

MMAE Guide to Graduate Studies

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Chapter 1

Introduction

This guide serves as a supplement to the [IIT Graduate Catalog](#) and the [MMAE Department's web site](#) for faculty and students of the Mechanical, Materials and Aerospace Engineering (MMAE) Department. Students should refer to [Graduate College forms](#) and [Graduate College deadlines](#), and see the [Graduate Student Handbook](#) for general policies. For information on co-terminal bachelors and masters degree programs and accelerated masters programs (AMPs), see the [AMP website](#). Faculty should refer to [Graduate College forms for faculty](#). These resources should be consulted for degree requirements; Graduate College deadlines, forms, and procedures; course descriptions; etc.. It is the student's responsibility, with guidance from his/her adviser, to be sure that all procedures are followed and deadlines met. For your reference, this guide addresses issues specific to the MMAE Department and is available on the [MMAE departmental web site](#).

Information provided in this document should reflect current department policies. If you are uncertain regarding any discrepancy between this and other sources of information, please reach out to your academic advisor or the associate department chair for graduate studies.

Chapter 2

Department and University Contacts and Resources

2.1 MMAE Department Contacts

- **Department Chair:** Matthew Spenko
 - Email: mspenko@illinoistech.edu
 - Office: RE 243A
- **Associate Chair for Graduate Studies:** Heng Wang
 - Email: heng.wang@illinoistech.edu
 - Office: RE 203
- **Department Administrator:** Elena Magnus
 - Email: magnus@illinoistech.edu
 - Office: RE 243B
- **Department Office:** John T. Rettaliata Engineering Center, Suite 243, 10 W. 32nd St., Chicago, IL 60616
 - Email: mmae@illinoistech.edu
 - Phone: 312.567.3175
 - Website: engineering.iit.edu/mmae

2.2 Useful University Contacts and Resources

- **Office of Global Services**
 - Website: <https://www.iit.edu/global-services>

- Duties/Can help with: Students with any immigration-related questions should consult this office for advice to ensure current policies and procedures are considered. If an international student wishes not to enroll in a given term, a leave of absence must be approved by Global Services by the registration deadline of that term. An international student wishing to withdraw is required to consult the international student adviser in Global Services. A reduced course load form must be filed with Global Services for less-than-full-time enrollment in certain circumstances.

- **Office of the Registrar**

- Email: registrar@illinoistech.edu
- Phone: 312.567.3100
- Websites: web.iit.edu/registrar
- Duties/Can help with: The Registrar's Office at Illinois Tech handles a variety of academic record and registration-related tasks. It serves as the official data steward of institutional academic information and student records to support the needs of students, faculty, staff, and alumni at Illinois Institute of Technology. The office maintains accurate, timely, and secure information to support and enforce academic policy, registration, grading, enrollment and degree certification, course information, the production of diplomas and official transcripts, and other related university functions. Our knowledgeable and helpful staff are dedicated to providing courteous and professional service.

- **Office of Student Affairs**

- Website: web.iit.edu/student-affairs
- Duties/Can help with: The Student Affairs office provides a wide range of support services to help students succeed both academically and personally. They offer assistance with general student concerns, wellness checks, and incident reporting. Additionally, they facilitate services like academic honesty support, excused absences, medical leaves, and student recognition programs. They also connect students with various campus resources and provide advocacy and support for navigating challenges.

- **Office of Student Employment**

- Website: <https://www.iit.edu/student-employment>
- Duties/Can help with: The Student Employment Office (SEO) assists students with various aspects of on-campus employment. This includes finding on-campus job opportunities, navigating the hiring process, understanding policies and procedures, and ensuring compliance with university and federal regulations. Advertises Federal Work-Study (FWS) positions through the Handshake platform.

- **Office of Technology Services (OTS)**

- Website: <https://www.iit.edu/ots>
- Email: support@illinoistech.edu
- Duties/Can help with: The Office of Technology Services (OTS) provides support for the university's IT infrastructure including network access, email, software, classroom/conference room technology, and helpdesk support.

- **Graduate Academic Affairs**

- Office: Michael Paul Galvin Tower, 2nd Floor
- Phone: 312.567.3300
- Email: aa@illinoistech.edu
- Website: www.iit.edu/gaa
- Duties/Can help with: The Office of Graduate Academic Affairs (GAA) is responsible for the implementation and enforcement of graduate academic policies, communication with and support of graduate students, and the identification of campus resources, as appropriate to student needs. They handle tasks like academic standing reviews, matriculation reviews, degree audits, evaluating transfer credits, course repeat requests to overwrite records with insufficient grades, assessing student petitions, and degree conferrals. They also offer guidance on academic policies, procedures, and connect students with relevant campus resources. granting official leave of absence or an official withdrawal from the university. DegreeWorks, the online degree audit system, is monitored and maintained by this office.
- Useful links:
For Quick Start Guide on DegreeWorks and eforms, Links to academic forms, visit:
<https://www.iit.edu/gaa/students/student-forms>
For Academic Related FAQs, visit:
<https://www.iit.edu/gaa/students/faqs>

Chapter 3

MMAE Graduate Programs and Requirements

3.1 Master of Science (MS) and Master of Engineering (MEng) Degrees

All programs require 30 credit hours. For Master of Science programs students have the option of completing a thesis based on up to eight credit hours of research (MMAE 591) with the approval of a thesis adviser, or completing the program with courses, which may include up to six credit hours of project-based learning (MMAE 594 or MMAE 597). Note in either case, the combined credit hours among MMAE 591, MMAE 594, and MMAE 597 can not exceed eight. In general, MMAE 594 should not be taken alongside MMAE 591, and MMAE 597 should be allowed only if it is project-based learning of a topic different from MMAE 591 research.

