

# Aerospace Engineering

## Graduate Program

Department-Specific  
Requirements

2021-2022

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# 1 General

The following requirements should be followed by ALL Masters Students in the Aerospace Engineering department at Cal Poly. Modifications will be considered only in exceptional circumstances on a case-by-case basis by the graduate coordinator in conjunction with the student and their thesis advisor.

These requirements are in addition to any University defined requirements as outlined in the Cal Poly Graduate Education Handbook.

## 1.1 Program Learning Objectives for the MS Aerospace Engineering

1. Competency in advanced mathematics, science, and aerospace engineering knowledge.
2. Ability to apply advanced mathematics, science, and aerospace engineering knowledge to a project that is conducted independently.
3. Make a specific contribution to a field that is relevant to aerospace professionals.
4. Ability to convey effectively engineering ideas and results both orally and in writing.
5. Awareness of professional and ethical responsibility.
6. Awareness of global, contemporary issues related to aerospace engineering and the society at large.
7. Awareness of rapid advancement of modern technology and ability for life-long learning.

## 1.2 Student Expectations

- The student shall be enrolled for a minimum of three quarters as a graduate student in the aerospace engineering department.
- The student shall complete a thesis proposal, thesis seminar, and thesis defense, each of which occur in separate quarters.
- The student should attend a minimum of 50% of thesis seminars in any quarter they are enrolled with graduate standing at Cal Poly (not just quarters they are enrolled in thesis units) unless a class conflict occurs.

- The student will make every reasonable effort to complete the Masters thesis within the timeline agreed upon with their advisor, and will notify the advisor as soon as possible in the event circumstances require changes to the initial plan.
- The students shall make themselves available to help the department teach labs and classes as TAs or ISAs as needed, unless not feasible under current circumstances.

### 1.3 Administrative Requirements

All graduate students are responsible for the timely completion of their required paperwork. All forms must be downloaded from grad.calpoly.edu at the time of completion to ensure the latest version is used.

- 1.3.1 A **Working Formal Study Plan (WFSP)** and **Advancement to Candidacy** must be submitted by the end of the 1st quarter the student is of graduate standing at Cal Poly. The **Graduate Writing Requirement (GWR)** must be complete before the WFSP is submitted. Contact the Cal Poly Writing and Rhetoric Center for questions regarding the GWR.
- 1.3.2 Should the anticipated graduation quarter change throughout the degree, a **Change of Degree Completion** form must be submitted. Discuss with your advisor an updated suitable graduation date before submitting. A maximum of two extensions will be granted by the department.
- 1.3.3 **Application for Graduation** must be submitted one quarter prior to the quarter you expect to graduate. This excludes summer quarter, so if planning on graduating in Fall the application for graduation form must be completed in Spring.
- 1.3.4 The final **Formal Study Plan (FSP)** must be submitted in the first three weeks of the quarter you will graduate. This form must be completed electronically, then printed for signatures.
- 1.3.5 On completion of the culminating experience (thesis defense) the **Master's Thesis Approval Form** must be completed and submitted on or before the last day of the quarter you will graduate. This must be signed by all members of the committee. Should a committee member not be physically present, an emailed and scanned form is acceptable. Not all committee members must be on the same form, but all signatures must be submitted together.
- 1.3.6 A Cashier's receipt or copy of confirmation email if paying online for the **Digital Archiving Fee** must be attached to the Master's Thesis Approval Form.

1.3.7 **Upload the final version of the thesis** to the Digital Commons Library Archiving website on or before the last day of the quarter you will graduate.

## 2 Degree Requirements

### 2.1 Courses

2.1.1 The student shall enroll in courses appropriate to their degree as specified by the Cal Poly catalog at the time the student is enrolling. The students should discuss elective courses with their advisor and if desired the Graduate Coordinator when choosing enrollment.

Required Courses	Units
MATH 501	4
MATH 502	4
Advisor Approved Electives	
500-level AERO courses	16
400 or 500 level courses from the College of Engineering or College of Science and Mathematics	12
Culminating Experience	
AERO 599 (Thesis)	9
<b>TOTAL</b>	<b>45</b>

2.1.2 Requirements and grades for all non-thesis unit courses will be determined by the instructor of record.

### 2.2 Thesis Units and Grading

2.2.1 A total of 9 thesis units taken over a minimum of three quarters while enrolled as a graduate student in the Cal Poly Aerospace program is required. Thesis units must be taken in the quarter thesis work is being done, in proportion to the work.

2.2.2 Thesis units CANNOT be taken during summer quarter. Students should consider this when planning their timeline for graduate school. Note, this also means that thesis proposals and defenses cannot take place during the summer quarter.

