

IOWA STATE UNIVERSITY

Department of Industrial and Manufacturing Systems Engineering

Graduate Student Handbook



Industrial and Manufacturing Systems Engineering
3004 Black Engineering

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GRADUATE STUDIES IN THE DEPARTMENT OF INDUSTRIAL AND MANUFACTURING SYSTEMS ENGINEERING

The Department of Industrial and Manufacturing Systems Engineering (IMSE) in the College of Engineering at Iowa State University offers the Master of Engineering (M.Eng.), Master of Science (M.S.), and Doctor of Philosophy (Ph.D.) in Industrial Engineering. Graduate course work and research activities are focused on operations research, ergonomics/human factors, advanced manufacturing, and information engineering.

Operations Research

Operations research is focused on the development and application of mathematical tools and models to solve problems of a quantitative nature. The main research areas include the design and analysis of quantitative models to support effective decision making in industrial, commercial, and governmental systems. Specific areas of course work and research include: mathematical optimization (linear programming, nonlinear programming, integer programming, etc.), stochastic processes, queueing, simulation, inventory and scheduling, and network analysis.

Ergonomics/Human Factors

Ergonomics is the application of our understanding of the capabilities and limitations of human beings in the design of the workplace and consumer items. Current research emphases are in the areas of physical ergonomics and cognitive engineering. In physical ergonomics the particular focus is on spine biomechanics, upper extremity biomechanics and ergonomic intervention effectiveness research. In cognitive engineering the research focus is on human performance engineering, human computer interaction, and system design that enhances performance, reduces errors and increases safety. Courses are offered in occupational biomechanics, human factors, ergonomic/human factors in product design, human-computer interaction, applied ergonomics and work design, and research methods.

Advanced Manufacturing

Advanced manufacturing engineering is focused on the development and application of tools and methods that support the product realization process. The main research areas include rapid prototyping, the design/manufacturing interface, manufacturing processes, and systems integration and design. Courses are offered in geometric modeling, CAD/CAM, concurrent engineering, rapid prototyping, geometric variability, and quality control.

Information Engineering

Information engineering is focused on advanced studies in the principles and practices of enterprise-wide systems. The main research areas include knowledge engineering methods and information technology used to design, analyze, and implement scalable enterprise systems. Courses are offered in requirements engineering, e-commerce systems engineering, data mining and knowledge discovery, enterprise modeling and integration, and manufacturing information systems.

GRADUATE COLLEGE REQUIREMENTS

No part of this manual supersedes policies or requirements of the Graduate College. Students are responsible for knowing and complying with all policies in the [Graduate College Handbook](#) and the [Thesis/Graduation deadlines](#).

ADMISSION

To be successful in the program, students should have a strong background in engineering, mathematics, or physical sciences and exhibit good working skills and high ethical standards.

Admission into the I.E. Major for the M.Eng., M.S., or Ph.D. degree

To be considered for admission to the graduate program, the applicant should have a Bachelor's degree in industrial engineering or related field from a college, university, or technical school of recognized standing. Other degree programs will be considered on an individual basis but completion of a calculus sequence through differential equations is required. High academic achievement or other persuasive evidence of professional accomplishments is expected for admission to the program.

In addition, all applicants must provide GRE scores. If an applicant has taken IE courses at ISU within the last five years then the GRE score requirement can be waived. Applicants to whom this applies can submit GRE scores if they wish. As a guideline for prospective students, typical GRE scores for new students are 160 (or 760) on quantitative, 4.5 (or 680) on analytical, and 154 (or 520) on verbal. TOEFL requirements are 550 for PBT (Paper-Based), 213 for CBT (Computer-Based), 79 for IBT (Internet-Based) and 6.5 for IELTS. A GPA of 3.00 for the M.Eng. or M.S. program and 3.40 for the Ph.D. program are recommended. These represent typical student qualifications and should not be construed as a guarantee of admission to the program.

