School of Earth and Space Exploration

Graduate Program Guidebook

Arizona State University

Last Revision: July 2015

Prepared by:
Professor Linda Elkins-Tanton, Director of SESE
Professor James Rhoads, Associate Director for Graduate Education
Professor Hilairy Hartnett, Associate Director for Undergraduate Education
Professor Ramón Arrowsmith, Associate Director for Operations

Becky Polley, Manager of Academic Programs
Becca Dial, Graduate Coordinator

Table of Contents

Introduction

This guidebook outlines the requirements and procedures set forth by the faculty of the School of Earth and Space Exploration (SESE) at Arizona State University for students enrolled in programs leading to M.S. and Ph.D. degrees. These degree programs are directed toward the attainment of excellence in Earth and Space Exploration as demonstrated by accomplishments in research, coursework, and examinations.

SESE graduate student recruitment, mentoring, and oversight is accomplished by a 9+ person faculty committee comprised of two subcommittees (Graduate Recruitment and Graduate Oversight) and chaired by the SESE Associate Director for Graduate Studies. In addition, the full-time Academic Support Specialist/Graduate Coordinator position assists current students in administrative issues, the subcommittees with their charges, and recruitment activities.

For processing of graduate student progress, SESE will use the most current guidebook for deadlines, formats, etc. Any student can petition for a specific exception to the current guidebook if it puts them at a disadvantage.

In addition to the requirements set by SESE, students must follow the policies and procedures established by the Graduate Education Office, which can be found at: https://graduate.asu.edu/policies-procedures .

SESE Graduate Program Elements and Requirements					
	M.S. Astrophysics	**M.S. Geological Sciences**	**Ph.D. Astrophysics**	**Ph.D. Geological Sciences**	**Ph.D. Exploration Systems Design**
Required Coursework	GLG591: Faculty Research Seminar (1)	GLG591: Faculty Research Seminar (1)	GLG591: Faculty Research Seminar (1)	GLG591: Faculty Research Seminar (1)	GLG591: Faculty Research Seminar (1)
	GLG500: SESE Colloquium (1)	GLG500: SESE Colloquium (1)	GLG500: SESE Colloquium (1)	GLG500: SESE Colloquium (1)	GLG500: SESE Colloquium (1)
	AST599: Thesis (6)	GLG599: Thesis (6)	AST799: Dissertation (12)	GLG799: Dissertation (12)	AST/GLG799: Dissertation (12)
	AST521: Stars & Interstellar Medium I (3)		AST521: Stars & Interstellar Medium I (3)		Three CORE courses (9)
	AST522: Stars & Interstellar Medium II (3)		AST522: Stars & Interstellar Medium II (3)		Two science courses (6)
	AST523: Stars & Interstellar Medium III (3)		AST523: Stars & Interstellar Medium III (3)		
	AST531: Galaxies and Cosmology I (3)		AST531: Galaxies and Cosmology I (3)		
	AST532: Galaxies and Cosmology II (3)		AST532: Galaxies and Cosmology II (3)		
	AST533: Galaxies and Cosmology III (3)		AST533: Galaxies and Cosmology III (3)		
Required coursework credits*	20	20	25	25	25
Total units required	30	30	84	84	84
Qualifying exam	N/A	N/A	X	X	X
Culminating experiences	Technical Review	Technical Review	Technical Review	Technical Review	Technical Review
	Thesis	Thesis	Dissertation	Dissertation	Dissertation
	Oral defense	Oral defense	Oral defense	Oral defense	Oral defense
***Research, thesis and dissertation hours are not applicable to the coursework credit requirements**					

Counseling of Students

During Orientation Week, which typically occurs the week before the fall semester starts, each incoming graduate student will receive general information about the graduate program from the Graduate Oversight Committee. Students should meet individually with their research advisors for personalized guidance about the graduate program, advice in first year class selections, and discussion of other related matters. The Graduate Oversight Committee is available to assist in advising graduate students at any time, but particularly during this period. Students admitted in the spring semester are required to attend orientation during the fall semester.

Research Advisor

The student must identify a faculty member (job titles are Assistant Professor, Associate Professor, Professor) of the School of Earth and Space Exploration who agrees to serve as their research advisor and chair their Thesis/Dissertation Supervisory Committee. Co-advisors and co-chairs are allowed.