3.1.1 Masters of Science in Mechanical and Aerospace Engineering (MAE)

Illinois Institute of Technology's Master of Science in Mechanical and Aerospace Engineering will prepare you for an exciting career path. By combining components of a master's in mechanical engineering with an aerospace master's degree, you'll broaden your skills and knowledge in both fields. Our master's in mechanical and aerospace engineering degree is ideal if you are considering a career in academia.

All MAE students are expected to demonstrate proficiency in engineering analysis, normally accomplished by taking one or two numerical method courses, and one of the five major areas within mechanical and aerospace engineering. The five major areas of study are fluid dynamics; thermal sciences; solids and structures; design and manufacturing; and dynamics and control. Master of science students are required to take the core course for their chosen major area and a set of electives, which may include core courses from other areas. The core courses corresponding to the five major areas are:

- Fluid Dynamics: MMAE 510 Fundamentals of Fluid Mechanics

- Thermal Sciences: MMAE 520 Advanced Thermodynamics or MMAE 525 Fundamentals of Heat Transfer
- Solids and Structures: MMAE 530 Advanced Mechanics of Solids
- Dynamics and Controls: MMAE 541 Advanced Dynamics
- Computer Aided Design and Manufacturing: MMAE 545 Advanced CAD/CAM

The approved MMAE courses that emphasize numerical methods are:

- MMAE 450 Computational Mechanics II
- MMAE 451 Finite Element Methods in Engineering
- MMAE 500 Data-Driven Modeling
- MMAE 517 Computational Fluid Dynamics
- MMAE 532 Advanced Finite Element Methods
- MMAE 544 Design Optimization
- MMAE 570 Computational Methods in Materials Science and Engineering

Courses offered by other departments with an emphasis in numerical methods can also be used to satisfy the numerical requirement. Such requests will be considered on a case-by-case basis by the GSC. NOTE: MMAE 502 is no longer required for students with thesis option.

For more details regarding this program visit: <https://www.iit.edu/academics/programs/mechanical-and-aerospace-engineering-ms>

3.1.2 Master of Science in Materials Science and Engineering (MSE)

The Master of Science in Materials Science and Engineering will prepare you for cutting-edge research focusing on materials processing, crystal growth, energy storage, semiconductors, mechanical properties, and alloy development. Advance your knowledge in the field through post-baccalaureate coursework and state-of-the-art research.

Required courses include 18 credit hours from a list of approved courses. The remaining credit hours are fulfilled by technical elective courses on the 400 and 500 level. The approved MSE courses are:

- MMAE 463 Structure and Properties of Materials II
- MMAE 501 Engineering Analysis I
- MMAE 520 Advanced Thermodynamics
- MMAE 554 Electrical, Magnetic, and Optical Properties of Materials
- MMAE 563 Advanced Mechanical Metallurgy
- MMAE 565 Materials Laboratory

- MMAE 569 Advanced Physical Metallurgy
- MMAE 578 Fiber Composites
- MMAE 579 Advanced Materials Processing
- MMAE 586 Advanced Failure Analysis
- MMAE 588 Additive Manufacturing

For more details regarding this program visit: <https://catalog.iit.edu/graduate/colleges/engineering/mmae/ms-materials-science-engineering/#programrequirementstext>

3.1.3 Master of Science in Autonomous Systems and Robotics

The M.S. in Autonomous Systems and Robotics focuses on physical systems and the internal algorithms by which they are controlled and monitored for real-time operations, environmental awareness, and decision-making. Graduates of this program will be leaders in the innovation and development of self-guided platforms needing limited intervention, including vehicles, robots, and collaborative physical systems. The program requires three required courses and 21 credits from a list of approved electives (<https://catalog.iit.edu/graduate/colleges/engineering/mmae/ms-autonomous-systems-robotics-engineering/#programrequirementstext>). Approval from your academic advisor and the department GSC are required before taking any other course towards the degree requirements.

For more details regarding this program visit: <https://www.iit.edu/academics/programs/autonomous-systems-and-robotics-ms>

3.1.4 Master of Science in Advanced Manufacturing

In the Master of Science in Advanced Manufacturing program, students will explore the latest technologies, such as digital manufacturing and additive manufacturing, as well as learn more traditional, hardware-based methodologies. As many companies in the automotive, aerospace, and chemical industries, for example, are advancing standard manufacturing practices to include innovative technology, students will be prepared to address challenges and excel in today's competitive business market. The program requires four required courses, nine credits from a list of AM electives, and nine credits from an extended list of electives. (<https://catalog.iit.edu/graduate/colleges/engineering/mmae/ms-advanced-manufacturing/>). Approval from your academic advisor and the department GSC are required before taking any other course towards the degree requirements.