The TOEFL test is required for students whose native language is not English. This requirement can be waived for applicants who hold a post-secondary degree from a U.S. institution. Please follow [this link](#) for complete application instructions and requirements.

Admission to the Graduate Certificate in Advanced Manufacturing is based on the same requirements. Students may take up to 9 credits before admission into a degree or certificate program. Details on the application process are available at [this link](#).

ENGLISH EXAM FOR INTERNATIONAL STUDENTS

This test is taken upon arrival and is for non-native English speakers who do not have a prior Bachelor's or Master's or PhD degree from a U.S. college or university.

Entrants who have a Bachelor's, Master's, or PhD degree from a U.S. college or university, where the language of instruction was English, must fill out a form to certify that the English requirement has been met.

REQUIREMENTS FOR THE MASTER OF SCIENCE DEGREE IN IE

Master of Science - Thesis (M.S.) - 30 credits minimum

Courses	Credits
500 and 600 level IE courses (Normally there is a maximum of three credits of 590 courses permitted. All 590 courses must be evaluated by the departmental Graduate Committee before acceptance on the Program of Study. Prior approval before taking the 590 course is required.) IE 590 courses are graded as Satisfactory/Fail.	15
Courses outside the major that carry graduate credit	6
IE 699 Thesis Research	9
Continuous registration in IE 501 in Fall and IE 502 in Spring semesters (graduate seminar)	R
Total	30

Note: All cross-listed IE/Stat courses may be counted as courses outside the major.

Timeline for the M.S. degree: All forms available from [Graduate College](#)

Action	Completion Date	Forms to Graduate College
Satisfy Graduate College English Requirement (International students only)	First week of entry	
Approval of Program of Study Committee	By the end of the first semester	Recommendation for Committee Appointment
Approval of Program of Study	Beginning of second semester	Program of Study
Diploma Slip Filed	Before the semester of graduation	Application for Graduation
Final Oral Exam	Within 2 years of entry	Request for Final Exam form (needs to be submitted 3 weeks before the date of the exam)
Graduation Approval Slip	Available from the Graduate College – Room 1137 Pearson Hall	

Requirements for the M.S. Minor in Industrial Engineering

Select any three 500 or 600-level IE course – including experimental courses but excluding independent study courses. The Program of Study Committee must include a faculty member from the IMSE Department.

Program of Study Committee

You and your major professor will form a Program of Study Committee by adding at least two more members. The master's Program of Study Committee shall consist of at least three members of the Graduate Faculty, including one member from outside the major department. The major professor serves as chairperson of the committee. The Program of Study Committee must be approved prior to submission of the Program of Study. The Recommendation for Committee Appointment form must be signed by all committee members and the Director of Graduate Education.

Program of Study

The Program of Study form lists all the courses that will be taken to complete the degree. It should be submitted to the Graduate College by the beginning of the second semester. After the graduate programs assistant reviews the program of study, and it has been approved by the Program of Study Committee, the student is responsible for obtaining signatures on the final form. The Program of Study is signed by the student, the Program of Study Committee, and the Director of Graduate Education.

Major courses and minor (or outside department) courses should be designated as X and Y, respectively, on the Program of Study. Prerequisite courses should be designated as Z courses.

Theses

Theses must be prepared according to the [Graduate College requirements](#).

The Department's policy for turning in your **final** thesis is to provide an unbound copy after the successful completion of your final oral examination. This unbound copy must be printed on high quality white paper and turned into the graduate programs assistant. Please see the graduate programs assistant if you have any questions about this requirement.

Final Oral Exam

The thesis must be distributed to members of the Program of Study Committee at least 2 weeks prior to the final oral exam. It is the responsibility of the student to arrange a meeting time and place in agreement to all committee members. The exam is generally a defense of the thesis. However, questions may be asked on specific coursework or areas of concentration. The student must be registered during the semester in which the final oral exam is taken. For examinations to be valid, all members of the committee must be present throughout the entire scheduled period of the exam. The paperwork for the final oral exam must be submitted at least 3 weeks before the date of the exam and is arranged through the graduate programs assistant.

