

Graduate Manual

Department of Mechanical and Aerospace Engineering
State University of New York at Buffalo
School of Engineering and Applied Sciences

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Chapter 1

General Academic Information

1.1 Admission Requirements

The Department of Mechanical and Aerospace Engineering offers Master of Science (M.S.), Master of Engineering (M.Eng.), and Doctor of Philosophy (Ph.D.) degrees. Students are accepted for Spring or Fall admission. Subject to certain limitations, students may undertake their programs on a full- or part-time basis.

A B.S. in Mechanical or Aerospace Engineering, or the equivalent, with a quality point average of at least 3.0/4.0, is normally required for admission to all programs. Prospective students may apply to the M.S., M.Eng., or Ph.D. program. Students with a B.S. degree who do not hold a master's degree may apply directly to the Ph.D. program or may choose to first obtain an M.S. or M.Eng. degree and then apply to the Ph.D. program. Students who complete a master's program at UB and wish to continue to the Ph.D. program must reapply for admission to the Ph.D. program.

All applicants to the Ph.D. program are required to take the GRE before admission. Applicants to the master's programs (M.S. and M.Eng.) are not required to take the GRE.

1.2 Student Classifications

- a) Degree Student: A graduate student who has been accepted by the department with an undergraduate quality point average of 3.0/4.0 or better.
- b) Non-degree Student: A student with appropriate academic qualifications who does not wish to pursue a degree program.
- c) Non-Matriculated Student: A student who has been accepted but has not yet enrolled in the academic program.

Graduate credit earned by a non-degree student, up to four courses or 12 credits, may be applied toward a degree program by petition to the Director of Graduate Studies after the student has been accepted as a degree student. An online application must be completed, an application fee is required, and an official transcript must be submitted.

1.3 Application Dates for Admission

Current application deadlines can be found at:

1.4 Student Status

- a) Full-Time: A student who carries 12 credit hours of coursework is considered a full-time student by the department. Research assistants (RAs), teaching assistants (TAs), and graduate assistants (GAs) are considered full-time when registered for 9 or more credit hours. The following students must maintain full-time status: university fellows, departmental fellows, TAs, RAs, GAs, veterans supported by the Veterans Administration, and international students holding a student visa.

Students who are within 12 credit hours of fulfilling their master's or Ph.D. degree requirements, or within 9 credit hours in the case of RAs, TAs, and GAs, should submit the Certification of Full-Time Status Form to the Graduate School if registering for fewer than 12 credits, or fewer than 9 credits for RAs, TAs, and GAs.

All supported students and international students who fall into this category must submit the form. An Application to Candidacy (ATC) form must be submitted and approved before a request for Certification of Full-Time Status will be approved by the Graduate School.

Supported students should also be aware that tuition scholarship credits are limited to the number of credit hours required for the degree being pursued: 30 credit hours for the master's programs (M.S. and M.Eng.) or 72 credit hours for the Ph.D. degree, less any approved transfer credits.

- b) Part-Time: A student who carries fewer credits than required for full-time status and has not received Certification of Full-Time Status is considered a part-time student by the department.

1.5 Advisement

- a) Initial Advisement and Registration: Students enrolling in graduate study for the first time should report to the Department office in 238 Bell Hall at least one week before the first day of classes. International students registering for the first time should report to the Office of International Education in Talbert Hall for assistance with housing, visa status, and orientation before coming to the Department office.

Each student is assigned a preliminary advisor upon admission. The preliminary advisor will: (1) work with the student to determine the coursework that should be taken during the first year of graduate study; (2) assist with general questions about the program, research opportunities, or funding; and (3) help the student identify an academic advisor for an M.S. project or thesis or Ph.D. dissertation. The academic advisor may or may not be the same person as the preliminary advisor.

The preliminary advisor may also provide guidance on non-curricular matters, such as health, housing, or difficulties with English comprehension, speaking, or writing.

All incoming students must attend the Department's orientation, where they will be introduced to their preliminary advisor. This orientation is typically held during the week before Fall Semester classes begin. After consulting with their preliminary advisors, new students will register for their first-semester courses.

- b) Ph.D. Academic Advisor: The advisor for each incoming Ph.D. student is identified in the student's admission or offer letter.
- c) M.S. Academic Advisor: All M.S. students are required to complete a project or thesis. The M.S. advisor is not identified at the time of admission. Students should work with their preliminary advisor and meet

with MAE faculty members as soon as possible to identify a common area of research or technical interest and select a project or thesis topic and advisor.

Upon reaching a mutual agreement with a faculty member, the student must notify the Department graduate office. The advisor must be a member of the Graduate School Faculty. Before selecting an academic advisor, the student should consult with the preliminary advisor regarding the student's program of study.

Students should meet regularly with their advisors. The advisor must approve all course selections and provide project or thesis supervision. In unusual circumstances, a student may change advisors only with permission from the Director of Graduate Studies.

- d) M.Eng. Academic Advisor: Students in the Master of Engineering program do not complete a project or thesis and therefore do not require a research advisor. They may discuss their academic progress and course selection with their preliminary advisor or the Director of Graduate Studies.
- e) Ph.D. or M.S. Advisement by Non-MAE Faculty: Non-MAE faculty members may serve as co-advisors or as members of project, thesis, and dissertation committees, provided they hold an appropriate Graduate School appointment.

1.6 Academic Grievances

All academic grievances should first be brought to the attention of the Director of Graduate Studies. If the grievance concerns the Director of Graduate Studies, the issue should be brought to the attention of the MAE Chair.

Policies and procedures regarding academic grievances can be found at the following website:
<https://grad.buffalo.edu/succeed/current-students/policy-library.html>.

1.7 Academic Integrity

Academic integrity is a fundamental university value. Through the honest completion of academic work, students sustain the integrity of the university while facilitating the university's imperative for the transmission of knowledge and culture based upon the generation of new and innovative ideas.

When an instance of suspected or alleged academic dishonesty by a student arises, it shall be resolved according to the procedures established by the Graduate School. These procedures assume that many questions of academic dishonesty will be resolved through consultative resolution between the student and the instructor.

It is recommended that the instructor and student each consult with the Department Chair, School or College Dean, or the Graduate School if there are any questions regarding these procedures.

Examples of academic dishonesty include:

- a) Previously submitted work. Submitting academically required material that has been previously submitted—in whole or in substantial part—in another course without the prior express consent of the instructor.
- b) Plagiarism. Copying or receiving material from any source and submitting that material as one's own without acknowledging and citing the particular debts to the source, including quotations, paraphrases, and basic ideas, or in any other manner representing the work of another as one's own.
- c) Cheating. Soliciting and/or receiving information from, or providing information to, another student or any other unauthorized source, including electronic sources such as cellular phones and other electronic devices, with the intent to deceive while completing an examination or individual assignment.

