

**Kazuo Inamori School of Engineering**

**at**

**Alfred University**

**GRADUATE PROGRAM MANUAL**

**2022-2023**

**Last Updated: August 2021**

## **1. Purpose of the Manual**

This Graduate Program Manual, which is intended as a reference for graduate students and faculty, describes the policies and procedures of the School of Engineering (SoE) graduate programs. This document is supplemental to the Alfred University's Graduate Academic Regulations and the current Graduate Catalog, both of which are available on-line at:

Regulations: <https://my.alfred.edu/academic-regulations/graduate.cfm>

Catalog: <https://www.alfred.edu/academics/graduate-programs/catalog.cfm>

Students are encouraged to review the University's Graduate Academic Regulations because they contain important information not repeated in this manual. The policies in the University's Graduate Academic Regulations and current Graduate Catalog supersede those outlined in this manual. Graduate students who identify any policy or procedure in the SoE Graduate Program Manual which appears to be in conflict with university policies should bring it to the attention of their academic advisor and the Dean for clarification.

## **2. Admission and Enrollment**

### **2.1 Admission**

General policies regarding admission and transfer of credits are outlined in the AU Graduate Catalog. Applications to the graduate engineering programs are reviewed by the SoE Graduate Admissions Committee. Applicants to the M.S. programs are either accepted or denied admission. Accepted students are automatically placed on a waiting list for financial assistance, but may also enroll as self-funded students. Applicants to the Ph.D. programs are either accepted with an offer of a full assistantship, pre-accepted and placed on a waiting list for financial assistance, or denied admission. Current M.S. students must also go through the application process to enter the Ph.D. program. The School does not generally admit students to the Ph.D. program without a full assistantship in the form of a teaching assistantship, a research assistantship, a fellowship/scholarship, or guaranteed funding from an employer.

### **2.2 Transfer Credit**

Due consideration will be given to graduate coursework done elsewhere and is at the discretion of the Dean's Office. In general, the transferred credits must be appropriate to the student's degree program and presented with a grade of B or better. No more than 6 graduate semester credit hours may be transferred toward a master's degree programs, and no more than 15 credit hours may be transferred toward a Ph.D. program. Thesis credits are not transferrable.

Students with graduate credit from another institution must petition the Dean in writing within the first year of residency at Alfred University. The written petition shall include a proposal for

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how the transfer credit might be applied to AU requirements, an official transcript from each university from which credit is claimed, and the catalog description/syllabus for each transferred course claimed. All documents must be provided in English, or must be translated using an appropriate translation service. The student must bear any cost associated with the translation.

### **2.3 Duration of Degree Programs and Residency Requirements**

The M.S. programs are designed to be completed in no more than four semesters of full-time enrollment. The M.S. degree programs must be completed within six years of first enrollment, and students must maintain continuous enrollment at a minimum of 2 credits a semester.

The Ph.D. programs are designed to be completed within four years from a B.S. starting point or 3 years from an M.S. starting point., and students must maintain continuous enrollment at a minimum of 2 credits a semester. The residency requirement for the Ph.D. program is four semesters of full-time enrollment. The residency requirement may be waived in some special cases (for example, residency at an industrial collaborator). Such a petition may be made in writing to the Dean's office and must be approved by the advisor.

### **2.4 Full-time, Part-time and Continuous Enrolment**

Full-time enrollment is defined as 12 credits or more. Part-time enrollment may range from two to twelve credits per semester.

Full-time students in the School of Engineering are expected to enroll in 15 credits of combined coursework and thesis. Applicants admitted as full-time students are expected to maintain full-time status until they complete the degree, even after they have completed the minimum number of thesis credits for the degree. Students wishing to convert to part-time status must petition the Dean in writing. This petition shall include the reasons for wishing to convert to part-time status and the projected timeline for completing the degree. As an example, students who have completed all of their research and are writing their thesis may petition to enroll in two-credits of thesis during their final semester.

Full-time tuition, while enrolled in the School of Engineering, only covers courses that count toward the degree program in which the student is enrolled, i.e., the tuition does not typically include courses taken within the College of Business, School of Art and Design, or College of Liberal Arts and Sciences unless they are part of the specified degree program. Occasionally, faculty in the other divisions of the university may offer courses with SoE designations; these are covered by the full-time tuition.