CONCURRENT B.S./M.S. DEGREE

Up to 6 credits of graduate work can be used to satisfy your program requirements for both degrees. After completing the B.S. program, you will be a full time graduate student for the remainder of the M.S. program.

Program Policies

1. Up to 2 semesters of concurrent enrollment are allowed.
2. You can use up to 6 credits of 500 level courses in Industrial Engineering for both the B.S. and M.S. degrees.
3. You must take at least 3 credits of 500 level courses each semester during concurrent enrollment.
4. Once you are concurrently enrolled, you will be paying graduate tuition and fees and you will be eligible for a graduate assistantship.
5. Assistantships are limited to quarter-time during concurrent enrollment.

Admission Requirements

Students must have a record of high academic achievement and should have a GPA of at least 3.40. Students must be within 30 credits of completing the requirements for the B.S. degree.

Application Procedure

You will need to submit your application documents prior to the start of either your last two semesters or last semester of your B.S. degree program. The following items must be submitted:

Documents submitted to the IMSE graduate programs assistant in 3030 Black Engineering:

1. Complete a study plan with your undergraduate advisor
2. Complete the Concurrent Enrollment Request form available at <http://www.grad-college.iastate.edu/forms/files/ConcurrentEnrollmentGUG.doc>.

Documents submitted online:

1. Complete the Graduate College application online at <http://www.admissions.iastate.edu/apply/graduate.php>. Under the **Study Plan** section, enter "Concurrent B.S./M.S. Program in Industrial Engineering" on the "Major/Program desired:" line.
2. Write a statement of purpose for graduate study.
3. One letter of recommendation is required from an IMSE faculty member.

The application fee will be waived because you are an undergraduate student.

REQUIREMENTS FOR THE MASTER OF ENGINEERING (M.ENG.) DEGREE IN IE

This program is a course work degree program consisting of 30 credits of courses as described below. The program can be completed from a distance or on campus. Assistantships are not offered to students in the M.Eng. program.

Courses	Credits
500 level IE courses	9
1. One course from each of the following areas is required.	
Operations Research	
IE 508 Design and Analysis of Allocation Mechanisms	
IE 510 Network Analysis	
IE 513 Analysis of Stochastic Systems	
IE 514 Production Scheduling	
IE 519 Simulation Modeling and Analysis	
IE 534 Linear Programming	
IE 541 Inventory Control and Production Planning	
Manufacturing	
IE 545 Rapid Prototyping and Manufacturing	
IE 546 Geometric Variability in Manufacturing	
IE 549 Computer Aided Design and Manufacturing	
IE 543 Wind Energy Manufacturing	
Human Factors	
IE 537 Reliability and Safety Engineering	
IE 571 Occupational Biomechanics	
IE 576 Human Factors in Product Design	
IE 577 Human Factors	
2. Four additional graduate level courses in Industrial Engineering (from the list above or the course catalog)	12
3. Registration in IE 501 (graduate seminar) in Fall semester within one year of starting the program	R
Three courses outside the major that carry graduate credit	9
Total	30

Note: All cross-listed IE/Stat courses may be counted as courses outside the major.

Timeline for the M.Eng. degree: All forms available from [Graduate College](#)

Action	Completion Date	Forms to Graduate College
Satisfy Graduate College English Requirement (International students only)	First week of entry	
Approval of Program of Study	Beginning of second semester	Program of Study
Diploma Slip Filed	Before the semester of graduation	Application for Graduation
Graduation Check	At least 5 weeks before graduation.	Graduation Check for Approved Programs without a Final Oral Examination
Graduation Approval Slip	Available from the Graduate College – Room 1137 Pearson Hall	

Program of Study Committee

The Program of Study Committee for the M.Eng. degree consists of a single individual. The default individual is the Director of Graduate Education in the Department but any member of the IE graduate faculty may be selected.