- d) Interference with Another Student's Academic Work. Intentionally deleting, modifying, or otherwise interfering with another student's code or other academic work for the purpose of negatively affecting that student's academic performance.
- e) Falsification of academic materials. Fabricating laboratory materials, notes, reports, or any forms of computer data; forging an instructor's name or initials; resubmitting an examination or assignment for reevaluation that has been altered without the instructor's authorization; or submitting a report, paper, materials, computer data, or examination, or any considerable part thereof, prepared by any person other than the student responsible for the assignment.
- f) Misrepresentation of documents. Forgery, alteration, or misuse of any university or official document, record, or instrument of identification.
- g) Confidential academic materials. Procurement, distribution, or acceptance of examinations or laboratory results without the prior express consent of the instructor.
- h) Selling academic assignments. No person shall sell or offer for sale to any person enrolled at the University at Buffalo any academic assignment, or any inappropriate assistance in the preparation, research, or writing of any assignment, that the seller knows, or has reason to believe, is intended for submission in fulfillment of any course or academic program requirement.
- i) Purchasing academic assignments. No person shall purchase an academic assignment intended for submission in fulfillment of any course or academic program requirement.

Complete policies and procedures regarding academic integrity issues can be found at the following website:

<https://grad.buffalo.edu/succeed/current-students/policy-library.html>.

1.8 Use of Generative Artificial Intelligence in Theses and Dissertations

Generative Artificial Intelligence (AI) tools are increasingly accessible and may provide limited support in academic workflows. However, their use in theses and dissertations must be carefully restricted to preserve academic integrity, originality, reproducibility, and compliance with research funding and data-security requirements. The student bears full responsibility for all submitted content, regardless of the tools used.

The following guidelines apply within the Department of Mechanical and Aerospace Engineering. M.S. and Ph.D. research advisors may impose stricter limitations or prohibit the use of Generative AI tools entirely. Failure to comply with these guidelines will be considered a violation of academic integrity policies and may result in institutional disciplinary action.

1.8.1 Text Generation and Editing

The use of Generative AI tools to produce original thesis or dissertation text is strictly prohibited. This includes generating sentences, paragraphs, sections, arguments, interpretations, or conclusions.

Limited use of Generative AI as a mechanical editing aid may be acceptable under the following conditions:

- Use is restricted to grammar correction, typo correction, and minor refinement of text originally written by the student.
- Generative AI tools must not introduce new technical content, interpretations, or structure.

- The student must discuss the use of such tools with their advisor in advance.
- The selected tool must be verified to comply with project funding agreements, intellectual property constraints, or data-security requirements (e.g., export control, proprietary or sensitive data exposure).

1.8.2 Figures and Visual Content

The use of Generative AI tools to create conceptual or illustrative figures (e.g., schematic diagrams, conceptual block diagrams, or figures intended solely to explain a general idea) is acceptable. However, the use of Generative AI tools is strictly prohibited for generating:

- figures representing experimental setups;
- figures showing simulation results, experimental results, or processed data; and
- visualizations that imply or summarize measured, simulated, or analyzed outcomes.

All figures included in a thesis or dissertation must be fully reproducible from the described methodology, data, and analysis pipeline. Figures derived from experiments or simulations must be generated directly from the underlying data using appropriate scientific or engineering tools.

1.8.3 References and Citations

The use of Generative AI tools for generating or managing references is not allowed.

Students are strongly encouraged to use established reference-management tools such as BibTeX, End-Note, Zotero, or Mendeley for citation management. Students should be aware that:

- references suggested or generated by Generative AI tools are often incomplete, incorrect, or fabricated; and
- bibliographic files (e.g., `.bib` files) produced by Generative AI tools must not be trusted or used, even if they appear syntactically correct.

1.8.4 Disclosure and Responsibility

Any use of Generative AI tools must be transparent and fully disclosed to the advisor. Regardless of disclosure, the student remains fully responsible for the originality, accuracy, integrity, and reproducibility of all submitted work.

A dedicated disclosure section must be included in the final thesis or dissertation. This section should clearly identify: (1) all Generative AI tools used during preparation of the document, and (2) any figures or visual materials created using AI tools, including their purpose and scope of use.

1.9 Registration

Every student is required to register each semester. Registration options include coursework, research, thesis, or dissertation work, depending on the student's program. Schedules should be planned as early as possible at the beginning of each semester.

Research, thesis, and dissertation work may be undertaken only under the direct supervision of a faculty member. No credit will be allowed for work completed without proper registration. Proper registration is also important for determining residence requirements. "Residence" implies the pursuit of advanced study or research while registered at UB under the supervision of a member of the Graduate School Faculty.

Normally, a minimum registration period of one year on a full-time-equivalent basis is expected for a master's degree, and two years on a similar basis is expected for the Ph.D. degree. A Ph.D. candidate must also fulfill the Ph.D. residency requirement of at least two semesters as a full-time student.

International students must maintain full-time status throughout their graduate study at the University at Buffalo, in accordance with applicable immigration regulations. All international students must register for at least one (1) credit in the semester prior to graduation.

Students are required to register continuously during their period of graduate study until all degree requirements have been completed. Students who, for any reason, cannot maintain continuous registration must request a Leave of Absence before the beginning of the semester for which the leave is requested. The student must petition the Dean of the Graduate School and obtain the approval of the Director of Graduate Studies.

A Leave of Absence will be granted only to students in good academic standing. If the student is enrolled for fewer than 12 credits, or fewer than 9 credits for TAs, GAs, or RAs, the Certification of Full-Time Status Form should also be completed.

Leaves of Absence will normally be granted for only one (1) semester at a time. A leave of more than one (1) semester may require additional justification and documentation from the student and the student's advisor. Documented cases of financial hardship, illness, or compulsory military service constitute valid justification.

Students who leave the program after completing graduate work but have not received an approved Leave of Absence must reapply and be readmitted as new students. Continued Leaves of Absence beyond two (2) semesters will not be granted.

1.10 Paperwork Deadlines for Master's and Ph.D. Degree Conferment

It is the responsibility of the student to meet all deadlines specified by the Department and the Graduate School.

Degree-conferment deadlines are available at:

<https://registrar.buffalo.edu/degrees/graduate.php>

and are subject to change. Students should review the applicable deadlines at least three months before their expected degree-conferment date and allow sufficient time for internal processing.

It is the student's responsibility to confirm with the Graduate School, before the applicable deadlines, that all degree requirements and required paperwork have been completed.

Important Note on the Application to Candidacy (ATC) Form: To comply with University policies, all full-time students must submit their ATC forms at least one semester before the degree is to be conferred.

Students in the master's programs (M.S. and M.Eng.) should submit their ATC forms during their second semester of full-time study.

Students in the Ph.D. program should submit their ATC forms as soon as possible after passing the Ph.D. Qualifying Examination, but no later than their fourth semester of full-time study.

1.11 Transfer Credit

- a) From Another Institution: Graduate work completed at another institution may be offered in partial fulfillment of degree requirements if the work is of acceptable quality and is appropriate to the student's program.