For more details regarding this program visit: <https://www.iit.edu/academics/programs/advanced-manufacturing-ms>

3.1.5 Master of Engineering Management, Product Design and Development Track

Illinois Tech's Master of Engineering Management program allows new engineering graduates to explore the possibilities offered by advancing technology through strategic business practices. This

program is also recommended for seasoned employees seeking to gain a second skillset for their engineering portfolio. Students will learn to translate ideas into practical design and mass production of innovative and cost-effective products. Gain in-depth knowledge of engineering design and new product manufacturing skills necessary for success in an engineering research and development environment.

Currently this is the only track offered under Master of Engineering Management program

The program requires four core courses, nine credits from a list of product design and development courses, and nine credits from 500 level engineering courses (BME, CHE, CAE, ECE, EG, ENVE, INTM or MMAE). detailed requirement can be found: <https://catalog.iit.edu/graduate/colleges/engineering/mmae/master-engineering-management-prdd/>

For more details regarding this program visit: <https://www.iit.edu/academics/programs/engineering-management-product-design-and-development-track-mas>

3.1.6 Master of Engineering in Energy Systems, Energy Generation and Sustainability Track

Illinois Tech's Master of Engineering in Energy Systems, Energy Generation and Sustainability Track prepares students to meet the challenges of generating, storing, and converting energy. Courses in this track include renewable energy technologies, computer-aided design of electric machines, and elements of sustainable energy. This program prepares students to meet the challenges of generating, storing, and converting energy. Courses in this track include renewable energy technologies, computer-aided design of electric machines, elements of sustainable energy, and next-generation smart grid. The program requires nine credits of core courses, nine credits from a list of energy and sustainability electives, and 12 credits from another list of electives. Refer to this link for details: <https://catalog.iit.edu/graduate/colleges/engineering/mmae/me-energy-systems-engs/>

For more details regarding this program visit: <https://www.iit.edu/academics/programs/advanced-manufacturing-ms>

3.1.7 MS and MEng Degree Completion

All Masters Students

Within two weeks of the start of the intended graduation semester, the student files a [Form G527, Application for Graduation](#), with the Graduate Academic Affairs Office. After the application is filed, the Graduate College provides a form entitled, "The Sequence of Events and Deadlines," applicable to that semester that articulates the necessary steps and corresponding deadlines for completion of the degree. Note that students must be registered for a minimum of one credit hour in the semester in which they graduate, including the summer semester.

MS with Thesis Students

MS with thesis students should submit [Form G300](#) prior to the final oral examination to schedule the exam. The examination committee consists of at least three faculty members whose purpose it is to evaluate the student's thesis and carry out the examination. The committee includes the

student's advisor, and one of the three faculty members must be a departmental representative from a discipline different than the student's major area of study. At least one week prior to the final oral defense, the student distributes copies of the thesis draft to the thesis committee members. His/her adviser then emails all MMAE faculty members announcing the place and time of the examination. The email should include an abstract of the thesis. It is the student's responsibility to ensure that the email is sent on time. Failure to do so may result in rescheduling of the examination.

The MS oral examination is conducted by the student's MS Advisory Committee but shall be open to the public without restriction. However, the student's MS Advisory Committee appointed to conduct the examination may continue the defense and deliberate the candidate's performance and prepare its report in private. The results of the oral examination are reported to the Graduate College on Form G309 by the student's adviser in the presence of all members of the PhD Advisory Committee, and should be returned to the Graduate College within 72 hours after the final oral exam. Form G309 will be provided to the advisor by the Graduate College. The student is responsible for obtaining approval from all committee members of the final thesis on [Form G501, Final Thesis Approval](#).

3.2 Doctor of Philosophy (PhD) Degrees

Although many of those entering the PhD program have already completed a Master of Science or Master of Engineering degree, a graduate degree is not required when applying to a PhD program. Students who have earned a masters degree from IIT and wish to pursue a doctorate must reapply to the Graduate College through the Graduate Admissions Office. Typically, all of the work done towards a masters degree in the same field will apply toward the requirements for the PhD. Students who wish to transfer a masters degree in a different field should be prepared to provide course descriptions and/or syllabi to the GSC (graduate study committee). The GSC will evaluate the student's transcripts and supporting documentation to determine how many credits should be transferred and which course requirements have been met by transfer courses.

Students working toward the doctoral degree have significant flexibility in formulating an overall program to meet individual needs under the guidance of an adviser and the department. The student's thesis adviser will help the student formulate an overall plan of study, including course work and a plan of research. The program of study must include a total of 72 credit hours, of which up to 30 credit hours may be from a completed MS degree. A total of 36 credits must come from coursework, and the rest can be from research credit (MMAE 691).

3.2.1 PhD in Mechanical and Aerospace Engineering

Illinois Tech's Doctor of Philosophy in Mechanical and Aerospace Engineering program provides students with the latest research-based education and knowledge through advanced coursework, state-of-the-art and original research, and publication of novel results in preparation for careers in academia and industrial research and development. Our mechanical and aerospace engineering faculty and graduate students are making significant contributions to the profession, working in the areas of high-impact innovation including robotics; GPS/DGPS/CDGPS; manned and unmanned aircrafts and spacecrafts; driverless cars; biomedical devices; solar and wind energy; turbomachinery, and more.