Program of Study

The Program of Study form lists all the courses that will be taken to complete the degree. It should be submitted to the Graduate College by the beginning of the second semester. After the graduate programs assistant reviews the program of study, and it has been approved by the Program of Study Committee, the student is responsible for obtaining signatures on the final form. The Program of Study is signed by the student, the Program of Study Committee, and the Director of Graduate Education.

Major courses and minor (or outside department) courses should be designated as X and Y, respectively, on the Program of Study. Prerequisite courses should be designated as Z courses.

CONCURRENT B.S./M.ENG. DEGREE

Up to 6 credits of graduate work can be used to satisfy your program requirements for both degrees. After completing the B.S. program, you will be a full time graduate student for the remainder of the M.Eng. program.

Program Requirements

1. Up to 2 semesters of concurrent enrollment are allowed.
2. You can use up to 6 credits of 500 level courses in Industrial Engineering for both the B.S. and M.Eng. degrees.
3. You will need to take at least 3 credits of 500 level courses each semester during concurrent enrollment.
4. Once you are concurrently enrolled, you will be paying graduate tuition and fees.

Admission Requirements

Students must have a record of high academic achievement and should have a GPA of at least 3.40. Students must be within 30 credits of completing the requirements for the B.S. degree.

Application Procedure

You will need to submit your application documents prior to the start of either your last two semesters or last semester of your B.S. degree program. The following items need to be submitted:

Documents submitted to the IMSE graduate programs assistant in 3030 Black Engineering:

1. Complete a study plan with your undergraduate advisor
2. Complete the Concurrent Enrollment Request form available at <http://www.grad-college.iastate.edu/forms/files/ConcurrentEnrollmentGUG.doc> .

Documents submitted online:

1. Complete the Graduate College application online at <http://www.admissions.iastate.edu/apply/graduate.php>. Under the **Study Plan** section, enter “Concurrent B.S./M.Eng. Program in Industrial Engineering” on the “Major/Program desired:” line.
2. Write a statement of purpose for graduate study.
3. One letter of recommendation is required from an IMSE faculty member.

The application fee will be waived because you are an undergraduate student.

Requirements for the Graduate Certificate in Advanced Manufacturing

The graduate certificate in advanced manufacturing provides students who have strong science, technology, mathematics and/or engineering backgrounds with additional graduate education in advanced manufacturing. The students are required to take four courses with emphasis on advanced manufacturing and design innovation concepts. All the courses are offered through engineering online education to accommodate off-campus students. Three courses must be selected from the list of courses in advanced manufacturing and one must be selected from the design innovation list.

Advanced Manufacturing courses

- ME 520 Material and Manufacturing Considerations in Design
- ME 521 Mechanical Behavior and Manufacturing of Polymers and Composites
- ME 527 Mechanics of Machining and Finishing Processes
- ME 528 Micro/Nano Manufacturing
- IE 545 Rapid prototyping and manufacturing
- IE 546 Geometric variability in manufacturing
- IE 549 Computer aided Design and Manufacturing
- IE 543 Wind Energy Manufacturing
- IE 642 Simultaneous Engineering in Manufacturing Systems

Design Innovation courses

- ME 523X Creativity and Imagination for Engineering and Design
- ME 517 Advanced Machine Design
- ME 525 Optimization methods for Complex design
- ME 557 Computer Graphics and Geometric Modeling
- ME 564 Fracture and Fatigue of Materials
- ME 625 Surface Modeling

Requirements for the Doctor of Philosophy Degree

In the Ph.D. program, you must demonstrate a high level of proficiency in an area of study and competence in the industrial engineering discipline. There are no prerequisite course requirements for students entering the department with an M.S. degree.