Transfer credit will be allowed only for graduate coursework completed with a grade of “B” or better. Courses graded S or P are eligible for consideration unless the transfer institution’s grading policy equates an S or P grade with a grade lower than a full B. Credits earned through correspondence courses may not be transferred.

- b) A student seeking to transfer graduate credits should consult with their advisor before the end of the first semester in the program. When the student’s Application to Candidacy is submitted, it must identify the credits to be transferred.
- c) Information regarding the maximum number of credits that may be transferred can be found in Section 2.5 for the master’s programs and Section 3.3.1 for the Ph.D. program.
- d) From Another Department within UB: Graduate work completed in another department at UB may be offered in partial fulfillment of degree requirements if the work is of acceptable quality, is appropriate to the student’s program, and is approved by the student’s advisor.

1.12 Graduate Credit

Graduate credit may be granted to students who:

- a) have been accepted into the department prior to registration in any course, seminar, research program, or other type of graduate study; or
- b) are seniors close to graduation with at least a 3.0/4.0 grade-point average during their last three semesters and do not need the course credit to complete their B.S. requirements. Petition forms are available through Student Advising Services. Exception registration is completed within the department with the instructor’s permission.

Graduate credit is earned for approved courses and registration in thesis or dissertation work completed under the direct supervision of the advisor.

Courses at the 500, 600, and 700 levels are approved for graduate credit, provided the advisement and registration requirements are met. Graduate courses outside the School of Engineering and Applied Sciences or Natural Sciences and Mathematics must receive prior approval from the student’s advisor and the Director of Graduate Studies. A form for this purpose is available from the department graduate office.

1.12.1 Informal Courses

Informal courses include Individual Problems and Graduate Internship. These courses require a complete narrative description on the designated form, including the signatures of the student, instructor, and Director of Graduate Studies. The completed form should be submitted to the MAE graduate office during the registration period at the beginning of the semester.

A maximum of six (6) credit hours of informal coursework may be applied toward the minimum 30-credit-hour requirement for the master’s programs (M.S. and M.Eng.).

A maximum of six (6) credit hours of informal coursework may be applied toward the minimum 72-credit-hour requirement for the Ph.D. degree. Any informal-course credits applied toward a master’s degree are included in this six-credit limit for Ph.D. students.

Informal courses are graded exclusively on a Satisfactory/Unsatisfactory (S/U) basis. Letter grading is not permitted.

Students enrolled in the Master of Engineering program are not eligible to register for Individual Problems courses. Graduate Internship (MAE 598) is the only informal-course option available to M.Eng. students.

1.12.2 Graduate Internship

Academic credit may be given for internship work performed during graduate studies. One (1) academic credit will be provided for every 90 hours of work performed during the internship, with no more than three (3) credits earned during each internship period.

Internships during the Fall and Spring semesters, in addition to the 12-week Summer Session, may carry up to three (3) credits. Internships during the Winter Session may carry no more than one (1) credit.

Students must be registered for the internship course, MAE 598, during the time they hold the internship for the credits to count toward their degree. To register for a Graduate Internship, students must complete the “Internship Credit Request Form for MAE 598,” located at:

<http://engineering.buffalo.edu/mechanical-aerospace/graduate/current-students/advising.html>.

Students must have completed at least three (3) credits in their program before they are allowed to register for a Graduate Internship.

A waiver of the three-credit requirement must be requested in writing from the Director of Graduate Studies *before* the Internship Credit Request Form is submitted. Students who hold a permanent position with the internship company will not be allowed to register for Graduate Internship credit.

1.12.3 Auditing Courses

An audited course carries no weight and does not count as attempted or accumulated credit hours. A student desiring an “audit” grade in a course must officially register for the course. The student must also submit a written request to the instructor by the fourth week of class indicating the desire to receive an “audit” grade. The instructor’s decision is final and must be communicated to the student in writing in a timely manner.

A student wishing to repeat a previously audited course and receive a weighted grade and academic credit must first obtain permission from both the course instructor and the Director of Graduate Studies before registering for the course.

1.12.4 Distance Learning for Part-Time Students

Part-time students may take up to four courses through distance learning (e.g., EngiNet).

1.12.5 Distance Learning for Full-Time Students

Full-time domestic students may take up to two courses through distance learning (e.g., EngiNet). Full-time international students may take up to one course through distance learning.

Both domestic and international students must discuss distance-learning enrollment with their advisor and the Director of Graduate Studies. International students must also contact International Student Services:

<http://www.buffalo.edu/international-student-services.html>.

1.12.6 Graduate Credit from Undergraduate Courses

Students wishing to use an undergraduate course for graduate credit must submit a petition form along with a statement or syllabus from the instructor showing the additional work required for graduate credit to the MAE graduate office two business days before the University’s Add/Drop deadline for the semester in which the course will be taken. Copies of these petitions must be included with the Application to Candidacy form. Retroactive approval will not be granted.

Such courses are limited to a maximum of two advanced undergraduate courses at the 400 level. This maximum applies to the entire master's or Ph.D. degree program.

For cross-listed courses offered under both undergraduate- and graduate-level course numbers (e.g., 400-level and 500-level versions), a student who previously completed the undergraduate version of the course at the University at Buffalo is not eligible to register for or receive graduate credit for the corresponding graduate-level version.

Undergraduate courses carrying four or more semester credit hours will receive a maximum of three semester hours of graduate credit. Graduate students taking a four-credit-hour course must register and pay tuition for the full four credits.

1.12.7 Other

The following courses may not be used to fulfill degree-credit requirements:

- a) undergraduate courses in which a grade below B is earned. Credit for such courses will not be applied toward the degree, but the grades will be counted in the overall grade-point average;
- b) a graduate course already used to fulfill the requirements of an undergraduate degree program;
- c) the graduate-level version of a cross-listed course when the student previously completed the corresponding undergraduate-level course at the University at Buffalo; and
- d) graduate courses in which a grade of D, F, or U is earned.

1.13 Scholastic Requirements (General)

- a) Grades: A minimum average of B (3.0/4.0) must be maintained during all graduate work. This requirement takes effect after nine (9) credit hours, and all work taken for graduate credit that could be applied toward the degree is used in calculating the grade-point average.

Except for courses designated as S/U, courses should not be taken using S/U grading unless approval is obtained in advance from the Director of Graduate Studies.

Accordingly, courses taken in excess of those applied toward the degree-credit requirements will be included in the computation of the student's grade-point average. Students whose averages fall below 3.0 at the end of any grading period may be permitted, upon recommendation of their advisors and approval of the Director of Graduate Studies, to make up the grade-point deficiency within a specified period.

- b) Dismissal from Academic Program: A student will be considered for dismissal from the program when:
 - i) a grade of F is earned in any course;
 - ii) more than two grades are earned from among C, D, and U;
 - iii) probation status has not been removed;
 - iv) the grade-point average falls below 2.5 at the end of any grading period;
 - v) multiple semesters with a GPA below 3.0 occur; or
 - vi) the student is found guilty of academic dishonesty according to existing regulations.