Course requirements can be found here. NOTE: MMAE 502 is no longer a required course, and MMAE 509 is no longer required for students in areas of fluid dynamics, thermal sciences, and solids and structures: <https://catalog.iit.edu/graduate/colleges/engineering/mmae/phd-mechanical-aerospace-engineering/#programrequirementstext>

3.2.2 PhD in Materials Science and Engineering

Illinois Tech's Doctor of Philosophy in Materials Science and Engineering program provides advanced, research-based education and knowledge through advanced coursework, state-of-the-art and original research, and the publication of novel results in preparation for careers in academia and industrial research and development.

PhD program in Materials Science and Engineering provides most flexibility in course planning, allowing it be tailored for individual interests and research needs. Students could consider the same list of MSE courses for MS degree (listed below), and other technical elective courses on the 400 and 500 level offered by other departments.

- MMAE 463 Structure and Properties of Materials II
- MMAE 501 Engineering Analysis I
- MMAE 520 Advanced Thermodynamics
- MMAE 554 Electrical, Magnetic, and Optical Properties of Materials
- MMAE 563 Advanced Mechanical Metallurgy
- MMAE 565 Materials Laboratory
- MMAE 569 Advanced Physical Metallurgy
- MMAE 578 Fiber Composites
- MMAE 579 Advanced Materials Processing
- MMAE 586 Advanced Failure Analysis
- MMAE 588 Additive Manufacturing

3.2.3 PhD Qualifying Exam

Students who are admitted to the MMAE PhD programs must pass a qualifying examination administered by the department in order to be admitted to candidacy for the PhD degree; each student has two attempts to pass the exam. The examination evaluates the student's academic background in order to determine their potential for achieving a doctorate. It also encourages doctoral students to develop and maintain a solid knowledge of fundamentals across a broad set of areas in their chosen discipline.

MAE PhD Qualifying Exam Format

To be admitted to candidacy, students must pass a qualifying examination within their first two years. Students are encouraged to take their exam as soon as they have met all requirements (described below). The exam aims to determine the student's potential for success in the Ph.D. program.

Students must take at least four 500-level graduate courses in the first two semesters. These courses should include MMAE 501 and at least one course each in their major and minor areas. If a student has received transfer credit for any of these courses, their grade for the transferred course can be counted. The grades from these four courses are averaged over a 4.0 scale. Students must have a minimum GPA of 3.5 in the above and have passed seminar in each semester they have been enrolled in order to be eligible for the qualifying exam. A student with a GPA below 3.5 may petition to take the qualifying exam in the next semester with the written approval of their research advisor. In their petition, the student may make a request for the course(s) they will take to improve their GPA, but the committee will make a final decision on a list of acceptable courses.

The exam involves an oral presentation of two related research papers selected by the student's adviser in consultation with the exam committee. The student should be provided with these papers one month in advance of the exam. The qualifying examination is administered by a research committee made up of three faculty members (+ research advisor) and approved by the chairperson.

- **Duration:** The oral exam has a duration of 90 minutes with roughly 45 minutes reserved for presentation by the student and the rest reserved for Q/A.
- **Evaluation:** The committee assesses the student using a standard rubric, evaluating proficiency in summarizing, understanding, and evaluating the research literature. The performance levels used are Proficient, Satisfactory, or Unsatisfactory.
- **Scheduling:** Exams are held in October and March. Students are required to register their intent to take the exam early in the Fall or Spring semester. They should be provided with the two papers at least 1 month prior to the exam.
- **Retaking the Oral Exam:** Students who receive an unsatisfactory in the oral exam may retake it once, during the next scheduled session. Student failed the qualifying exam twice are not eligible to continue as PhD candidates.

MSE PhD Qualifying Exam

The PhD qualifying examination for MSE program consists of an oral exam administered by a committee of MSE faculty. The level of the exam will assess basic materials science and engineering concepts at the undergraduate level. A written research exam is also required where students submit a critical review of a published paper or research topic. Students are required to take the exam within their first three semesters of study in the PhD program.

3.2.4 PhD Advisory Committee

The purpose of the Thesis Advisory Committee is to assist the student in the satisfactory and timely progression of the thesis research and to evaluate the comprehensive and final oral examinations.

The committee is nominated by the student in consultation with his or her adviser using [Form G301A](#) in preparation for the Comprehensive Exam. Upon approval by the Department Chair, Form G301A is submitted to the Graduate College.

The MAE student's PhD Advisory Committee must consist of at least four full-time IIT (tenured or tenure track) faculty members as follows:

- the student's adviser, who acts as committee chair
- one representative from the student's major area
- one representative from outside the student's major area but in the MAE program
- one representative from outside the MAE program

The PhD Advisory Committee for MSE students must consist of at least four full-time IIT (tenured or tenure track) faculty members as follows:

- the student's adviser, who acts as committee chair
- two tenured or tenure-track professors of materials engineering
- one representative from outside the MSE program

Other IIT faculty, or scientists (holding a PhD degree) from outside IIT, may serve as additional non-voting committee members with approval of the Department.