2.2.3 During the first quarter thesis units are taken a minimum of 2 and maximum of 4 units shall be taken. The thesis proposal and literature review shall be done in this quarter. A

grade will be awarded based on the proposal, literature review, and general progress in the following breakdown:

*50% proposal (determined through collating committee and advisor scores)*

*30% literature review (determined by advisor from draft and revised literature review)*

*20% general progress (determined by the advisor throughout the quarter)*

- 2.2.4 During the quarter the seminar is presented, a minimum of 1 and maximum of 4 units shall be taken, but the total thesis units taken to-date shall not exceed 6. Grading for the seminar quarter will be at the discretion of the thesis advisor based on general progress and may take the form of a letter grade, Report in Progress (RP), or Incomplete (I).
- 2.2.5 During the quarter the defense is to be done, a minimum of 2 and maximum of 4 units shall be taken. The total thesis units attempted to date shall be 9. If the advisor believes the student will not be in a position to finish that quarter, the student shall not be allowed to enroll in the last required thesis units that quarter. A grade will be awarded based on the defense and written thesis (determined through collating committee and advisor scores).
- 2.2.6 Should any of the expected tasks not be completed during any quarter, the student will receive an 'I' for incomplete, with a deadline for completion of the task arranged between the student and thesis advisor prior to the grade being released. **The student will not be allowed to enroll in future thesis units until the incomplete contract is satisfied.**
- 2.2.7 If the student falls below a 'B' grade for any quarter, the student should be marked with an 'I' for incomplete, with a set of revised tasks negotiated between the student and thesis advisor to be completed prior to a deadline also negotiated between the student and thesis advisor.
- 2.2.8 For extreme cases a student is faring very poorly, the graduate coordinator will arrange a meeting with the student and advisor to understand the issues, and seek a way forward with a timeline attached to progress.

## 3 Thesis Committee

### 3.1 Committee Selection

3.1.1 The committee is chosen by the student and the thesis advisor, and shall meet the following requirements

- *The committee shall consist of at least four members.*
- *The committee chair shall be the thesis advisor (and must be a tenured or tenure-track Cal Poly Aerospace Engineering faculty member)*
- *At least two committee members (including the thesis advisor) shall be tenured or tenure-track Cal Poly Aerospace faculty members.*
- *At least three committee members shall have a Ph.D. in an appropriate field.*
- *At least one committee member must come from outside the Cal Poly Aerospace department and be approved by the committee chair.*

### 3.2 Committee Expectations

3.2.1 The committee members should make themselves available for consultation and questions from the student as allowable within the confines of reasonable availability.

3.2.2 The committee member shall attend, either in person or via teleconferencing, the proposal and defense. Each committee member should use the provided forms to provide feedback to the advisor during the proposal and defense.

3.2.3 Each committee member shall read through the written thesis and provide feedback to the student and advisor before or during the defense.

3.2.4 Any committee member may choose to step down from the committee at any time. The student is responsible for finding a suitable replacement.



## 4 Thesis Advisor

The thesis advisor must be a Cal Poly Aerospace Engineering tenured or tenure-track faculty member. Students must identify prospective advisors and initiate discussions on thesis research topics and plans.

### 4.1 Advisor Expectations

- 4.1.1 The advisor will provide recommendations for courses if requested by the student
- 4.1.2 The advisor will provide guidance and feedback on thesis direction and progress
- 4.1.3 The advisor will work with the student to ensure thesis progress is on track
- 4.1.4 The advisor will ensure required thesis components are completed in a timely manner, and set up incomplete contracts when they are not.

### 4.2 Thesis Funding

- 4.2.1 The advisor is responsible for assisting the students to secure funding for any costs associated with completing thesis research. Should funds for thesis costs not be secured through attempts of the student, the advisor must provide funds. The students is not to pay for any thesis costs from their own pocket. This does not extend to general expenses such as printing or salaries, etc.

## 5 Thesis

### 5.1 Literature Review and Proposal

- 5.1.1 At the start of the quarter the proposal is to be scheduled (before add/drop date), the student and thesis advisor confirms enrollment in at least 2 but no more than 4 thesis units.
- 5.1.2 The **thesis committee** should be confirmed at least 2 weeks prior to the desired proposal date.
- 5.1.3 The student and committee members determine a mutually agreeable time for the proposal. The suggested duration is at least 50 minutes.
- 5.1.4 A draft **literature review** is sent to the thesis advisor at least 10 days prior to the proposal date. The advisor should provide feedback on the literature review for the student to revise and resubmit
- 5.1.5 PRIOR TO the proposal date, the student shall send the graduate coordinator an email with the following information:
  - Title of proposal (working thesis title)
  - Committee member names
  - Date of proposal
- 5.1.6 The student presents their **proposal** to ALL committee members. Refer to **Masters Thesis Proposal Feedback form** for expectations and content requirements. The student is responsible for providing the proposal feedback form to ALL committee members (including external members and those attending via teleconferencing) prior to the proposal. Committee members provide general feedback to the student during the proposal through comments and questions. Committee members provide feedback and scores to the thesis advisor through the provided proposal feedback forms
- 5.1.7 After the proposal is complete the thesis advisor collects and collates the committee feedback and scores, combines it with their own feedback and score, and produces a grade for the proposal based on the formula on the proposal feedback form. The student and thesis advisor then debrief and discuss committee feedback in the context of moving forward with the thesis.
- 5.1.8 At the end of the quarter, the advisor collates literature review, proposal, and general scores and assigns a grade for the quarter.