Applicants may be admitted to the programs as part-time students. Part-time students are also expected to maintain continuous enrollment.

Students who do not maintain continuous enrollment will be withdrawn from the university. Students who have been withdrawn, but who wish to return to complete their degree, may petition the Dean for retroactive enrollment. Students who do not intend to maintain continuous enrollment should consider petitioning for an official leave of absence as outlined in the Graduate Catalog.

### 3. Financial Aid

General financial aid policies are outlined in the AU Graduate Catalog. Following are the common types of financial assistantships available in the School of Engineering:

- *3-K Graduate Assistantship*: The *3-K Graduate Assistantship* is the minimum financial assistantship awarded to full-time students admitted into the M.S. program. It consists of a \$3000 stipend in exchange for 7.5 hours of work per week during the academic year. The assigned work duties may include teaching, equipment maintenance, and administrative support. The student is responsible for all tuition and fees and must maintain full-time status. Students receiving the *3-K Graduate Assistantship* are eligible to receive additional financial assistance, such as tuition or wages paid by a research grant. The student must report these additional earnings to financial aid and should be aware that they could affect other forms of financial aid such as loans.
- *Department Assistantship*: Two *Department Assistantships* are selected by the chair(s) responsible for the Mechanical Engineering, Electrical Engineering and Renewable Energy Engineering programs. These assistantships are equivalent to the cost of full-time tuition. A portion (25%) of the assistantship is paid as a stipend in return for 15 hours of work per week during the academic year. The assigned work duties may include teaching, equipment maintenance, and/or administrative support. The remainder of the assistantship is awarded as a tuition grant. The student must maintain full-time status and is responsible for all remaining tuition and fees. Students receiving a *Department Assistantship* are eligible to receive additional financial assistance, such as tuition or wages paid by a research grant. The student must report these additional earnings to financial aid and should be aware that they could affect other forms of financial aid such as loans.
- *NYSCC Teaching Assistantship*: Recipients of the *NYSCC Teaching Assistantships (TA)* are selected by the Dean, or faculty designee. The *NYSCC Teaching Assistantships* include an annual stipend of \$17,000, full tuition, and fees. Recipients are expected to work at least 40 hours per week (minus in-class time). Up to 15 hours of the weekly work commitment may be assigned by the Dean or teaching supervisor. The remainder of the work is assigned by the thesis research advisor and shall be related to the thesis.
- *Full Research Assistantship*: *Full Research Assistantships* that cover an annual stipend of \$17,000, full tuition, and fees, which are paid by research grants and contracts. Recipients are selected by a faculty research advisor. A work commitment of at least 40 hours per week (minus in-class time) is required. Typically work duties will be related to

thesis, but the advisor may assign up to 15 hours per week towards other research, lab maintenance, or teaching activities.

- *Fellowships*: Fellowships are prestigious awards granted by government agencies, companies, professional organizations, or philanthropic organizations. All eligible students are encouraged to apply to fellowships after consulting with their thesis advisor. For more information about fellowship opportunities, please visit <http://www.asee.org/fellowship-programs/graduate>. Because fellowships typically offer financial incentives substantially greater than the assistantships described above, students receiving such fellowships must forfeit any AU-funded assistantship. The School will consider supplementing fellowships that do not offer full-tuition assistance.
- *Miscellaneous Opportunities*: Research grants and contracts frequently provide partial assistance and employment opportunities for graduate students. These may take the form of tuition grants, hourly wages, stipends, and/or support for travel. The hourly wage for graduate students varies with the task and experience following the guidelines of the Office of Research and Sponsored Programs (ORSOP). The student must report these additional earnings to financial aid and should be aware that earnings could affect other forms of financial aid such as loans. International students and their research supervisor should also discuss any work-related arrangements with the Office of International Programs to ensure compliance with visa restrictions.

Most financial assistantships are awarded for a period of one or two semesters, and are renewable at the discretion of the research advisor or Dean, depending on the source of funding. In general, AU-based financial aid will not be extended beyond the above-stated duration for a degree program, .