Thesis or Supervisory Committee

The student, after consultation with their advisor, will secure the appropriate number of ASU faculty members as members of their Thesis/Dissertation Supervisory Committee. These members in general will be from the Graduate Faculty—a classification defined and managed by the ASU Graduate Education Office (http://graduate.asu.edu/graduate_faculty). All SESE faculty members are on the Graduate Faculty, along with various researchers and lecturers. Most Graduate Faculty can be committee chairs or co-chairs. Personnel may be added to the Graduate Faculty by a request initiated by the Graduate Oversight Committee. Students who wish to add members to the graduate faculty should contact the Graduate Coordinator for the procedures.

M.S. Supervisory Committee

This 3 person committee shall consist of:

- The research advisor as chair or two research advisors as co-chairs
- Two members of the Graduate Faculty in the degree program (which includes all SESE faculty as well as other research staff and faculty from other programs). If a student has co-chairs only one additional committee member is required.
- Additional participants (e.g., academic professionals, adjunct faculty, affiliated faculty, or non-ASU faculty members not on the SESE Graduate Faculty) may serve only in addition to the 3 Graduate Faculty members upon approval of the Graduate Oversight Committee

Ph.D. Supervisory Committee

This 5 person committee shall consist of:

- The research advisor as chair or two research advisors as co-chairs

- Four members of the Graduate Faculty in the degree program (http://graduate.asu.edu/graduate_faculty) which includes all SESE faculty as well as other research staff and faculty from other programs). If a student has co-chairs only three additional committee members are required.
- Additional participants (e.g., Academic Professionals or external faculty members not on the SESE Graduate Faculty) may serve only in addition to the 5 Graduate Faculty members upon approval of the Graduate Oversight Committee.
- For Exploration Systems Design Ph.D. students, at least one committee member must be a SESE graduate faculty member with a research area primarily in science rather than engineering.

If a student wishes to include non-ASU participants, he/she should submit the name of the proposed member and a rationale for that choice to the Supervisory Committee for evaluation. Should the Supervisory Committee concur, the outside participant should be contacted by the student and asked to provide their curriculum vitae. The student submits a short memo requesting this addition and presenting the rationale for it along with their curriculum vitae and a committee approval request form (https://graduate.asu.edu/forms?field_file_type_tid=25) to the SESE Director or Associate Director for Graduate Studies through the Graduate Coordinator. With the Director or Associate Director's approval, the request form is submitted to the Graduate Education Office. Once the Graduate Education Office approves the outside participant, the student should adjust their Program of Study (see below) accordingly.

Program of Study

The Program of Study (POS) is an official academic plan for the student that maps the requirements for degree completion. It includes coursework, the student's Thesis/Dissertation Supervisory Committee and any additional milestones. The student is expected to meet with their Supervisory Committee shortly after its appointment to formulate and approve their POS. The POS must be filed at least one semester before the student's comprehensive examination (Ph.D.) or technical review (M.S.). The student must turn in a POS signed by their advisor to the Graduate Coordinator for approval by the Director or Associate Director for Graduate Studies. The POS will then be forwarded to the Graduate Education Office for approval. Final approval of the POS by the Graduate Education Office confirms the appointment of the Thesis/Dissertation Supervisory Committee and the approval of coursework toward degree requirements.

It is the student's responsibility to submit and update a POS (through MYASU) as necessary and to include the POS requirements as noted in this guidebook depending on their degree. For an explanation of the POS, see visit this site: https://graduate.asu.edu/sites/default/files/how-to-ipos.pdf . POS coursework requirements for the M.S. and Ph.D. degrees will be listed in upcoming sections. The POS coursework and/or Supervisory Committee may need to be updated as the student advances toward completion of their studies. Ph.D. students must have an approved POS on file before taking comprehensive oral exams. It is the student's responsibility to ensure that the information on the POS is accurate before the student

schedules the defense. Students must notify the Graduate Coordinator when any changes are made to the POS.

Academic and Research Performance Evaluations

A graduate student is considered to be performing satisfactorily when:

- Student maintains a "B" average (3.0 GPA) or better for the M.S. program, and a "B+" average (3.33 GPA) for the Ph.D. program in graduate coursework approved by the Graduate Oversite Committee or the student's Supervisory Committee, excluding research, thesis or dissertation credits.
- Student research is progressing satisfactorily as determined through the annual report process.
- The performance of duties related to any appointment the student may hold (e.g., teaching or research assistantship) is satisfactory.
- Requirements and responsibilities outlined in the following sections for examinations, technical reviews, and defense of thesis or dissertation are completed within the allowed time period.