3.2.5 PhD Comprehensive Exam

Whereas the purpose of the PhD qualifying examination is to assess a student's technical background in the topical areas related to their degree program, the objective of the comprehensive examination is to determine the student's level of competency in conducting research in the area of his/her thesis. According to Graduate College guidelines, the comprehensive examination must be conducted at least one year before the PhD defense examination.

The MMAE version of the comprehensive exam consists of a written and oral thesis proposal. The student must submit a brief written thesis proposal to the PhD committee prior to the oral comprehensive examination. During the comprehensive examination, the student is expected to present his/her thesis proposal. The approval of the proposal will be based on a satisfactory oral presentation to the committee and evaluation of the written proposal.

The suggested Comprehensive Exam timeline is as follows:

1. Student submits written dissertation proposal to PhD committee approximately two weeks prior to the oral exam.
2. Oral exam dissertation proposal presentation. (At the committee's discretion, the oral exam on the written topic and the thesis proposal may be conducted on separate days).

The results of the Comprehensive Examination are reported to the Graduate College on Form G309 by the student's adviser in the presence of all members of the Comprehensive Examination Committee, and should be returned to the Graduate College within 48 hours after the completion of the exam. Form G309 will be provided to the advisor by the Graduate College.

3.2.6 PhD Thesis Review and Defense Exam

Within two weeks of the start of the intended graduation semester, the student files a [Form G527, Application for Graduation](#), with the Graduate Academic Affairs Office. After the application is filed, the Graduate College provides a form entitled, "The Sequence of Events and Deadlines," applicable to that semester that articulates the necessary steps and corresponding deadlines for completion of the degree. Note that students must be registered for a minimum of one credit hour in the semester in which they graduate, including the summer semester.

PhD students should submit [Form G301B](#) prior to the final oral examination, i.e. the PhD defense, to schedule the exam. At least one week prior to the final oral defense, the student distributes copies of the thesis draft to the thesis committee members. Failure to do so may result in rescheduling of the defense upon request by any committee member. The Student or adviser then emails all MMAE faculty members announcing the place and time of the examination. The email should include an abstract of the thesis. It is the student's responsibility to ensure that the email is sent on time. Failure to do so may result in rescheduling of the examination.

The PhD final oral defense is conducted by the student's PhD Advisory Committee but shall be open to the public without restriction. However, the student's PhD Advisory Committee appointed to conduct the examination may continue the defense and deliberate the candidate's performance and prepare its report in private. The results of the Defense Examination are reported to the Graduate College on Form G309 by the student's adviser in the presence of all members of the PhD Advisory Committee and should be returned to the Graduate College within 72 hours after the final oral exam. Form G309 will be provided to the advisor by the Graduate College. The student is responsible for obtaining approval from all committee members of the final thesis on [Form G501, Final Thesis Approval](#).

3.3 Transfer Credits Policy

3.3.1 Master's Students

For master's degree programs, a maximum of nine applicable credit hours may be transferred into an Illinois Tech graduate degree program. These credits may come from internal or external graduate-eligible transfer credits at the 400- and/or 500-level that have not been applied toward any earned degree, or applicable shared undergraduate program credits at the 400- and/or 500-level for an accelerated master's program at Illinois Tech. This limit of nine credit hours may not be exceeded for any master's degree program. A minimum "B" grade is required for each eligible transfer. No research credits can be transferred. Grades for transferred credits will not be included in the student's GPA.

3.3.2 Doctoral Students

Doctoral degree candidates may transfer previously completed graduate coursework up to a maximum of 36 credit hours beyond the bachelor's degree. This may include up to 30 credit hours from a completed master's degree from Illinois Tech or another institution within the previous six years. Remaining transfer credit hours cannot have been applied to any earned degree. A minimum

"B" grade is required for each eligible transfer. No research credits can be transferred. Grades for transferred credits will not be included in the student's GPA.

3.3.3 Transfer Credit Submission and Approval

Credit transfer requests can be submitted anytime before applying for graduation. The student does not need to register for the courses required by the degree, which will be replaced by a transfer. The courses don't need to be offered at the time of the student's study at IIT.

Graduate students who have earned credit following the university's graduate transfer credit guidelines will seek and gain initial academic approval by using the transfer credit review process in the online eForms for Graduate Degree Works system, to be reviewed and approved by the graduate academic adviser, graduate academic department, and the Office of Academic Affairs. For more information, please refer to the university Catalog under the "Academic Policies and Procedures" section, specifically the "Transfer Credit" subsection: <https://catalog.iit.edu/graduate/>.

3.4 Student Advising

All new graduate students are assigned an advisor at the time of admission who will assist in the selection of courses. MS with thesis and PhD students are encouraged to find a permanent research advisor as soon as possible. All graduate students are advised to update their mailing addresses, email addresses, and/or telephone numbers on myIIT so that IIT has accurate contact information.