Incomplete grades ('I') are not counted in the program average while they are on the student's record. However, after no more than two additional semesters, all requirements for such courses must be completed and a letter grade assigned. If this is not done, the 'I' grade will automatically be changed to a U

(Unsatisfactory), which cannot be used to satisfy graduation requirements. The program average is not affected by grades received for thesis, dissertation, and seminar.

Graduate students are permitted to resign from a course without academic penalty if this is done prior to the last day for dropping a course without penalty. The student must resign officially through their HUB Student Center. Step-by-step instructions can be found at:

<https://registrar.buffalo.edu/hub/droppingAClass.php>

Students who are required to maintain full-time status must also receive approval from the Director of Graduate Studies prior to dropping a course. It is important that the student resign officially from a course in the manner described; otherwise, a grade of F will be recorded.

c) Time Limits for Degree Students:

The time limit for the master's programs (M.S. and M.Eng.) is four years, measured from the first registration as a graduate degree student. For part-time students, a time limit of six years from the first registration in the graduate program may be permitted. At the end of four years, a graduate student petition form must be submitted to request an extension beyond the fourth year.

For students entering the Ph.D. program with a master's degree, the limit is five years from the date of the first Ph.D. registration and seven years from the date of first graduate registration. For students entering the Ph.D. program with a B.S. degree, the limit is seven years from the date of the first Ph.D. registration. Time spent on an approved Leave of Absence is not included in these time limits.

Time-limit extensions may be granted for adequate reasons by petition to the Executive Committee of the Graduate School. The petition must be forwarded with a recommendation from the Director of Graduate Studies. The extension of the time limit is normally granted for a maximum period of one year.

Note: The time limits for international students may vary depending on applicable immigration policies.

d) Other Requirements:

Any general requirements of the Graduate School or SEAS must also be satisfied. See the UB Graduate School Policy Library at:

<https://grad.buffalo.edu/succeed/current-students/policy-library.html>.

1.14 Financial Assistance and Tuition Scholarships

All students are automatically considered for financial aid upon application for admission to graduate studies. There are three main types of financial support: Teaching or Graduate Assistantships, provided by state funds for lines allotted to the department; Research Assistantships, provided by research grants held by individual faculty members; and Graduate Fellowships, provided by state funds administered by the Graduate School.

In addition to Research Assistantships, potential new graduate students applying for admission are also eligible for Teaching Assistantships, for which decisions are made by the Graduate Studies Committee of the department. For TAs, the general policy of the department is to limit appointments to two semesters. Ph.D. students serving as TAs are eligible for support beyond the first two semesters; however, the expectation is that the bulk of the support for Ph.D. students will be provided through Research Assistantships and Graduate Fellowships based on satisfactory performance.

The duties of TAs, which are assigned by the Department Chair after consulting the Director of Graduate Studies, typically require twenty (20) hours per week and consist of conducting undergraduate laboratories, assisting faculty in recitations, grading problems, or holding office hours.

The stipend and duties of RAs are determined by the Principal Investigator or grant holder. Usually, the work of RAs contributes directly to their thesis or dissertation research, or is closely related to it.

Graduate or University Fellowships are awarded annually to new students by the Graduate School on a University-wide competitive basis. The department proposes several of its most promising candidates for these fellowships when applications are solicited by the Graduate School.

Assistantships and fellowships normally include a full or partial tuition scholarship.

Tuition Scholarship credit hours are limited to those credits required for the degree being pursued (master's or Ph.D.). Continuing students who are eligible for tuition scholarships must complete and submit the necessary forms before the beginning of the Fall semester each year.

In cases of late appointments, tuition scholarship forms may be filed until the middle of the second week of classes each semester. Failure to do so could result in the loss of the tuition scholarship regardless of the initial appointment terms.

Students should also note that tuition scholarships are not granted for courses or thesis/dissertation work undertaken during the summer months. It is therefore necessary that graduate students register for adequate thesis, project, or dissertation credit during the Fall and/or Spring semesters in order to receive tuition scholarships for such study, even though some of the work may actually be completed during a later period.

Supported students in the Ph.D. program must take the Ph.D. Qualifying Examination at the first opportunity, as described in Sec. 3.6, and complete the annual review form every year. Failure to observe these requirements may result in termination of financial support.

In the department's view, the main purpose of assistantship or fellowship support is to assist the student in completing the objectives and requirements of the degree program. It is mutually advantageous for the student to complete their program in the shortest period of time consistent with high academic performance.

All assistantship appointments are subject to continuous departmental review and require satisfactory progress toward program objectives as well as satisfactory performance of assigned assistantship duties.

Teaching and Research Assistants, as well as Fellows, are expected to pursue their programs vigorously and as a continuing full-time commitment. During recesses and periods without classes that occur during the 10-month academic year (September through June), all Teaching and Research Assistants are expected to be present and actively engaged in thesis, project, dissertation, or assigned duties. Leaves of absence for time away from campus must have the prior approval of the student's advisor.

Unfortunately, the department does not have sufficient financial resources to assist all students deserving of support. Only a fraction of students can be supported. Students should therefore consult the following websites:

- a) <http://ed.buffalo.edu/admission/scholarships.html>
- b) <http://financialaid.buffalo.edu/aid/scholarships/graduate/>
- c) <https://engineering.buffalo.edu/mechanical-aerospace/graduate/admissions/scholarships.html>

Students are also encouraged to search for competitive awards available from sources outside the department or the University.

1.15 Seminar Requirement

All full-time M.S. and Ph.D. students should register for and attend the departmental seminar series (MAE 503). In cases where courses or formal assignments preclude regular attendance at the seminar, students may be excused.

- a) Ph.D. Students: Students who enter the Ph.D. program without a master's degree are required to successfully complete at least two (2) semesters of the seminar. This requirement is reduced to one (1) semester for students who enter the Ph.D. program with a master's degree.
- b) M.S. Students: All students in the M.S. program are required to successfully complete at least one (1) semester of the seminar.
- c) M.Eng. Students: Students in the Master of Engineering program are not required to enroll in the graduate seminar. However, they are encouraged to attend the seminars, as participation can be beneficial to their professional development.

A waiver of the seminar requirement or a request to change the mandatory semester for M.S. students may be made to the MAE Director of Graduate Studies. Waivers and change requests will be granted only when sufficient justification is provided.

Chapter 2

Master's Program Information

The Department of Mechanical and Aerospace Engineering offers Master of Science (M.S.) and Master of Engineering (M.Eng.) degrees in both Mechanical and Aerospace Engineering. In this chapter, we discuss the differences between the M.S. and M.Eng. programs and the requirements for completion of each degree.

2.1 Distinction between M.S. and M.Eng.

The M.S. program primarily focuses on theoretical foundations, scientific inquiry, and academic research. Completion of this degree requires a research project or thesis. In contrast, the M.Eng. is an applied degree centered on operational execution, hands-on experience, and solving engineering problems while considering practical engineering constraints such as performance, safety, cost, and manufacturability. These differences are further elaborated in the program learning outcomes listed below.