Annual Review

The Graduate Oversight Committee of SESE reviews the progress of all graduate students annually. All students with more than 1 semester completed are required to submit the following materials to the Graduate Oversight Committee by October 15 (details of the submission process will be sent in advance of the due date):

- The Ph.D. or M.S. report form (found at the end of this document) signed by the thesis/dissertation advisor. Signatures can be obtained by scanning a signed hardcopy, coordinating an email indicating signature by the advisor, or by using electronic signatures.
- A 1-2 page narrative progress report outlining thesis/dissertation progress over the past years in terms of research, classes, workshops, conferences, etc.
- An updated CV, including references for all research meeting abstracts, as well as publications in print, in press, or in preparation.

The student must also meet with their Supervisory Committee (as many as possible; virtual presence is permitted) for an annual review of academic progress before the report is due on October 15. The Supervisory Committee will write a memo to the Graduate Oversight Committee and student summarizing the meeting. Note that the student is not to generate this memo – it must be generated by the Supervisory Committee. Students who conducted a Technical Review during the review period do not need to hold an additional meeting, but must include the memo from that review. Students who defended their thesis or dissertation during the review period are exempt from submitting an annual report.

Failure to submit an annual research report will result in a meeting with the Graduate Oversight Committee to discuss the student's progress in more detail, and may also result in suspension from the graduate program, loss of office space, low priority for funding, or termination from the graduate program.

Satisfactory Academic Progress

The Graduate Oversight Committee will review all student annual reports and submit recommendations to the Associate Director for Graduate Studies for review. The committee's decision will be communicated in writing for situations of concern, before the end of the semester, to the student. The letter will outline the basis for the decision regarding satisfactory progress in the program. For a student whose performance is deemed unsatisfactory, the following actions may be proposed to the Director and Associate Director of Graduate Education:

- Termination as a graduate student in the graduate program at the end of the semester in which the student is currently enrolled.
- Transfer of a Ph.D. student to the M.S. graduate program.
- Completion of the M.S. degree, with continued enrollment subject to a positive recommendation by the thesis/dissertation Supervisory Committee.
- Probationary continuation of enrollment in the graduate program. Following a meeting with the Graduate Oversight Committee, the student will be given a specific set of requirements to achieve in a specified period of time. The requirements and timeline will be documented in a memo and kept in the students file. Failure to meet these requirements will result in one of the three recommendations above.

Copies of letters recommending probation, suspension, or dismissal will be forwarded to the dean of the Graduate Education Office. The student may appeal in writing to the Director and Associate Director for Graduate Studies if he/she feels there are extenuating circumstances that should be considered. Unsatisfactory performance is grounds for discontinuation of financial support from the School of Earth and Space Exploration.

Academic Integrity

Academic dishonesty will not be tolerated, and if uncovered, appropriate actions will be taken. Students are expected to familiarize themselves with what constitutes violations to the academic integrity policy. A detailed list of violations can be found online (http://provost.asu.edu/academicintegrity). Briefly, violations include (but are not limited to) cheating on exams and assignments, plagiarizing, fabricating data or information, etc. Students are encouraged to pay special attention to the definition of plagiarism so as to avoid unintentional mistakes, and discuss the topic further with their advisors and instructors if they are unclear on whether a particular action constitutes plagiarism.

Allegations of academic dishonesty will be reviewed by the Graduate Oversight Committee who will decide on the appropriate actions. This may include reporting the student to the Graduate Education Office with a recommendation for dismissal from the program.

Requirements for M.S. Degree

Given the broad range of expertise necessary for the diverse research topics under study in the School, no single prescription for achievement of breadth from the School can be defined. Therefore, the onus is on the advisor and the Thesis Supervisory Committee, as well as the student, to ensure that not only the specific knowledge and skills necessary for the degree are gained, but also that the value of educational and experiential breadth in the longer term interest of the student is considered.

Students who are admitted with a B.S. that is not in a field related to their SESE graduate degree may be required by the Graduate Oversight Committee or their research advisor to take additional courses to complete their background. All required course work must be completed before the student can hold a thesis technical review.