Doctor of Philosophy (Ph.D.) - 72 credits minimum

The primary requirements for the degree are: (1) high attainment and proficiency of the candidate in his or her chosen field, (2) dissertation research that makes a significant contribution to the field and shows independent and creative thought and work, and (3) successful passing of qualifying and preliminary examinations.

Courses	Credits
500 level IE courses ¹ (Normally there is a maximum of three credits of 590 courses permitted. All 590 courses must be evaluated by the departmental Graduate Committee before acceptance on the Program of Study. Prior approval before taking the 590 course is required.) IE 590 courses are graded as Satisfactory/Fail.	9
600 level courses ²	6
Courses outside the major that carry graduate credit	6
IE 699 Research	24
Courses from M.S. degree	Up to 27
Continuous registration in IE 601 in Fall and IE 602 in Spring semesters (graduate seminar)	R
Total	72

1. All cross-listed IE/Stat courses may be counted as courses outside the major.
2. For the 600 Level IE courses, students may use 600 level courses from other departments or an Independent Study, IE 690. All 690 courses must be evaluated by the departmental Graduate Committee before acceptance on the Program of Study. Prior approval before taking the 690 course is required. IE 690 courses are graded as Satisfactory/Fail.

Minor in IE at the Ph.D. Level

A minor in IE can be granted at the Ph.D. level to students who pass the IE Ph.D. qualifying exam and take **at least four 500 or 600-level IE courses**. The Program of Study Committee must include a faculty member from the IMSE Department.

Residency Requirement

At least 24 semester credits must be earned during two consecutive semesters or during a continuous period including two semesters and a summer session for the Ph.D. Of the 72 graduate credits required for a Ph.D., at least 36 credits, including all dissertation research credits, must be earned from Iowa State University under the supervision of the student's POS committee.

Timeline for the Ph.D. Degree: All forms available from [Graduate College](#)

Action	Completion Date	Forms to Graduate College
Satisfy Graduate English Requirement (International students only)	First week of entry prior to registration	
Declare Major Professor	Within two months of entry – form available from graduate programs assistant	
Qualifying Exam	End of first year	
Approval of Program of Study Committee	Within three months of passing the Qualifying Exam	Recommendation for Committee Appointment
Approval of Program of Study	Within three months of passing the Qualifying Exam	Program of Study
Dissertation Proposal	Distributed to Program of Study Committee two weeks prior to the Preliminary Examination	
Preliminary Examination	Within one year of passing the Qualifying Exam	"Request for Preliminary Exam" form two weeks prior to exam date. After "Request" form is received, the Graduate College mails back "Report of Preliminary Exam" form.
Diploma Slip Filed	Before the semester of graduation	Application for Graduation
Final Oral Exam	Typically, within 3 1/2 years after the date of entry, and at least 6 months after the Prelim exam has been passed	"Request for Final Examination" form – (submitted 3 weeks before the final exam date). After "Request" form is received, the Graduate College mails back "Report of Final Examination"
Graduation Approval Slip	Available from the Graduate College – Room 1137 Pearson Hall	

Qualifying Examination

A Qualifying examination is required of all students aspiring toward the Ph.D. degree.

The Qualifying examination is an assessment of a student's ability to conduct research in the student's focus area. Each student must pass the Qualifying examination to continue on in the Ph.D. program.

Each entering student and their major professor must complete a Major Professor Declaration Form for the graduate programs assistant. The requirements for the Qualifying Examination are as follows:

1. Ph.D. students holding a Master's degree must take at least four graduate level industrial engineering courses or courses approved by the Graduate Committee (excluding IE 501/601) – 12 credits minimum – during their first year and achieve a GPA of at least 3.40 in these courses.