Financial assistance may be terminated for: poor academic performance, failure to meet the associated work obligations, university disciplinary action, arrest, or visa violations. Decisions to terminate financial assistance because of poor academic performance are made by the Graduate Committee in consultation with the Dean at the end of each semester. After consultation, the Dean's office will notify the student in writing that an issue has arisen. The minimum notice for termination or reduction in funding will be four weeks. The notification (or warning) will state the nature of the problem, may recommend remedies for correcting the problem within a specified period of time, and will describe the consequences of failing to remedy the problem.

## **4. Academics**

### **4.1 Degrees Offered and Requirements**

The School of Engineering offers the following graduate degrees:

- M.S. Biomaterials Engineering

- M.S. Ceramic Engineering
- M.S. Electrical Engineering
- M.S. Glass Science
- M.S. Materials Science and Engineering
- M.S. Mechanical Engineering
- Ph.D. Ceramics
- Ph.D. Glass
- Ph.D. Materials Science and Engineering

The current requirements for the degrees are summarized in Appendix B. Students in the program may elect to fulfill the current graduate catalog requirements or those outlined in the AU graduate catalog for the year that they matriculated in the graduate program.

#### **4.2 Undergraduate Deficiencies and Cross Listed Courses**

Advanced degrees will be conferred only upon those candidates who have demonstrated adequate knowledge in the field of study. Students lacking the undergraduate preparation in the field of study may be advised to enroll in undergraduate courses, which do not count towards the graduate degree requirements.

Students may have an opportunity to take cross-listed courses at Alfred University. Cross-listed courses are a pair of one undergraduate and one graduate course that have similar course content and share a common lecture period. The two courses differ from each other in their assignments, exams, and/or grading standards. Only the graduate version of a cross-listed course will be applied to the graduate transcript. Undergraduates may take the graduate version of the course and have it applied to their graduate transcript, but they **MUST** inform the registrar of their intention before completing their B.S. degree. Graduate courses applied to the undergraduate degree requirements cannot be applied to the graduate transcript. Students who have completed the undergraduate version of the course may not enroll in the graduate version of the course.

#### **4.3. Graduate Seminar**

All full-time graduate students must enroll in and attend Graduate Seminar, ENGR 690, each semester of full-time enrollment. No more than two absences, excused by the instructor of record, will be allowed per semester. If the scheduled seminar conflicts with a teaching assignment, the student may seek a semester-long waiver from the Dean. Failure to acceptably complete Graduate Seminar will be considered as unsatisfactory academic progress. Part-time graduate students are encouraged, but not required, to enroll in seminar.

#### 4.4 Thesis Committee

All students are expected to select an advisor and a thesis advisory committee before the end of the first semester of graduate enrollment. This is accomplished by submitting a completed Advisor and Thesis Committee Selection form to the Dean's Office - Graduate Program Administrative Assistant – Laura Grove. Any changes to the thesis advisory committee must be communicated to the Dean's Office - Graduate Program Administrative Assistant in writing. The advisor will: serve as the principal consultant/supervisor for the thesis, chair the thesis committee, and report the thesis-credit grades to the Registrar. The advisory committee provides advice on safety and professional responsibility, the research project, the written thesis, and the student's professional development. The advisory committee shall arrive at all matters concerning the thesis by unanimity. In the unlikely event that such agreement cannot be reached, the question at issue will be brought to the School of Engineering Graduate Committee for decision by majority voting.

The thesis committee shall consist of (1) the thesis advisor and (2) at least two additional AU graduate faculty members for M.S. students or at least three additional AU graduate faculty members for Ph.D. students. Individuals who do not hold faculty rank at AU may act as additional non-voting committee members at the discretion and approval of the thesis advisor. The names of non-voting committee members will appear on the thesis signature page.

#### 4.5. Thesis Progress and Report

After completing the first semester of enrollment, the **student should meet with the thesis committee each semester to update them on the progress towards completion of the degree.** Starting with the second semester of enrollment, the student should (1) deliver a formal presentation to the thesis committee and (2) submit a completed copy of the Graduate Student Progress Report to the Dean's Office - Graduate Program Secretary before mid-term break. Failure to complete the presentation and report will be deemed unsatisfactory academic performance at mid-semester and result in an "NC" for "no credit". Students receiving an "NC" must meet with the committee by semester's end or the "NC" will become the final grade

After the advisory committee meeting, the advisor will consult with the advisory committee to complete the student assessment form, discuss the completed form with the student, and submit the completed form to the Dean's Office.