Pre-admission/Transfer credits

A maximum of 12 semester hours of graduate credit taken at ASU or other accredited institutions prior to admission to the SESE graduate degree program may be included in a Program of Study (POS) per approval by the student's advisor. Such courses must be acceptable for inclusion in graduate degree programs at that institution. Pre-admission courses must have been taken within three years of admission to the ASU degree program. Only those courses with an "A" or "B" grade may be eligible for transfer. Not more than nine semester hours of graduate credit completed at ASU before admission to the degree program will be accepted toward a Master's degree. See the Graduate Education Office guidelines for more details regarding transfer and pre-admission credits at: https://graduate.asu.edu/policies-procedures (see ASU pre-admission section under graduate degree requirements section) .

Course Load

Graduate students employed as a Research or Teaching Assistant (RA) cannot be otherwise employed and must register for a minimum of six credit hours and a maximum of twelve credit hours per semester. Students supported on work-study, other types of financial aid, or those on a VISA may be required to take a minimum course load of more than six credit hours but no more than twelve hours per semester.

Graduate students employed as a Research or Teaching Assistant during the summer must be enrolled in at least one credit hour during the summer (any session) to receive pay. Summer RAs or TAs who wish to be exempt from FICA must enroll in one credit per summer session (A and B).

Continuous enrollment

Students must be continuously enrolled during the regular semesters (fall and spring) from their first semester through the submission of their thesis.

Once admitted to an M.S. degree program, the student is expected to be enrolled continuously, excluding summer session, until all requirements for the degree have been fulfilled. Continuous

enrollment promotes steady progress toward the completion of the degree and an ongoing relationship between the student and faculty offering the program. If a program of study must be interrupted, the student may apply for leave status for a maximum of two semesters during their graduate program. The research advisor, Supervisory Committee, Graduate Oversight Committee, and the Graduate Education Office must endorse an application for leave status. This request must be filed and approved the semester before the anticipated absence. The form and the policies related to continuous enrollment are located on the Graduate Education Office website at: https://graduate.asu.edu/key-policies .The student should briefly state the reason for needing leave status and the duration (not to exceed two semesters per Graduate Education Office guidelines). This petition should be turned in to the Graduate Coordinator once all committee members have signed the form. A student on leave is not required to pay fees, but is also not permitted to place any demands on university faculty or use any university facilities.

Failure to maintain continuous enrollment without prior approval will result in the student being discontinued from the graduate program. A student removed from the Graduate Education Office for this reason may re-apply for admission; the application will be considered along with all the other new applications to the degree program.

Time To Degree Limit for M.S.

The time that a student will spend in graduate school varies considerably, depending on a number of factors such as background preparation and the nature of the research. A student with a B.S. or B.A. degree should reasonably expect to complete the requirements for the M.S. degree within three calendar years.

The Graduate Education Office requires that a master's degree must be completed within a maximum of six (6) consecutive years. The six years begin with the first course included on a student's approved program of study. Any exception to this timeline must be approved by the student's Supervisory Committee, the Graduate Oversight Committee and the Graduate Education Office. To submit this request, students must submit a time extension petition to Graduate Education (https://graduate.asu.edu/node/72). Approval of this petition may involve the repetition of a technical review. A recommended timeline for the M.S. degree is at the end of this guidebook.

Course Requirements for M.S.

The student will complete at least thirty (30) semester hours of graduate coursework credit. At ASU, graduate courses are defined as courses numbered 500 or greater, but up to 6 credit hours of 400 level classes may be included with the approval of the research advisor, the Associate Director of Graduate Education and the Graduate Education Office. Twenty (20) hours or more will consist of formal coursework other than Research and Thesis. This coursework should be designed to serve the individual needs of the student, with due attention to breadth and depth of development. A cumulative average GPA of 3.0 or better must be maintained at all times in graduate coursework approved by the Graduate Oversight Committee or the student's Supervisory Committee, excluding Research and Thesis credits. The following courses are required of all students seeking an M.S degree in SESE:

- Faculty Research Seminar (AST/GLG 591) During the first fall semester in residence, all graduate students are required to take this one-hour seminar that is devoted to a weekly series of talks by ASU faculty on their current research.
- Colloquium (GLG 500) All graduate students are required to take the SESE colloquium for at least one semester. A research paper may be required as part of this courses.
- Research (AST/GLG592) Most students will register for research hours during semesters in which they are actively engaged in research. There is no credit requirement for research hours. Students who are TA/RA's often use research hours to meet the minimum registration requirement for tuition remission and health insurance benefits. Students should consult with the faculty advisor on how many credit hours of research, if any, should be taken in a given semester.
- Thesis (AST/GLG 599) During their course of study, students must complete exactly six (6) hours of Thesis, which involves the preparation of a written thesis on an original research topic. The thesis will be defended in a final oral examination.