2. Before the qualifying exam deadline, the student and the student's major professor must submit a technical paper to a refereed journal. Progress reports must be submitted by the student and major professor at the end of each semester before the deadline. After the paper is submitted to the journal, the student must complete a submission form and the major professor must complete an evaluation form. These forms are obtained from the graduate programs assistant and must be turned in with the technical paper to the graduate programs assistant. The deadline is ten days prior to the first day of classes of the semester one year after the date of entry into the PhD program. Requests for an extension to the paper submission deadline will be considered only for significant extenuating circumstances.

3. The student must defend the technical paper before at least three members of the Graduate Committee in an oral presentation. If the major professor is on the Graduate Committee, s/he will not be present. The Graduate Committee will meet with the major professor after the presentation. These presentations and meetings will take place during the week between the paper deadline and the beginning of classes.

The Graduate Committee will make a pass/fail decision based on its evaluation of the student's performance in the first year.

Early Qualifying Option for M.S. Students on the Ph.D. Track

M.S. students who plan to continue for a Ph.D. may request that the Qualifying Examination be conducted upon submission of a journal paper based on their M.S. thesis. The coursework criterion (item 1 above) will be evaluated based on all graduate coursework in IE completed at ISU for the M.S. degree. The submission and evaluation forms should be submitted as in item 2 above. The defense of the paper will take place on the same occasion as for students on the regular Ph.D. schedule (refer to item 3 above).

Program of Study Committee

The Program of Study Committee must be formed within three months of passing the Qualifying examination. The doctoral Program of Study Committee shall consist of at least five members of the Graduate Faculty. It must include at least three members, including the major professor, from within the student's major or program. A term member of the graduate faculty may participate in the direction of a student's dissertation research as a co-major professor if a member of the graduate faculty serves as a co-major professor and jointly accepts responsibility for direction of the dissertation. The major professor serves as chairperson of the committee. A faculty member holding a joint or courtesy (non-salaried) appointment may not serve as an "outside the department" member on a committee if the student's major is in either of the departments represented by the joint or courtesy appointment. For examinations to be valid, all members of the committee must be present throughout the entire scheduled period of the exam.

Program of Study

The Program of Study should be submitted to the Graduate College within three months of passing the Qualifying examination. The Program of Study includes all courses that will be taken (including Master's courses) for the Ph.D. degree. After the Program of Study has been reviewed by the graduate programs assistant and has been approved by the Program of Study Committee, the student is responsible for obtaining signatures on the final form. The Program of Study is signed by the student, the Program of Study Committee, and the Director of Graduate Education.

Dissertation Proposal

Two weeks prior to the preliminary examination, a dissertation proposal should be distributed to the Program of Study Committee. At a minimum, the proposal should consist of the following:

- a) Description of the research problem
- b) Review of related literature and current research on the topic
- c) Detailed description of the methodology that will be used
- d) Preliminary results
- e) Schedule

Preliminary Examination

The preliminary examination is an oral exam that can be scheduled after passing the Qualifying Examination and typically covers all the course work on the POS. The exam gives the Major Professor and the Program of Study Committee the opportunity to examine the student's research proposal in depth. A form requesting the preliminary exam and a form reporting the outcome of the exam must be submitted to the Graduate College.

Dissertation

The dissertation must be prepared according to the [Graduate College requirements](#) . The Department's policy for turning in your **final** dissertation is to provide an unbound copy after the successful completion of your final oral examination. This unbound copy needs to be printed on high quality white paper and turned into the graduate programs assistant. Please see the graduate programs assistant if you have any questions about this requirement.

Attendance at Final Examinations

Candidates must attend a minimum of three Ph.D. Final Exams prior to scheduling their Final Exam.

Final Oral Exam

The dissertation should be distributed to members of the Program of Study Committee at least two weeks prior to the final oral exam. It is the responsibility of the student to arrange a meeting time and place in which all committee members can participate. The exam is generally a defense of the dissertation. However, questions may be asked on specific coursework or areas of concentration. The student must be registered during the semester in which the final oral exam is taken. The paperwork for the final oral exam must be submitted at least three weeks before the date of the exam and is arranged through the graduate programs assistant.