Program Learning Outcomes: Master of Science

1. Demonstrate advanced domain expertise in mechanical or aerospace engineering methods and tools, including the ability to formulate, analyze, and investigate research problems grounded in scientific and engineering principles.
2. Communicate technical and scientific findings effectively with colleagues, researchers, and stakeholders through written, oral, and visual formats.
3. Act ethically and responsibly in the conduct of research and professional practice, both independently and as part of collaborative teams.
4. Demonstrate the ability to conduct rigorous scientific and engineering investigation, including problem formulation, modeling, analysis, and interpretation of results.
5. Develop original work that contributes to the advancement of knowledge, suitable for dissemination in peer-reviewed journals or conferences, through a thesis or project under the supervision of a faculty advisor.

Program Learning Outcomes: Master of Engineering

1. Integrate and apply advanced mechanical or aerospace engineering principles, methods, and tools to analyze and solve complex, real-world engineering problems.
2. Develop and implement engineering solutions through analysis, modeling, simulation, and design, leveraging modern engineering software, laboratory experiences, and applied engineering workflows, while considering practical engineering constraints such as performance, safety, cost, and manufacturability.

3. Communicate technical information effectively with colleagues, clients, and stakeholders in professional engineering environments.
4. Act ethically and responsibly, both independently and as part of multidisciplinary teams, in the practice of engineering.
5. Demonstrate professional readiness through a comprehensive engineering portfolio, developed as part of MAE 599 (Engineering Portfolio Design), that synthesizes applied coursework and project experiences to showcase the ability to formulate problems, integrate modern engineering tools, and deliver implementable solutions aligned with industry expectations.

The requirements of the M.S. and M.Eng. programs are compared in the following tables and further discussed in their designated sections.

Table 2.1: A summary of requirements for each master's degree

Degree	Coursework	Culminating Experience	Graduate Seminar
M.Eng.	30 credits	e-Portfolio (MAE 599)	N/A
M.S. (Project)	27 credits	3-credit project (MAE 560) + presentation	1 semester
M.S. (Thesis)	24–27 credits	3–6 credits M.S. Thesis (MAE 560) + defense	1 semester

Table 2.2: Comparison of approved courses

Course Type	M.S.	M.Eng.
Required MAE courses	21 credits	24 credits, including at least 6 credits of applied MAE courses (MAE 529, 533, 542, 544, 564, 577, 589, 593)
Non-regular MAE courses	Up to 6 credits, MAE 501 and/or MAE 598	Up to 6 credits, MAE 598
Approved courses outside MAE*	Up to 9 credits	Up to 6 credits

* Approved courses outside MAE are courses from another engineering department or a hard-science department such as Chemistry, Physics, Mathematics, Geology, or Biology. Requests to use credits from any other department must be made to the Director of Graduate Studies before the semester in which the course will be taken.

To aid in course selection, MAE courses have been organized into six tracks. These tracks may contain courses from different research areas:

- BIO: Bioengineering
- CAM: Computational and Applied Mechanics
- DC: Dynamics and Control
- DM: Design and Manufacturing
- FTS: Fluid and Thermal Sciences
- MAT: Materials

Appendix B provides a suggested first-semester course list in each area. A full list of currently offered courses can be found at:

<http://engineering.buffalo.edu/mechanical-aerospace/graduate/courses.html>.

2.2 Master of Science Program

2.2.1 Course Requirements for M.S.

For the Master of Science (M.S.) degree in Mechanical Engineering or Aerospace Engineering, the credit requirement is a minimum of thirty (30) semester credit hours. Two options exist in each program:

- i) M.S. with Thesis, which includes 3–6 credits of Thesis (MAE 560) plus at least eight courses of three credits each; and
- ii) M.S. with Project, which includes a 3-credit Project (MAE 560) plus at least nine courses of three credits each.

Students receiving financial support (TA, RA, or GA) through the department are required to complete the Thesis option.

At least 21 credits, including research credits, must be from within the MAE department. The remaining 9 credits may be taken from MAE, another engineering department, or a hard-science department such as Chemistry, Physics, Mathematics, Geology, or Biology. Requests to use credits from any other department must be made to the Director of Graduate Studies before the semester in which that course will be taken.

Additionally, students must register for at least one semester of the MAE Graduate Seminar (MAE 503).

2.2.2 Project or Thesis Requirement for Master of Science

A student in the Master of Science program must complete either a Project or Thesis. The student must first reach a mutual agreement with an MAE faculty member who will serve as the student's advisor. The faculty member will then inform the department of the agreement.

Both the Project and Thesis options require students to register for MAE 560: Masters Research Guidance under their advisor's section. To register for MAE 560, the advisor must first inform the department of the advising agreement. Each semester in which a student wishes to register for MAE 560, the student must submit the appropriate request form to the MAE department.

a) Master of Science Degree with Thesis:

The thesis may cover a variety of activities, including theoretical and experimental investigations, practical design projects, and similar research activities. The nature of these activities may vary greatly, but no essential difference should exist in quality and significance as a contribution to engineering. The thesis should be carefully prepared as indicated below.

Three people qualified to render judgment in the area involved constitute the thesis examination committee: the advisor plus two other graduate faculty members. Non-MAE faculty may serve as a co-advisor or committee member, provided they have a Graduate School appointment. Two members of the thesis examination committee must hold MAE appointments. A waiver of this requirement may be requested from the MAE Director of Graduate Studies.

The candidate is required to hold a public oral presentation at which the examination committee is present, in addition to other interested faculty and students. Advance notice of the oral defense must be sent to all department members at least one week before the presentation. Any changes to the thesis examination committee should be approved by the graduate committee. The department must approve and notify the Graduate School in writing when major changes in the program, such as a change in thesis title, are made.

Following a successful oral defense, the examination committee certifies approval of the thesis by signing the Graduate School "M" form, and the advisor reports the thesis grade if it needs to be changed.

The typing, detailed format, and arrangement of the M.S. thesis are to be the same as prescribed for the Ph.D. dissertation in Sec. 3.12. Students should also refer to the guidelines in Section 1.8 regarding the use of Generative Artificial Intelligence in M.S. thesis. After final corrections have been made, the student must submit the thesis electronically to the Graduate School; see

<http://grad.buffalo.edu/study/graduate/etd.html>

for details. The department sends the signed “M” form to the Graduate School. All materials must be received by the Graduate School on or before the degree-conferral deadlines established each year.

b) Master of Science Degree with Project:

The project should be carefully prepared. Two people qualified to render judgment in the area involved constitute the project examination committee: the advisor plus one other faculty member. Non-MAE faculty may serve as a committee member, provided they have a Graduate School appointment.

The candidate makes an oral presentation at which the examination committee is present, in addition to other interested faculty and students. Advance notice of the oral presentation must be sent to all department members at least one week before the presentation.