Students registering for either of the following research and thesis credit hours require an online registration override from their research adviser prior to registering:

- MMAE 591 Research and Thesis for MS Degree
- MMAE 691 Research and Thesis for PhD Degree

Students registering for either of the following project credit hours require an online registration override from the corresponding instructor prior to registering:

- MMAE 594 Project for Masters of Engineering Degree
- MMAE 597 Special Topics

3.5 Competitive Application Standards

Competitive applications to MMAE graduate programs are expected to meet the following standards:

- **Minimum Cumulative Undergraduate GPA:** 3.0/4.0, if applicant is from an international institution, the reported GPA must be converted to a standard 4.0 scale.
- **Minimum GRE Scores:** 300 (quantitative + verbal), 3.0 (analytical writing)
- **Minimum TOEFL Scores:** 80/550 (internet-based/paper-based test scores)

Meeting the minimum GPA and test score requirements does not guarantee admission. Test scores and GPA are only two of several important factors considered.

The applicants with an undergraduate degree in a related field to the masters program they apply to is seen as a great strength in their applications:

- **for MS in Advanced Manufacturing:** a degree in Materials science and Engineering, Mechanical Engineering, Aerospace Engineering, Engineering Management.
- **for MS in Mechanical and Aerospace Engineering:** a degree in Mechanical Engineering, Aerospace Engineering, Engineering Management
- **for MS in Materials Science and Engineering:** a degree in Materials Science and Engineering, Physics, Chemistry, Mechanical Engineering
- **for MS in Autonomous Systems and Robotics:** a degree in Mechanical Engineering, Aerospace Engineering, Electrical Engineering, Computer Science
- **for Master of Engineering Management Product Design and Development Track:** a degree in Mechanical Engineering, Aerospace Engineering, Materials Science and Engineering, Chemical Engineering, Industrial Engineering, Civil Engineering, Electrical Engineering, Engineering Economics
- **for Masters of Engineering Energy Systems, Energy Generation and Sustainability Track:** a degree in Mechanical Engineering, Chemical Engineering, Civil Engineering, Electrical Engineering

NOTE: The list above is not meant to be exclusive, applicants with other backgrounds will still be considered. Applicants to PhD programs are strongly encouraged to contact faculty members and secure a research advisor before submitting their applications. These are reviewed case-by-case on their qualifications, and the standard provided above provides only very limited reference.

Chapter 4

Departmental Financial Support

Financial support in different forms may be offered to students. Students in masters programs could receive a merit-based scholarship. This scholarship is applied to student account in the form of a reduced tuition rate per credit hour. Remaining tuition and other costs are a student's financial responsibility. PhD students usually receive full financial supports in the form of RA or TA. Both PhD and MS students can also apply for additional financial support. NOTE: in most cases PhD students receive priority and MS students aren't as competitive, especially those without thesis research.

Different forms of support include:

- **Research Assistantships (RA):** The department doesn't select or hire RAs. Instead, these are offered by individual professors, who recruit students based on available funding and research project. Most RAs go to PhD students, nonetheless from time to time there are openings for MS students. Often professors interview and try out students when they are already on campus.
- **Teaching Assistantships (TA):** The department hires a certain number of TAs each semester and application is open during each semester for the next one. In practice, the majority of TAs are PhD students, but around one MS student is hired each semester on average. Similarly, this tends to go to those with a track record at IIT, instead of new incoming students. PhD students and masters student with research thesis receive priority for TA positions.
- **Department Fellowships:** The department offer a few graduate fellowships. These vary by size and are awarded annually or bi-annually. Some of them are open to international students and are sufficient to cover tuition and part of living expenses. These are merit-based and highly competitive. Announcements will be made to graduate students when application is open. Also check MMAE official site for updates: <https://www.iit.edu/mmae>.
- **Campus Work Positions:** Most are offered through different offices (i-center, helpdesk, library, student dorms etc.). More info can be found here: <https://www.iit.edu/student-employment/students/campus-jobs>. Many of these are paid on an hourly basis which aren't substantial.

Chapter 5

MMAE Seminar (MMAE 593)

Registration in the departmental seminar course, MMAE 593, is required for all graduate students enrolled in a degree with a thesis requirement. This includes all PhD students and Master of Science students pursuing the thesis option. The seminar is a no fee, no credit class, but registration and attendance is mandatory. The seminar is a pass/fail class and will be graded on attendance. A student will receive a passing grade if he/she attends a minimum of 80 percent of the seminars offered in that semester. Whether meeting this requirement will be a factor considered for TA applications and other department awards such as fellowships. This requirement can be exempted only for unavoidable time conflicts. Registering and passing MMAE 593 each semester is required for PhD students to take the qualifying exam.

Students pursuing masters of science with courses only, masters of engineering (including co-terminal and AMP students) and are encouraged to attend the seminars, but they are not required to attend the seminar for graduation requirements.

Chapter 6

Accelerated Master's Programs (AMP) / Co-Terminal Programs

Accelerated Master's Programs (AMP) allow outstanding Illinois Institute of Technology undergraduate students and alumni to complete a graduate master's degree in an accelerated manner, which allows students to gain deeper and/or broader knowledge in specialized areas. Through the sharing of up to nine credit hours of courses between the bachelor's and master's degrees, students may complete the master's degree in as little as one year beyond the bachelor's degree. Students may select from either a pre-determined pairing of bachelor's and master's degrees or work with their adviser to select a customized pairing that matches their interests. In the latter case, the student must have advance approval from both the undergraduate and graduate academic units for the program of interest, including the intended shared courses.