ADDITIONAL INFORMATION

Teaching and Research Assistantships

1. Graduate assistants are expected to provide the following levels of effort.
 - $\frac{1}{4}$ time appointment - 10 hours per week
 - $\frac{1}{2}$ time appointment - 20 hours per week
2. The following criteria must be satisfied before you can be employed by the IMSE Department as a teaching or research assistant.
 - Committee Appointment submitted after your first semester at Iowa State (or within 3 months of passing the qualifying exam for Ph.D. students)
 - Program of Study submitted after your second semester at Iowa State (or within 3 months of passing the qualifying exam for Ph.D. students)
 - You must be registered for classes for the semester employment begins (for example, if the assistantship begins in the fall you must register for that semester the previous spring).
3. Continuing appointment is contingent on performance as evaluated by faculty. The evaluations will be conducted *every semester*.
 - 1st week of November for Fall Semester
 - 1st week of April for Spring Semester

4. Students who are given an unacceptable rating will meet with a member of the Graduate Committee.
 - 1st week of December for Fall Semester
 - 1st week of May for Spring Semester
5. The maximum period for funding from the IMSE Department is
 - 2 years for the masters degree
 - 3 years for the PhD degree

These time periods are based on any combination of RA and TA service.
6. Offers will be made based on student performance and available funds. Due to this restriction, RAs no longer employed by a grant cannot be guaranteed employment by the department.
7. You will be assigned an office in the IMSE Department *only* while you have an assistantship through the IMSE Department.
8. Students holding assistantships must maintain a GPA of at least 3.00. Graduate assistants must be enrolled full-time (minimum of nine credits) if employed during the Fall or Spring Semester. M.S. students on assistantship are expected to take at least five courses (minimum of fifteen credits) that count towards their program of study during the first year.
9. New teaching assistants whose native language is not English are evaluated for their ability to communicate effectively in English before their assistantship assignment is made. Tests of oral proficiency and teaching skills (Oral English Certification Test) are given before the beginning of each semester. A prospective teaching assistant who does not pass is required to complete coursework in speaking and teaching skills and to be retested.
10. A graduate assistant must be registered and pay full resident fees during any term in which he/she holds an appointment.
11. Requirements 2 and 8 apply to tuition scholarships for students not on assistantship within the IMSE department.

Employment at Iowa State University

Current law states that employers can hire only American citizens and aliens who are authorized to work in the United States. Under the Immigration Reform and Control Act of 1986, the university must verify the employment eligibility of every employee hired. Form I-9 (Employment Eligibility Verification) must be completed to document legally employable status.

Individuals who are neither United States citizens nor U.S. permanent residents must report to International Students and Scholars, 3248 Memorial Union, on or before their first day of work to complete Form I-9 (and submit such to Human Resource Services) to register for payroll and fringe benefits.

Persons on F-2 visas are not permitted to work or pursue degrees. F-2s wishing to hold graduate assistantships must change their visa status to F-1 before they may be employed. International Students and Scholars staff must endorse and U.S. Citizenship and Immigration Services must approve off-campus employment requests by F-1 visa-holders before they may legally work off-campus.

Transfer Credits

For the M.S. or M.Eng. degree, a maximum of six graduate credits of course work may be transferred from another school for the Y courses (i.e., courses outside of the department).

Any transfer of credits from another institution must be approved by the student's Program of Study Committee and the Director of Graduate Education before appearing on the Program of Study. Graduate credit will be approved for transfer only if it is of B grade or better. The host institution must state that the credits carry graduate credit.

Transfer of S and "pass" grades will be accepted for research for the Ph.D. program. The Graduate College requires that copies of transcripts from the university where courses were taken be attached to the Program of Study for all transfer courses listed on a graduate student's Program of Study so that the grade status of the student can be verified. Responsibility for submitting such documentation to the Graduate College rests with the student.