## 5.2 Seminar

- 5.2.1 At the start of the quarter the seminar is to be scheduled (before add/drop date), the student and thesis advisor confirms enrollment in at least 1 but no more than 4 thesis units, with a total thesis unit count of no more than 6 units.
- 5.2.2 The student contacts the graduate coordinator to schedule the seminar. Seminar time slots fill up quick; it is the student's responsibility to schedule their thesis early enough to obtain a suitable timeslot.
- 5.2.3 The student must send a seminar flyer to the graduate coordinator at least one week prior to the scheduled seminar. The flyer should be submitted electronically and formatted for a single-page 8.5x11 sheet of paper. It must include the student's name, seminar title, date and time of the seminar, an abstract, and may include relevant graphics.
- 5.2.4 The thesis advisor must confirm that the student is ready to give their seminar.
- 5.2.5 The student presents their seminar and receives feedback on the provided forms from other students in attendance.
- 5.2.6 Refer to Masters Thesis Seminar Feedback Form for expectations.
- 5.2.7 The student and thesis advisor debrief and discuss feedback received in the context of moving forward with the thesis
- 5.2.8 At the end of the quarter, the thesis advisor awards a grade based on general progress. The grade may take the form of a letter grade, Report in Progress (RP), or Incomplete contract (I).

## 5.3 Written Thesis and Defense

- 5.3.1 At the start of the quarter the defense is to be scheduled, the student and thesis advisor confirms that all 9 thesis units will be complete by the end of the quarter.
- 5.3.2 AT LEAST 4 weeks before the desired defense date the student sends a **polished thesis draft** to the thesis advisor. The thesis advisor provides feedback to the student for corrections. **Thesis formatting guidelines and templates** are available through the Graduate Education office

- 5.3.3 On receipt of corrections, a mutually agreeable time for the defense is determined between the student and committee members. Minimum permissible time is 110 minutes. It is permissible for committee members to virtually attend the defense through videoconferencing.
- 5.3.4 The student makes the corrections and sends the **revised thesis** to the committee members, AT LEAST 2 weeks prior to the defense date.
- 5.3.5 PRIOR TO the defense, the student sends the graduate coordinator an email with
- Title of thesis
  - Updated committee member names – if relevant
  - Date of defense
- 5.3.6 The committee members provide feedback on the written thesis, either prior to the defense or within 24 hours after the defense if wanting clarifications during the defense.
- 5.3.7 The student presents their thesis to ALL committee members at the **thesis defense**. Refer to **Masters Thesis Defense Feedback form** for expectations and content requirements. The student is responsible for providing defense feedback forms to ALL committee members (including external members) prior to the defense starting. The student is responsible for bringing a copy of the **Masters Thesis Approval Form** to the defense. Committee members provide general feedback to the student during the defense through comments and questions, and ask questions to gauge if thesis level and understanding of student is sufficient for the award of a Cal Poly Masters degree. Immediately after the defense, the committee discusses (in the absence of the student) the suitability of the thesis, required additions and changes, and if the student should be awarded the degree.
- 5.3.8 Committee members provide feedback and scores to the thesis advisor through the provided defense feedback forms. The student incorporates the committee feedback into the **final thesis**. If acceptable by the committee, the thesis advisor is responsible for checking the thesis edits and approving the final version (preferred). If required by the committee, this is checked by all committee members prior to final thesis approval
- 5.3.9 After receiving final approval from the thesis advisor, the student must:
- *Upload the final thesis version to library digital archive*
  - *Submit a signed completion form to graduate education*
  - *Pay the digital archive deposit fee*

5.3.10 The grade assigned to the thesis units for the defense quarter are based entirely on the thesis defense and submission, determined through collating committee and advisor scores.

## 6 Summarized Timeline

### 6.1 General Administrative

Quarter	Requirement	Deadline
First quarter as Graduate Standing	Working Formal Study Plan and Advancement to Candidacy	End of Quarter
Quarter Prior to Graduation	Application to Graduate	End of Quarter
Graduation Quarter	Final Study Plan	End of 3 <sup>rd</sup> Week

### 6.2 Thesis Specific

Quarter	Requirement	Deadline
First quarter in AERO599	Proposal	End of Quarter
Second quarter in AERO599	Seminar	End of Quarter
Final quarter in AERO599	Defense	End of Quarter
	Thesis Upload to Library	End of Quarter
	Masters Thesis Approval Form	End of Quarter
	Digital Archiving Fee	End of Quarter