.

E. International Students Only:
   Industrial internship - ISEN 684: 2 hrs, 1 hr per semester _____
   (2 hours are required to be included in the degree plan for administrative purposes, but students are not required to use them. If used, does not count towards the minimum degree requirements of 32 or 36 hours. If not used, they will be removed before graduation.)

Notes:
1. Thesis option: at least 32 hours; Non-thesis option: at least 36 hours.
2. Graduate courses NOT allowed: STAT 601, STAT 630, CSCE 601, STAT 651, and ISEN 620.
3. For non-thesis option, ISEN 681 hours will not count towards a degree requirement. ISEN 691 is not allowed on a non-thesis degree plan.
4. Generally, no undergraduate courses may be on degree plan. But with prior approval of ISEN Graduate Program Director, up to 2 non-ISEN undergraduate (400-level) courses may be used.
5. The cross-listed sections of ISEN courses (e.g., ISEN 642) are considered as ISEN courses.
Instructions: The purpose of this checklist is to help you insure that your degree plan satisfies university and departmental policies. Additional university requirements can be found through the OGAPS website.

E. **Required Systems Engineering Courses**: 12 hours
   (i) ISEN 613 _____
   (ii) ISEN 625 _____
   (iii) ISEN 640 _____
   (iv) ISEN 641 _____

F. **Required Engineering Management Courses**: 12 hours
   (v) ISEN 608 _____
   (vi) ISEN 663 _____ –or– ISEN 665 _____
   (vii) ISEN 667 _____
   (viii) ISEN 669 _____

**Elective Courses**: 12 hours*
(These can be graduate courses taken either from ISEN or any other department. ISEN 692 is optional, but if used, may be used up to a maximum of 3 hours. ISEN 685 is also optional, but if used, may be used up to a maximum of 3 hours.)

__________          __________          __________          __________

*Suggested: use these elective courses to earn a certificate from another department with no additional time or money investment. Example: Business Certificate - ACCT 640, FINC 635, MGMT 655, MKTG 621. Some certificate and non-ISEN courses may not be available to Distance Learning students at this time.

**International Students Only:**
Industrial internship - ISEN 684: 2 hrs, 1 hr per semester _____
(2 hours are required to be included in the degree plan for administrative purposes, but students are not required to use them. If used, does not count towards the minimum degree requirements of 36 hours. If not used, they will be removed before graduation.)

**Notes:**
1. A non-thesis degree requiring at least 36 hours.
2. ISEN 691 is not allowed and ISEN 681 hours will not count towards a degree requirement.
3. Graduate courses NOT allowed: CPSC 601 and STAT 651.
4. Generally, no undergraduate courses may be on degree plan. But with prior approval of ISEN Graduate Program Director, up to 2 non-ISEN undergraduate (400-level) courses may be used.
5. ISEN 620 may not be used with ISEN 622 or ISEN 623; STAT 630 and 610 may not be on the same degree plan.
6. The cross-listed sections of ISEN courses (e.g., ISEN 642) are considered as ISEN courses.
Ph.D. Degree Checklist

Instructions: The purpose of this checklist is to summarize the department's Ph.D. requirements. However, you cannot design your degree plan without explicit help from an advisor, since each faculty member will have requirements beyond the minimal departmental and area requirements.

University Requirements

The total must be at least 64 hours beyond the Masters or 96 hours beyond the Bachelors. Additional university requirements can be found through the OGS website.

Department Requirements

A. Course requirements *

For Area 1 students: ISEN 602 ______ ISEN 622 ______ ISEN 623 ______ STAT 611 ______

For Area 2 students: ISEN 616 ______ ISEN 640 ______ ISEN 631 ______ STAT 611 ______

Additional Advanced Courses (at least three, chosen in coordination with the student’s Advisor/Chair):

____________  ____________  ___________

Additional Electives Related to Research Area (total number of graded courses must be at least 10)

____________  ____________  ___________

B. Qualifying procedure. Students will take three two-hour exams over the material from the required courses from their area (Area 1: ISEN 602, 622, 623; Area 2: ISEN 616, 640, 631), excluding STAT 611, though the information may prove useful. A student will only be given a conditional pass without a named faculty advisor.

C. ISEN 681 Seminar (3 hours, taken as 1 credit over three semesters)

D. ISEN 691 Research (at most 31 hours for 64-hour degree plan, at most 63 hours for 96-hour degree plan. No more than 3 hours per regular semester may be taken before a student passes the qualifying exams, or these hours must be pre-approved by the Departmental Graduate Committee.

E. International Students Only: ISEN 684 Industrial Internship (1 hr per semester, 3 hrs maximum; not required, but if used, does not count towards the minimum required 64 or 96 hours)

F. Students must take their Preliminary Exam by the end of the semester following the one in which they get within six hours of completing their degree plan course hours (not including ISEN 691 hrs).

G. Submit Dissertation Proposal (this can be done together with the Preliminary Exam, or separately, as determined by the student’s individual committee).

H. Submit dissertation and clear the Thesis Office.

I. (Optional) Presentation of research results during a 681 Seminar, Student Society Seminar (such as INFORMS), or a national conference, and submission of papers to a refereed journal.

*Note: The following courses will not be allowed on a Ph.D. degree plan: all undergraduate courses except MATH 409, 446 and 447; and the following prerequisite courses ISEN 609, 620, CSCE 601, STAT 601 and STAT 651. STAT 610 or 630 will be allowed, but not both. At most, 3 hours of ISEN 685 may be used towards the degree plan.