The program consists of two formats:

- **Co-Terminal (AMP-CT):** For Illinois Tech undergraduates with at least 12 credits remaining toward their undergraduate degree. The co-terminal program allows students to complete both a bachelor's and master's degree simultaneously in as few as five years through sharing of up to nine credit hours between the bachelor's and master's degrees. Co-terminal students maintain their undergraduate student status while completing graduate coursework, which allows them to maintain financial aid eligibility when applicable.
- **Advanced Standing (AMP-AS):** For Illinois Tech alumni who have completed a bachelor's degree within three years before enrollment in the master's degree. AMP-AS students can apply up to nine credit hours of their bachelor's degree to the accelerated master's if such shared courses satisfy requirements of the master's degree.

6.1 Planning Guidance for Co-Terminal Students

- **After Admission:**
 - Complete the Co-Terminal planning worksheet and review your plan with your co-term advisor.

- Co-terminal students using federal and/or state aid need to fill out a Co-Terminal Planning Worksheet with financial aid before their first term as a co-terminal student (This form is optional for students who do not intend to use federal/state aid). This worksheet does not take the place of your plan of study, but enables financial aid to have an informed discussion with you about how your future financial aid may be affected depending on the courses that you take in a term. This should have no effect on IIT scholarships, with the exception of scholarships below:
 - * Crown and Duchossois Scholars need to appeal for a scholarship extension in their 5th year
 - * Rowe Clark awards expire after 4 years of coverage
 - * Leadership Academy Scholars are only eligible for 4 years of LA funding
- The Master's programs typically have many more course options so you can choose to take more classes in a particular area such as manufacturing or autonomous systems in order to develop better expertise in that topic. Your advisors can help direct you to classes that may be appropriate for your interests.
- As you put together your plan, try to:
 - * Take only one graduate course in your first semester in the co-terminal program
 - * Take no more than four total courses in semesters that you are taking graduate courses
- You will be able to count three 400-level courses towards both your Bachelor's and Master's, and these will be referred to as "shared" courses. Your remaining courses for your Master's will need to be 500-level courses. You can also take 500-level courses as free/technical electives and share those between the two degrees.
- Send the completed form to your co-term advisor for them to check over and then send it to financial aid.

• **Before your First Semester:**

- A graduate advising hold needs to be released by your co-term advisor before you can register for your first term in the co-terminal program. Contact your co-term advisor prior to registration to ensure they approve of your course plans and remove the hold.
- You should not need a permit to register for graduate classes since you are both an Undergraduate (UG) and a Graduate (Grad) student. If you have difficulty registering for graduate classes, let your co-term advisor know.

• **In your First Semester:**

- In your first term as a co-terminal student, you need to file and have approved a shared/unshared course e-form in graduate Degree Works for the graduate degree. All courses for the graduate degree need to be listed, and each one marked as shared or unshared. This e-form will need to be approved by your co-terminal advisor and by Graduate Academic Affairs.
- Shared/unshared courses can be changed at a future time. The e-form is only a plan, and only the shared courses declared must be adhered to. All other courses in the plan of study can be substituted as long as they meet the degree requirements. Only changes in shared courses need to be updated in a revised form.

Chapter 7

IIT Partner Programs with European Institutions

Students admitted to MMAE programs through our European partner programs should be aware of the following policies:

1. Students admitted to a dual degree program with Illinois Tech and a European partner institution may have a requirement (or option) to complete a research project to satisfy the home institution's degree requirements. This research is not the same as the thesis or research project degree requirement at Illinois Tech.
2. Depending on the specific agreement with the partner school, students from a partner school are on average permitted transfer of credit of up to 6 U.S. credits.

Some useful guidelines can be found in the following page: <https://www.iit.edu/gaa/students/europe-partner-school-information>

For specific course transfer policies with some European partner institutions, please note the following pre-approved transfer courses. To get another course approved for transfer, you will need to submit a course description containing a list of topics covered and identify the equivalent IIT course. Note that the material covered in a single IIT course may be covered in multiple courses at your home institution.

1. France:

- ENSEIRB-MATMECA:
 - MMAE 451 – UE M7-B Scientific Calculus
 - MMAE 520 – MF203 Thermodynamics
- INSA Strasbourg:
 - MMAE 510 – Fluid Mechanics I & II and Aerodynamics
 - MMAE 525 – Heat Transfer
 - MMAE 545 – CE 4 - Modeling & Simulation, Project S7 - Design of Automated Systems, CE 7 - Processes 2, CE 1 - Mechanical System Components 1 & CAD