#### 4.6. Publication Requirements

Publishing in peer reviewed journals is important to a graduate student's professional development as well as the reputation of the institution. Prior to defending the master's thesis, the candidate must prepare and submit at least one manuscript for publication in a peer-reviewed journal or peer-reviewed conference proceedings. Because the M.S. program is completed in a relatively short period of time, the manuscript does not need to be accepted by

the journal, but must meet the approval of the voting members of the thesis committee prior to its submission (the committee members need not be authors). Students completing the M.S. project option (available only in EE and MECH) are exempt from the publication requirement. Prior to defending the Ph.D. thesis, the candidate must present at least three peer-reviewed publications. For the Ph.D., the publications must be published or in-press, meaning that they have been fully accepted for publication.

Students who are unfamiliar with guidelines for manuscript authorship should discuss it with their thesis advisor. Authors are individuals who make substantial contributions to the work in terms of conception, design, execution, and/or analysis and interpretation of data and who participate in drafting, reviewing, and/or revising a manuscript for intellectual content. Typically, the first author is the individual who conducts the bulk of the experimental work, analyzes the data, and writes the first draft of the paper. The last author is often the senior author who conceived the project, who coordinates the contributions of co-authors, and who is responsible for the overall content of the final paper. As such, any manuscript that is based on a student's thesis must include the student as a co-author and will typically include the advisor as the senior author.

#### **4.7. PhD Qualifying Exam**

Students registered in the Kazuo Inamori School of Engineering Ph.D. programs in Ceramics, Glass Science, and Materials Science and Engineering must successfully pass a qualifying process. The qualifying process consists of two separate requirements: (1) successful completion of the Ph.D. core curriculum; and, (2) a written thesis proposal and its oral defense (the qualifying examination). Additional rules and regulations concerning each part of the qualifying process follow.

The purpose of the qualifying examination sequence is to determine whether a student possesses the necessary background and skill to execute a research plan that will result in a significant original contribution to knowledge in their field. Specifically, the qualifying examination is a tool to evaluate the ability of the student: to conceive and perform novel research (e.g., critically evaluate literature, formulate hypotheses, design and conduct experiments, interpret and analyze data, etc.); to extemporaneously communicate relevant scientific and technical information; and to synthesize core disciplinary concepts in the framework of their research and in broader contexts as appropriate.

The investments of resources within the Ph.D. program by the community, faculty, staff, institution, and state as well as by the commitment of the student are enormous. As custodians of these resources, the SoE Faculty utilizes the Ph.D. qualifying process as a tool to assess, within the early stages of the program, the probability of success of the student with regard to established traditions and impacts that Alfred University Ph.D. graduates have toward supporting the greater community.



Specifically, the qualifying examination is used by the Faculty to assess the student's level of competencies to articulate an original thesis statement and to propose a well-conceived, manageable research plan of appropriate scope. Although passing the qualifying examination does not guarantee success of the student in earning a Ph.D. degree at Alfred University or in going on to make significant contributions in support of society, the Faculty, as custodians of Ph.D. program resources, deem the successful passing of the qualifying examination as a paramount necessity toward further investment of resources in the student in the Ph.D. program. Failing to succeed in the examination does not mean that the student will not be able to earn a Ph.D. degree at another institution and go on to make significant contributions in support of society. Students within the Ph.D. program who do not pass the qualifying process at Alfred University within the allotted timeframe shall be invited to complete and will be placed within the appropriate Masters' program at Alfred.

#### **4.7.1. Ph.D. Core course requirements**

Students must enroll in the Ph.D. core courses at the earliest possible opportunity and must successfully pass all Ph.D. core courses with an average grade point average of 3.0 or better.