The three-credit Project must be completed under the supervision or advisement of a Mechanical and Aerospace Engineering Department graduate faculty member, although it may be initiated by the student. A typed report of substantial length is required and must meet a satisfactory standard as judged by the faculty advisor. An electronic copy of the report must be submitted to the MAE graduate office for retention. The detailed format and arrangement of the report are determined by the research advisor.

Following a successful oral presentation, the advisor certifies approval of the project by signing the Graduate School “M” form.

2.3 Master of Engineering Program

2.3.1 Course Requirements for M.Eng.

For the Master of Engineering (M.Eng.) degree in Mechanical Engineering or Aerospace Engineering, the credit requirement is a minimum of thirty (30) semester credit hours.

At least 24 credits must be from within the MAE department. These must include at least 6 credits of applied MAE courses selected from MAE 529, 533, 542, 544, 564, 577, 589, and 593.

M.Eng. students may apply up to 6 credits of Graduate Internship (MAE 598) toward the degree. Individual Problems (MAE 501) may not be applied toward the M.Eng. degree.

Up to 6 credits may be taken from approved courses outside MAE, as described earlier in this chapter.

2.3.2 e-Portfolio for Master of Engineering

All students in the Master of Engineering program must register for MAE 599 (Engineering Portfolio Design) during their final semester in the master’s program. This zero-credit course provides structured guidance and evaluation as M.Eng. students prepare a professional portfolio that synthesizes their graduate education and supports career readiness.

2.4 Dual Master’s Degrees

It is possible for a student to complete a program leading to two master’s degrees, for example, Mechanical Engineering and Aerospace Engineering, or one of these degrees and a second degree from another engineering

discipline and department.

The guideline governing such a program is that the integrity of each degree must be maintained. This will usually mean that a minimum of 24 semester hours of credit must be completed for each degree and that 6 semester hours may be applied to both programs. In some cases, the curricula will contain prescribed courses common to both programs. Such common courses may be counted toward both degree programs.

See also information on the Graduate School website at:

<https://grad.buffalo.edu/succeed/current-students/policy-library.html>.

2.5 Transfer Credit Limits

No more than six (6) credit hours may be comprised of non-UB graduate credits.

2.6 Deadlines

To ensure that students receive their degrees when expected, certain deadlines must be met during their programs. It is the student's responsibility to be aware of these deadlines and ensure that all requirements are completed on time.

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Chapter 3

Doctoral Program Information

3.1 Application to the MAE Ph.D. Program

All applicants to the Ph.D. program are required to take the Graduate Record Examination (GRE).

3.1.1 Students Entering the Ph.D. Program With a Master's Degree

Students who already have a master's degree, an outstanding academic background, and a strong interest in research may pursue a Ph.D. degree by entering the Ph.D. program.

3.1.2 Students Entering the Ph.D. Program Without a Master's Degree

Students with outstanding undergraduate records and a high level of interest in research may pursue a Ph.D. degree by directly entering the Ph.D. program. During this pursuit, if a student wishes to earn a master's degree while completing the Ph.D. program, the student should follow the requirements described in Sec. [3.5](#).

3.1.3 Ph.D. Program for Continuing Students

Students completing a master's program in UB's MAE department who wish to proceed to the Ph.D. program must reapply following the standard admission procedure. All applicants to the Ph.D. program must take the GRE before applying to the program. This requirement applies even if the applicant previously earned a master's degree or equivalent at UB or elsewhere and was not required to take the GRE for admission to the master's program.

3.2 Ph.D. Advisor

All incoming Ph.D. students will have an advisor. If at any point during their studies a student does not have a Ph.D. advisor, the student will have until the end of the following academic semester to reach an advisement agreement with an MAE Graduate Faculty member. If a student is unable to do so, the student may be dismissed from the program.

3.3 Credit Hour Requirements

The Mechanical Engineering and Aerospace Engineering Ph.D. programs both require a total of seventy-two (72) credit hours beyond the baccalaureate degree. The following are the credit-distribution requirements:

- Regular Course Credits: 36–60
- Minimum Regular Course Credits in MAE: 12
- Maximum Informal Course Credits: 6
- Research Credits: 12–36
- Minimum Ph.D. Dissertation (MAE 660) Credits in MAE: 12

Regular courses are those graded on a letter scale and having a syllabus. Informal courses include Graduate Internship (MAE 598) and Individual Problems (MAE 501 and MAE 601). Research credits include Masters Research Guidance (MAE 560) and Dissertation (MAE 660).

A waiver of the minimum 12 Regular Course Credits in MAE may be requested in writing from the Director of Graduate Studies through the end of the student's first semester. Each request will be considered on an individual basis.

Normally, at least three academic years of full-time graduate study beyond the baccalaureate degree are required to complete the Ph.D. degree requirements. The selection of the program of courses and the student's dissertation research are under the supervision of a Ph.D. Program Committee chaired by the student's advisor.

3.3.1 Transfer Credits

A student entering the Ph.D. program may transfer up to thirty-six (36) total credit hours of previous graduate work. Regular courses with a grade of B or equivalent, or higher, will be considered Regular Course Credits. Research or Informal Courses that meet the minimum grade requirement will be considered Research Credits.

Before submitting a transfer-credit request, all students must obtain the approval of their faculty advisors. Written approval from the faculty advisor must be provided to the MAE department before any request will be approved by the Director of Graduate Studies.

3.4 Ph.D. Academic Course Plan

Within three (3) semesters of beginning the Ph.D. program, students must consult with their Ph.D. advisor and form a 72-credit coursework plan. This plan must be filed with the MAE department by the end of the student's third semester. Any changes to this plan must be approved by the student's Ph.D. advisor and filed with the MAE department. Failure to submit this plan may result in dismissal of the student from the MAE Ph.D. program.

3.5 Earning a Master's Degree as a Ph.D. Student

Students who do not already hold a master's degree in their chosen area are eligible to earn a master's degree while completing their Ph.D. program. To do so, students must inform the department of their intent, satisfy all requirements of the particular master's program (M.S. or M.Eng.) chosen, and submit all paperwork according to the master's program deadlines required by the department, School of Engineering and Applied Sciences, and University at Buffalo Graduate School.

3.6 Qualifying Examination

All Ph.D. students must pass the Qualifying Examination within the first three (3) years of the Ph.D. program if they enter with a B.S. degree and within two (2) years of the Ph.D. program if they enter with an M.S. degree. The academic advisor of a student may require, at the advisor's discretion, that a student pass the Qualifying Examination within the first two (2) years of the Ph.D. program, regardless of whether the student entered with a B.S. or M.S. degree.

For students entering with an M.S. degree, the Ph.D. Qualifying Examination time limit will begin at the start of the student's first Fall semester, unless the student's academic advisor requires that the time limit begin from the student's first semester.