- ISAE-ENSMA:
 - MMAE 410 – Flight Mechanics
 - MMAE 444 – Manufacturing and Transport
 - MMAE 445 – CAD Tools
 - MMAE 452 – Engines and Propulsion Systems
 - MMAE 511 – Gas Dynamics
 - MMAE 525 – Heat Transfer
 - MMAE 530 – Mechanics of Solids
- ENSTA Bretagne:
 - MMAE 444 – Conception mecanique en phase d’avant projet
 - MMAE 445 – Maquette numerique
 - MMAE 482 – Poutres, plaques, coques et composites
 - MMAE 541 – Dynamics of Structures
- ENAC:
 - ECE 502 – Networks
 - ECE 511 – Signal Analysis

2. Spain:

- ETSII-UPM(Madrid):
 - MMAE 484 – Special Materials for Mechanical Engineering
 - MMAE 502 – Differential Equations and Advanced Calculus/Advanced Mathematics
 - MMAE 574 – Materials I
 - ECE 531 – Systems Dynamic Behavior
- ETSII-UPM(Valencia):
 - MMAE 450 – Numerical Methods to Solve Differential Equations
 - MMAE 451 – Numerical Analysis of Machine Technology
 - MMAE 520 – Thermodynamics I & II
 - MMAE 530 – Theory of Structures
 - MMAE 532 – Computational Techniques in Mechanical Engineering
- ETSIAE-UPM:
 - MMAE 502 – Metodos Matematicos I & II, Calculo Numerico II, Calculo Infinitesimal, Mecanica Analitica
 - MMAE 510 – Mecanica de Fluidos I & II
- ESEEIAT-UPC:
 - MMAE 502 – Mathematical Methods
 - MMAE 525 – Gas Dynamics & Heat and Mass Transfer
- ETSEIB-UPCatalunya:
 - MMAE 451 – Numerical Methods

- MMAE 485 – Fabrication Technologies
- MMAE 509 – Continuum Mechanics
- MMAE 543 – Computer Controls
- Engineering School-University of Seville:
 - MMAE 517 – Mechanics of Fluids II
 - MMAE 530 – Mechanics of Solids
- ESIB-UPVasco (University of the Basque Country):
 - MMAE 451 – Materials Technology and Design of Machines
 - MMAE 502 – Applications of Mathematics
 - MMAE 530 – Elasticity and Resistance of Materials
 - MMAE 541 – Theory of Machines / Applied Mechanics

Chapter 8

Graduate Course Offering Projection

This section provides a projection of graduate courses that will be offered in the next three years. Courses marked with an "X" are projected to be offered in that specific semester. Please note that this is a best estimate. We can't guarantee any course offering in a specific semester in advance.

8.1 Projections for Courses for MMAE Departments

Refer to this link for graduate courses: [Graduate course projection F25 to S28](#)

400 level tech electives:

- MMAE 445 Computer Aided Design: offered in Fall, Spring, and Summer
- MMAE 451 Finite Element Methods in Engineering: offered in Fall
- MMAE 426 Nuclear, Fossil-Fuel, and Sustainable Energy Systems: offered in Fall
- MMAE 453 Electrified Vehicle Powertrains: offered in Spring

8.2 Projections for Courses for Other Departments

- **Civil, Architectural, and Environmental Engineering (CAE):**
 - CAE 513 Building Science: Regularly offered in Fall.
 - CAE 526 Energy Conservation in Buildings: Regularly offered in Fall.
 - CAE 515 Building Energy Modeling: No longer regularly offered; students are encouraged to take CAE 517 (Computational Fluid Dynamics, which is offered in Spring by MMAE).
- **Mechanical, Materials, and Aerospace Engineering (MMAE - 400 level):**

- MMAE 445 Computer-Aided Design and Manufacturing: Offered in Spring, Fall, and Summer.
- MMAE 451 Finite Element Methods in Engineering: Offered in Fall.
- MMAE 426 (Course title not specified): Offered in Fall.
- MMAE 453 Electrified Vehicle Powertrains: Offered in Spring.
- MMAE 482 Poutres, plaques, coques et composites: Not offered regularly.
- MMAE 461 Failure Analysis: Not offered regularly.

- **Chemical Engineering (CHE):**

- CHE 543 Energy, Environment, and Economics: Offered in Fall.
- CHE 541 Renewable Energy Technologies: Not offered regularly.

- **Electrical and Computer Engineering (ECE):**

- ECE 412 Hybrid Electric Vehicle Drives: Offered in Spring.
- ECE 552 Adjustable Speed Drives: Offered in Spring.
- ECE 411 Power Electronics: Offered in Fall.
- ECE 418 Power System Analysis: Offered in Fall.
- ECE 539 Computer Aided Design of Electric Machines: Offered in Fall.
- ECE 551 Advanced Power Electronics: Offered in Fall.
- ECE 582 Microgrid Design and Operation: Offered in Fall.
- ECE 555 Power Market Operations

The following courses are not offered regularly: ECE 556 Power Market Economics and Security, ECE 561 Deregulated Power Systems, ECE 562 Power System Transaction Management, ECE 564 Control and Operation of Electric Power Systems, ECE 580 Elements of Sustainable Energy, ECE 581 Elements of Smart Grid.

Industrial Technology and Management (INTM):

- INTM 548 Agile Methodologies for New Product/Process Development: Offered in Spring.
- INTM 551 Data Analytics for Industry: Offered in Fall.