Ph.D. core courses comprise:

- CEMS 503: Thermodynamics of Materials
- CEMS 504: Kinetics and Non-Equilibrium Processes in Materials
- CEMS 501: Solid State Physics
- CEMS 545: Characterization of Materials (For students entering prior to Fall 2016, CEMS 506: Advanced Engineering Math may be presented instead)

#### **4.7.2. Written Proposal and Oral Defense (Qualifying Examination)**

The Qualifying Examination is administered by The Qualifying Examination Committee, consisting of at least three faculty members from the Graduate Programs Committee and the student's advisor as a non-voting member. The examination consists of a written thesis proposal and its subsequent oral defense. While the student's proposed research may be based on a proposal written by the thesis advisor, the student's proposal must be written in the student's own words and must cite the original proposal as a reference when appropriate. The Qualifying Examination Committee may request that the advisor provide a copy of the original proposal if there is concern regarding the originality of the student's proposal.

Students must pass the qualifying examination within three semesters of entering the Ph.D. program.

Students must submit one hard copy and one electronic copy of their written proposal to the Dean's office no later than the first day of classes of the semester in which the oral defense is to be scheduled, to be no later than the first day of classes of the third semester upon entering the Ph.D. program.

The written proposal should be ≤ 15 pages long (excluding references) ( ), single spaced with 1" margins, in either Times New Roman or Arial 12 point font and contain the following sections:

- Project Overview – a summary of the proposed project ( $\leq 1$  page)
- Introduction – a brief discussion describing why the research is being conducted ( $\leq 1$  page)
- Literature Review – a focused review of the literature that is relevant to the project ( $\leq 8$  pages)
- Preliminary Results (if applicable) – a presentation of any preliminary results
- Work Plan and Schedule – a description the proposed work broken down into tasks and subtasks and a proposed schedule for the project ( $\leq 3$  pages)
- Budget – a table summarizing the cost of the project including salary, tuition, supplies, travel, etc.
- Safety and Waste Disposal – a brief description of any safety concerns and plans for hazardous waste disposal ( $\leq 1$  page)
- References – a list of references (not included in the 15 page limit)

The Dean's office shall inform the student if the submitted document is found to be non-compliant, in which case the student shall have 48 hours to turn in a fully compliant revision. Continued non-compliance shall constitute failure of first attempt at the qualifying examination. Upon approval of a compliant proposal document, the Dean's office shall schedule the oral defense at the earliest possible opportunity allowing for at least two (2) weeks for examiner review of the written thesis proposal. The evaluation will be performed by a Qualifying Examination Committee. If the Qualifying Examination Committee finds that the submitted written proposal is of sufficiently poor quality, the Qualifying Examination Committee can fail an attempt without proceeding to the oral presentation.

At the scheduled oral defense, the student shall deliver a thirty (30) minute presentation defending their written thesis proposal to the Qualifying Examination Committee. Other than duration, no presentation format is prescribed. PowerPoint or other comparable presentation formats are acceptable. After the presentation, committee members will conduct an oral examination, which will cover material relevant to the proposed research, which may include topics from the core courses. The total examination time including questioning and deliberation shall not exceed three (3) hours.

The evaluation outcome will be Pass, Fail, or Conditionally Pass, and will follow guidelines and evaluation rubric issued by the Qualifying Examination Committee. If the outcome is Conditional Pass, the student must remedy the identified weakness within the time frame identified by the Qualifying Examination Committee.

Students unsuccessful at passing the qualifying examination at their first attempt may be permitted at most one additional attempt according to the following timetable:

- If the student unsuccessfully attempted the research proposal defense in their second semester upon entering the Ph.D. program, the second attempt shall be initiated by submission of a revised written proposal no later than the first day of classes of the third semester upon entering the Ph.D. program following the same general procedures.

- If the student unsuccessfully attempted the research proposal defense in their third semester upon entering the Ph.D. program, the second attempt shall be initiated by submission of a revised written proposal no later than four (4) weeks after their first attempt. Subsequent scheduling shall follow procedures outlined in the previous section. Students unsuccessful at passing the Ph.D. qualifying examination at their second attempt shall be dropped from the Ph.D. program and shall be invited to complete a master's degree in their respective field of study.

#### **4.8 Thesis and Oral Defense—Thesis Option (available for all M.S.) and only option for Ph.D.**

Candidates for the Ph.D. degree and the thesis option of the M.S. degree must develop and present a thesis which demonstrates the ability to perform an original, scientific investigation and to write a scholarly exposition. The research findings presented in the thesis must be unrestricted and available for full public display. The thesis author and research advisor may request that the thesis is withheld from full public display for a period of 12 months to secure intellectual property rights.