All students will have two (2) opportunities to pass the Qualifying Examination. Failure to take the examination during the second year for students who enter with a B.S. degree or during the first year for students who enter with an M.S. degree will be counted as a failed attempt.

For students whose academic advisor requires that they pass the Qualifying Examination during the first two years of the Ph.D. program, failure to take the examination during the first year will be considered a failed attempt.

Any request for deferment of a Qualifying Examination must be provided in writing by the student's Ph.D. advisor at least four (4) weeks prior to the scheduled examination date. Requests will be considered by the Graduate Studies Committee on a case-by-case basis. If a student is unable to take the examination on the scheduled date due to medical reasons, documentation regarding the medical condition must be provided to the Graduate Studies Committee.

3.6.1 Format

The Qualifying Examination consists of both written and oral components. The written portion assesses the student's fundamental knowledge in graduate-level topics, while the oral examination assesses both fundamental understanding and the student's research approach to solving a technical problem within the student's research area.

At the beginning of the Spring semester, each student taking the Ph.D. Qualifying Examination must declare three (3) *topics* for the written examination and one *research area* for the oral examination from Table 3.1.

No more than two (2) topics from a single area may be taken for the written examination. Once declared, the student's Ph.D. advisor will be notified of the selection for final approval. If the student does not have an advisor, the Director of Graduate Studies will review the student's choices.

3.6.2 Written Exam

For each written examination topic listed in Table 3.1, the associated MAE course covering the topic is also provided. While not required, it is suggested that students register for and successfully complete the associated courses before taking the Written Qualifying Examination.

A letter grade of A- or better received in the MAE-related courses listed in Table 3.1 within four (4) semesters prior to the Ph.D. Qualifying Examination may be used as a PASS for the written portion of that topic. A grade earned in a similar course offered in another department or outside UB cannot be used as a passing grade for the written examination.

Not all suggested courses may be offered every year. If a student wishes to take a course before taking the examination in a specific topic, the student should review the course offerings for the current academic year before selecting the topic.

Research Area	Topics for Written Exam	MAE Related Course
1-Computational and Applied Mechanics	(a) Elasticity	MAE 524
	(b) Finite Elements	MAE 529
	(c) Continuum Mechanics	MAE 555
2-Design and Manufacturing	(a) Probability	MAE 509
	(b) Optimization	MAE 550
	(c) Mechatronics	MAE 576
3-Dynamics and Control	(a) Controls	MAE 543
	(b) Dynamics	MAE 562
	(c) Systems Analysis	MAE 571
4-Fluid and Thermal Science	(a) Fluid Mechanics	MAE 515
	(b) Advanced Thermodynamics	MAE 532
	(c) Heat Transfer	MAE 545
5-Areas with written-only examination	(a) Engineering Analysis	MAE 507
	(b) Cardiovascular Biomechanics	MAE 578
	(c) Smart Materials	MAE 538

Table 3.1: List of research areas, written examination topics, and related MAE courses.

The written examination will consist of three 1.5-hour sessions, one in each of the three declared topics. The written examination will be offered once each year at the end of the Spring semester.

3.6.3 Oral Exam

The oral examination will be held after the written examination and consists of a research presentation followed by a Q&A session assessing the *fundamental knowledge* of the student in the selected research area.

Two weeks before the date of the oral examinations, faculty in each research area listed in Table 3.1 will announce two research topics and one or two associated references. Each student should choose one topic from their declared research area.

The Graduate Studies Committee will form a research committee for each student consisting of three ladder faculty members, including the student's Ph.D. advisor. The student is expected to conduct a literature review, formulate a research question within the selected topic, and outline a technical approach for investigating the topic.

The student will submit a one-page report to the committee three (3) days prior to the oral examination. The report should summarize the state of the art, problem formulation, and suggested technical approach.

The student should also provide a brief presentation (15–20 minutes) demonstrating fundamental knowledge in the field by covering the state of the art, research problem formulation, and technical approach. The presentation will precede questions by the committee about the *chosen topic and broader topics within the student's selected research area*.

The committee will assess the student's oral examination performance using the following criteria:

1. the student's ability to understand and apply fundamental concepts in their technical area;
2. the student's ability to perform original and independent research at the Ph.D. level; and
3. the student's ability to conduct a literature review and identify technical challenges.

The oral examinations will be offered twice in each academic year, at the end of the Spring semester (early May) and at the beginning of the Fall semester (early September).

Following completion of both the written and oral components of the Qualifying Examination, the Graduate Studies Committee, in consultation with the student's Ph.D. advisor, will determine whether the student has passed or failed.

Candidates who fail twice will be dismissed from the program.

At the discretion of the Graduate Studies Committee and in consultation with the student's Ph.D. advisor, additional work, including but not limited to additional written examinations, oral examinations, or coursework, may be required for passage of the Qualifying Examination.

3.7 Ph.D. Dissertation Committee

Within 12 months of successful completion of the MAE Ph.D. Qualifying Examination, a Ph.D. Program Committee is formed. This committee must consist of at least three MAE members who hold Full Graduate School membership plus one outside reader.

The chair of this Ph.D. committee, who must be a member of MAE and hold a Full Graduate School appointment, is the primary advisor of the student. Non-MAE UB faculty may serve as co-chairs, as long as three Ph.D. committee members are MAE faculty who hold Full Graduate School appointments.

The Ph.D. committee may consist of additional members. If an additional member is affiliated with UB, the member must hold either an Associate or Full Graduate School appointment. Additional members from outside UB require the approval of the MAE Director of Graduate Studies.

The outside reader, who cannot hold an appointment in MAE, is selected by the student and their advisor(s) and may be a non-MAE UB faculty member who holds a Full Graduate School appointment, a tenured or tenure-track faculty member at another university, or an individual who holds a Ph.D. degree and works in an industrial setting.

A waiver of these requirements may be requested from the MAE Director of Graduate Studies. Any changes in the Ph.D. Program Committee after the initial selection must be approved by the Ph.D. Program Committee and the Director of Graduate Studies.

3.7.1 Ph.D. Dissertation Committee Responsibilities

It is the responsibility of the Ph.D. Program Committee to provide guidance to the candidate.

The selection of the Ph.D. Program Committee members is primarily the responsibility of the candidate and their dissertation advisor(s). All Ph.D. Program Committee members are required to attend the Ph.D. Dissertation Proposal Defense, Sec. 3.8; review the Annual Evaluation, Sec. 3.9; read and approve the Dissertation, Sec. 3.12; and sign any other paperwork that may be required.

The outside reader is required to submit written approval of the Dissertation, Sec. 3.12, to the MAE Director of Graduate Studies.

3.8 Ph.D. Dissertation Proposal Defense

The student shall prepare a Ph.D. Dissertation Proposal Defense presentation for their Ph.D. Program Committee that includes a literature review, research plan, and any preliminary results. This presentation must be given within 12 months of successful passage of the MAE Ph.D. Qualifying Examination.

The student may include this proposal defense as part of the M.S. Project or M.S. Thesis defense if the student is earning the M.S. degree while working toward the Ph.D.