Students in the M.S. Astrophysics program are required to take a series of core courses. These courses provide graduate training in the major fields of astrophysics. A student involved in interdisciplinary research may petition the Graduate Oversight Committee to be excused from any of the courses that may not be applicable to the research topic of the student. The required core courses for students in the Astrophysics M.S. include:

- AST 521 (Stars and Interstellar Medium I)
- AST 522 (Stars and Interstellar Medium II)
- AST 523 (Stars and Interstellar Medium III)
- AST 531 (Galaxies and Cosmology I)
- AST 532 (Galaxies and Cosmology II)
- AST 533 (Galaxies and Cosmology III)

Thesis Technical Review

When the student and the faculty advisor decide that the major research results are near completion, the student will convene his or her Thesis Supervisory Committee for a technical review of the research results. The objective of the technical review is to:

- Allow the Supervisory Committee to establish whether an appropriate research project has been carried out and that the results are sufficiently sound to warrant completion and defense of a thesis.
- Ensure that the student receives substantive feedback from the entire Supervisory Committee well in advance of the thesis defense.
- Identify any technical problems with analyses done or any additional analyses that need to be completed.
- Advise the student on how best to present their material at the defense.

The technical review for an M.S. degree must be held at least 3 months in advance of the desired final defense date in order to accommodate any recommendations that emerge from the

technical review. The Graduate Oversight Committee must approve shorter time intervals between the technical review and final defense. The student is urged to schedule the technical review as soon as possible after the major research results are available in order to ensure that advisor, student, and Supervisory Committee are in agreement that an appropriate research effort will be completed. If the topic of a student's thesis changes after the completion of a technical review, a new technical review on the new thesis topic must be performed. A majority of the Supervisory Committee must be present in person for the technical review. Other committee members not available in person should attend via either teleconference or videoconference. If a majority is not present in person, the technical review must be rescheduled.

The student will provide an extended abstract and an outline of the thesis research to the Supervisory Committee at least one week before the review. The technical review shall consist of an oral presentation of results and appropriate interpretations (typically a 30-minute seminar-type presentation) followed by discussion of progress to date and future work needed for a successful thesis defense. Technical reviews typically last between 2 and 3 hours. The student and research advisor will work together closely to help the student understand the purpose and flow of the technical review process. Further, the research advisor should work with the student to ensure that the content of the presentation is appropriate for a technical review.

At the conclusion of the technical review, the Supervisory Committee will indicate any concerns regarding the thesis research. The committee members may identify specific areas that need further investigation and/or consideration. The manner in which the student subsequently addresses these areas is subject to evaluation at the thesis defense. These comments will be transmitted to the student via a detailed memo from the student's advisor. The memo should note the outcome of the technical review and any action items that must be completed for the defense. Students must also have their committee members sign off on the Technical Review Report Form (see Appendix). Both the form and a copy of the memo (electronic or hardcopy) should be given to the Graduate Coordinator after the technical review.

If the thesis is not defended within one year of the technical review, an additional review meeting with the Supervisory Committee will be required.

Final Oral Thesis Defense

A final oral defense of the completed thesis is required by the School of Earth and Space Exploration and the Graduate Education Office. The thesis Supervisory Committee conducts this examination and all members of the Supervisory Committee must be present for the defense. A majority of the committee including research advisor(s) must be physically present. Virtual presence of the remaining committee members may be permitted upon approval of the graduate oversight committee. A thesis defense typically lasts between 2 and 3 hours and begins with a 30-minute seminar-type presentation by the student. Students must be active and enrolled in at least one credit during the semester of the defense.

No later than the semester of the defense, students should:

- Confirm that the information on the POS is current and that all requirements are met. Students are encouraged to do a POS check a few months prior to the anticipated defense to avoid any issues with scheduling the defense.
- Submit an application for graduation.