The M.S. thesis should be fewer than 50 pages (excluding appendices). The Ph.D. thesis may be presented as a compilation of stand-alone papers, but must include at least two additional chapters -- one that introduces the body of work and one that discusses its significance as a whole.

Students should begin preparing their written thesis well in advance of their expected defense date. The initial draft copy of the thesis, with proper grammar/syntax/references will be submitted to the research advisor who will suggest revisions. Additional iterations will likely be required to garner the thesis advisor's approval on the *Thesis Review Form* to signify that the thesis can be reviewed by the Thesis Committee. Students then submit copies of the advisor-approved thesis to the thesis-committee members along with a signed copy of the *Thesis Review Form*. As indicated on the form, committee members may refuse to review the thesis in its current form, make recommendations for modifications, or approve the thesis. Students must allow 2-3 weeks for committee review. If a committee member does not provide comments within three weeks, it signifies approval of the thesis. Once approved by the advisor, the thesis should also be submitted to the Administrative Assistant of the Graduate Programs to be reviewed for formatting.

The thesis defense may be scheduled only after the thesis passes committee review and may occur only after the thesis has been on display for the required length of time (one week for M.S. theses and two weeks for Ph.D. theses). Additionally, the defense may only be held when the university is in session; these dates are specified in the academic calendar. The student is responsible for working with the committee members to identify a time and date for the thesis defense. Students should schedule two hours for the thesis defense. The student should notify the Graduate Program Secretary of the time and date of the defense and provide two copies of

the thesis for display. The Graduate Program Secretary will identify a chair for the oral defense and announce the defense to the campus community. The Thesis Defense Checklist, available from the Graduate Program Secretary, provides instructions for additional requirements that **MUST** be completed prior, during or after the defense. The degree will be conferred only after all of these requirements are met.

During the oral defense, the candidate will summarize the thesis project in a formal presentation during an open session followed by a brief question-and-answer session. As a guideline, the candidates should prepare a presentation that is roughly 20 minutes long for the M.S. and 45 minutes long for the Ph.D. A closed session, including only the candidate and faculty of the University, will follow. Non-voting committee members may be invited to attend the closed session with unanimous approval of the voting committee. Unanimous approval by the voting members of the thesis committee is necessary to fulfill the degree requirement for the oral examination. In the event of a disagreement over the quality of the thesis or the preparation of the candidate, the matter will be settled by the School of Engineering Graduate Committee.

#### **4.9 Project Final Report and Oral Presentation—Project Option (available only for EE and MECH)**

Candidates for the project option of the M.S. degree must write and present a technical report that demonstrates the ability to complete an independent research or design project. An M.S. project is different than an M.S. thesis in that the thesis must include a rigorous survey of existing work and generate new knowledge or significantly improve on existing techniques, whereas the project may use existing knowledge or techniques to solve an engineering problem. Often M.S. projects can be categorized as design rather than research projects. The candidate for the degree must submit a final written report and orally defend the work to the satisfaction of the project advisory committee. The circulation of the project report may be limited to the advisory committee.

### **5. Professional Standards of Conduct**

Graduate students are expected to behave in a manner consistent with the standards of the University and of the engineering and science profession. Graduate students are accountable for adherence to Alfred University's policies regarding such topics as educational records privacy (FERPA), safety, sexual harassment, discrimination, animal control, etc. Students must maintain a safe work environment. Through mandatory and optional safety training, students should familiarize themselves with the policies and procedures related to environmental health and safety. Students are expected to participate in the maintenance of common-use labs and to follow established standard operating procedures, when available. As a general operating principle, student researchers should leave equipment and facilities in a better state than when they started using them. Equipment and facilities found in an inoperable, damaged, or unsafe state should be noted on-site and reported immediately to the faculty member, technical

specialist or student responsible for the equipment. If unintentional damage occurs as a result of the student's use of the common-use facility, it should be reported to the facility supervisor and the research supervisor so a plan for covering the cost of the repair can be made. All researchers in the School of Engineering are expected to engage in responsible conduct of research.

The degree requirements are available in the Alfred University catalog. The most recent is appended.