Progress Evaluation

Each student's progress toward his/her degree will be monitored by the department's Graduate Committee. If the GPA falls below a 3.00, the student will be given the opportunity to achieve a 3.00 in coursework the following semester. Failure to do so will result in a **HOLD** being placed on registration.

Students who fail to meet the specified time constraints (5 years for M.S. and 7 years for Ph.D.) will be placed on Registration Hold until satisfactory arrangements are made to satisfy currency requirement of courses as stated in the Graduate Student Handbook. The five and seven-year periods are defined as the time periods ending at the date of the respective final oral exams. All courses listed on the Program of Study must meet the currency requirements. Carry-over credits from the M.S. degree are also subject to the currency requirements. Both the student and the major professor will be informed in writing when registration is put on hold.

Satisfaction of currency requirements will involve one of two options:

1. retake all overage courses on the Program of Study, or
2. develop a new Program of Study and take all courses listed.

IE 501/601 and IE 502/602 - Graduate Seminar

IE 501/601 is required for all M.S. and Ph.D. students every Fall semester. In addition, M.Eng. students must take it once, during the Fall semester of their first year in the program. It introduces students to the research process and exposes them to state-of-the-art research presented by seminar speakers. IE 502/602 is required for all M.S. and Ph.D. students every Spring semester. It completes the training requirements for responsible conduct of research as stipulated by federal funding agencies and continues the exposure to current research. These are R-credit courses that meet weekly and are graded on a Satisfactory/Fail basis. Regular attendance is required for a Satisfactory grade. Returning M.S. and Ph.D. students may be excused from the content-based sessions as announced by the instructor.

Severance of Major Professor

Under normal conditions, major professors who leave the university through retirement or transfer to another position may not serve as the major professor or committee member. However, under special circumstances, the student may petition the Graduate Committee to retain the major professor or committee member. When a new Program of Study committee is formed, retired professors cannot be chosen as committee members.

Registration

The student must be registered for all semesters in residence. This includes semesters in which he/she is a) developing a thesis, b) scheduling the final oral exam, or c) receiving support from the department.

Audit

Students planning to attend courses without a grade must register for "Audit".

Dual-Listed Courses in Industrial Engineering

Master of Science

No more than two dual-listed courses can be used to satisfy the Master of Science or Master of Engineering program requirements.

Ph.D.

No more than two dual-listed courses can be used to satisfy the Ph.D. program requirements. However, up to two additional dual-listed courses beyond the Master's degree (for a total of four dual-listed courses) can be used on the program of study if the Master's degree was received at ISU.

Miscellaneous Items

- 1) Major credit (X) is not given for 300 and 400 level industrial engineering courses at ISU.
- 2) Research grades are given as satisfactory/fail. Credits received for research cannot be used in computing the student's grade point average.
- 3) Registration is limited to a maximum of 15 credits per semester. Schedules for graduate assistants on one-half time appointments are limited to a maximum of 12 credits.
- 4) Students who register for a class will not be dropped automatically. You must submit a Schedule Change form.
- 5) Time Limits
It is expected that work for the master's degree shall be completed within 2 years and work for the Ph.D. degree shall be completed within 3 years beyond the M.S. degree. Graduate student support from the department will not extend beyond these time frames; time limits for TA's and RA's coincide with the above.
- 6) Students always have to comply with the related ISU rules, if this document does not specify such rules.
- 7) A student must be registered in the term in which they schedule their final oral exam.
- 8) Pass/Not Pass courses cannot be used on the Program of Study.
- 9) Forms requiring the signature of the Director of Graduate Education should be submitted to the graduate programs assistant.
- 10) Students who apply for Curricular Practical Training (CPT) and wish to register for the IE 697 Engineering Internship Course must submit a written job description for their internship to the graduate programs assistant. This will form the basis for the course objectives and requirements of IE 697.