After this presentation, the Ph.D. Program Committee will provide written and/or oral comments on the presentation and advise the student regarding the proposed future work.

3.9 Annual Evaluation

During the course of the student's program, annual progress evaluations should be carried out by the Ph.D. Program Committee and reported to the Director of Graduate Studies. A review form for this purpose is available from the MAE graduate office.

The annual review will take place during the Spring semester. In the progress evaluation, the candidate's course performance will be considered, as well as progress made on the candidate's dissertation research.

If the committee finds the candidate's progress unsatisfactory, it may recommend corrective action. If the candidate's progress continues to be unsatisfactory, the committee may recommend withdrawal from the University to the Department Chair.

3.10 Advancement to Candidacy

Continuation in the Ph.D. program requires that the student advance to candidacy. When considering a student's advancement to candidacy, the Graduate Studies Committee will consider the following components:

1. Results of the Qualifying Examination;
2. Results of the Ph.D. Dissertation Proposal Defense;
3. Graduate GPA/transcript;
4. Advisor letter of recommendation/Annual Reviews;
5. Curriculum Vitae (CV); and
6. TA evaluations, if available.

Successful advancement to candidacy requires formal review by the Graduate Studies Committee and the Director of Graduate Studies.

If the Graduate Studies Committee or Director of Graduate Studies does not support a student's advancement to candidacy, the student will be dismissed from the program.

To advance to candidacy, a student must submit an Application to Candidacy (ATC) form to the department. This ATC form must include evidence of full-time residency for at least two semesters; itemization of at least seventy-two (72) credit hours beyond the baccalaureate degree, including any proposed coursework; and any additional information required by the Graduate Studies Committee.

Courses for transfer credit must be indicated as such on the Application to Candidacy. The program is then filed for approval by the Executive Committee of the Graduate School. Approval by the Executive Committee constitutes admission to candidacy.

The student must notify the Graduate School by petition when minor changes in the program, such as changes in the dissertation title or deletion/addition of one or two courses, occur. Major changes in the program, such as revision of the research abstract, addition or deletion of more than two courses, or a change in major advisor, require a petition to be filed through the department graduate office.

3.11 Responsible Conduct of Research

All students initially admitted to a Ph.D. program for the Fall 2009 semester or thereafter are required to document successful completion of "Responsible Conduct of Research" (RCR) training when they submit their Application to Candidacy (ATC) for the Ph.D. degree.

This training requirement may be fulfilled by either:

1. enrolling in and passing PHI 640 Graduate Research Ethics or RPN 541 Ethics and Conduct of Research; or
2. completing the Collaborative Institutional Training Initiative (CITI) online Responsible Conduct of Research course with an average score of 80% or higher.

Students choosing to complete the CITI online course must provide documentation of successful completion with their Application to Candidacy.

3.12 Dissertation

Each Ph.D. student is required to complete an original dissertation and orally defend their work before the Ph.D. Program Committee and any other interested parties. Students should also refer to the guidelines in Section 1.8 regarding the use of Generative Artificial Intelligence in Ph.D. dissertations.

Upon completion of the dissertation, a draft is submitted to the advisor for comments, corrections, and approval. Upon the advisor's approval, the student submits copies of the dissertation to the remaining members of the Ph.D. Program Committee for their review and approval.

The oral defense consists of a presentation during which the candidate outlines the highlights of their work, followed by questions from the Ph.D. Program Committee or any other interested persons present.

The oral defense cannot occur earlier than six (6) months after the Ph.D. Dissertation Proposal Defense date.

Following a successful dissertation defense, the Ph.D. Program Committee certifies approval of the dissertation by signing the Graduate School M form. The M form must be signed by the Director of Graduate Studies or the Department Chair before being forwarded to the Graduate School.

After the student has made final corrections to the dissertation, the student must submit the dissertation electronically to the Graduate School; see the MAE Graduate Coordinator for details. This must be completed prior to the student's designated degree-conferral date. All materials must be received by the Graduate School on or before the degree-conferral deadlines established each year by the Graduate School.

The typing, arrangement, and submission of Ph.D. dissertations must meet the requirements of the Graduate School. More details regarding the formatting and ETD submission dates of the dissertation can be found at:

<http://grad.buffalo.edu/study/graduate/etd.html>.

Since theses and dissertations represent the joint effort of students and their advisors, and potentially other members of the faculty, the student should make no arrangements for publication without consulting their advisor. Electronic submission of Ph.D. dissertations, as required by the Graduate School, does not preclude publication by other methods at a later date.

The primary responsibility for the quality of the presentation, organization, grammar, and readability of the dissertation, thesis, or project lies with the student. Extra effort and outside editorial assistance may be required when a student does not write fluently in the English language.

Appendix A

Forms

- University required forms: <https://grad.buffalo.edu/succeed/current-students/forms.html>
- MAE forms: <http://engineering.buffalo.edu/mechanical-aerospace/graduate/current-students/advising.html>

Appendix B

Suggested First Semester Courses

All students can see a current listing of courses at <http://engineering.buffalo.edu/mechanical-aerospace/graduate/courses.html>. It is recommended that no student register for more than 12 credits per semester. MAE reserves the right to dis-enroll from courses a student who has registered for more than 15 credits before the first day of the semester. All PhD students should confirm their course selections with their advisor prior to registration. All courses are subject to the availability of the instructor or may be offered every other year. If a course is not offered the student is free to choose a replacement course.

Fall Semester Matriculation

Fluid and Thermal Sciences 1. MAE 515: Fluid Mechanics 1 2. MAE 532: Advanced Thermodynamics 3. MAE 542: Eng. App. in CFD 4. Elective	Computational and Applied Mechanics 1. MAE 507: Engineering Analysis 1 2. MAE 529: Finite Element Struct. Analysis 3. MAE 555: Continuum Mechanics 4. MAE 609: High Performance Computing 1
Dynamics and Controls 1. MAE 543: Continuous Control System 2. MAE 567: Vibration & Shock 1 3. MAE 571: Systems Analysis 4. Elective	Design and Manufacturing 1. MAE 509: Probability And Random Process 2. MAE 550: Optimization in Eng. Design 3. MAE 564: Manufacturing Automation 4. MAE 576: Mechatronics

Spring Semester Matriculation

Fluid and Thermal Sciences 1. MAE 539: Computational Fluid Dynamics 1 2. MAE 545: Heat Transfer 1 3. Elective 4. Elective	Computational and Applied Mechanics 1. CIE 511: Advanced Mechanics of Solids 2. MAE 524: Elasticity 3. Elective 4. Elective
Dynamics and Controls 1. MAE 525: Space Dynamics and Control 2. MAE 562: Analytical Dynamics 3. MAE 568: Vibration & Shock 2 4. Elective	Design and Manufacturing 1. MAE 552: Heuristic Optimization 2. MAE 577: CAD Applications 3. MAE 502: Human-Robot Interaction 4. Elective