A minimum of two weeks (ten business days) before the scheduled defense, it is the student's responsibility to:

- Submit a complete copy of the thesis to the Supervisory Committee. The Supervisory Committee needs sufficient time to review the thesis in preparation for the defense. Failure to provide them with two weeks of review time may result in the postponement of the defense.
- Provide pertinent information for the defense announcement to the Graduate Coordinator. Pertinent defense abstract information includes a title, an abstract, the name of the research advisor(s), the names of the Supervisory Committee members, and the date, time, and location of the defense. Abstracts should be a few paragraphs in length (no more than one page). Once received the Graduate Coordinator will distribute the announcement to the SESE community.
- Officially schedule the defense with the Graduate Education Office via the 'Defense' tab within the 'My Programs and Degree Progress' section of MYASU. Once the defense has been officially approved, the details of the defense will appear in this area of MYASU.

A minimum of ten calendar days before the scheduled defense, it is the student's responsibility to submit a complete copy of the formatted thesis to the Graduate Education Office for format review.

No more than 10 days after the defense, students must submit a copy of the form to the Graduate Education Office with the appropriate level of pass or fail noted and a brief description of revisions that need to be made.

After the defense and within the semester graduation deadlines, students should:

- Complete format revisions of the thesis as required by the Graduate Education Office.
- Complete content revisions of the thesis as documented by the Supervisory Committee at the defense.
- Submit the final defense form to the Graduate Education Office confirming the completion of the thesis requirements by the student's advisor.
- Submit final copy of thesis to ProQuest for publication.

Students can view the Graduate Education defense procedures and deadlines via the 'Defense' tab within the 'My Programs and Degree Progress' section of their MYASU homepage or they can visit the Graduate Education site directly at: https://graduate.asu.edu/completing-your-degree .

Requirements for Ph.D. Degree

Given the broad range of expertise necessary for the diverse research topics under study in SESE, no single prescription for achievement of breadth from SESE can be defined. Therefore, the onus is on the advisor, as well as the student, to ensure that not only the specific knowledge and skills necessary for the degree are gained, but also that the value of educational and experiential breadth in the longer term interest of the student is considered.

Students who are admitted with a B.S. or M.S. that is not in a field related to their SESE graduate degree may be required by the Graduate Oversight Committee or their dissertation advisor to take additional courses to complete their background. All required course work must be completed before the student can hold a dissertation technical review.

Pre-admission/Transfer credits

A maximum of 12 semester hours of graduate credit taken at ASU or other accredited institutions prior to admission to the SESE graduate degree program may be included in a Program of Study per approval by the student's advisor. Such courses must be acceptable for inclusion in graduate degree programs at that institution. Pre-admission courses must have been taken within three years of admission to the ASU degree program. Only those courses with an "A" or "B" grade may be eligible for transfer. See the Graduate Education Office guidelines for more details regarding transfer and pre-admission credits at: https://graduate.asu.edu/policies-procedures (see ASU pre-admission section under graduate degree requirements section). A previously earned Master's degree may be included in a program of study as the equivalent of thirty (30) credit hours of graduate credit toward the Ph.D. degree. See also http://graduate.asu.edu/faculty_staff/policies.

Course Load

Graduate students employed as a Research or Teaching Associate cannot be otherwise employed and must register for a minimum of six credit hours and a maximum of twelve credit hours per semester. Students supported on work-study, other types of financial aid, or those on a VISA may be required to take a minimum course load of more than six credit hours. Graduate students employed as a Research or Teaching Associate during the summer must be enrolled in at least one credit hour during the summer (any session) to receive pay. Summer RAs or TAs who wish to be exempt from FICA must enroll in one credit per summer session (A and B).

Continuous Enrollment

Students must be continuously enrolled during the regular semesters (fall and spring) from their first semester through the submission of their dissertation.

Once admitted to a Ph.D. degree program, the student is expected to be enrolled continuously, excluding summer session, until all requirements for the degree have been fulfilled. Continuous enrollment promotes steady progress toward the completion of the degree and an ongoing relationship between the student and faculty offering the program. If a program of study must be interrupted, the student may apply for leave status for a maximum of two semesters during their

graduate program. The research advisor, Supervisory Committee, Graduate Oversight Committee, and the Graduate Education Office must endorse an application for leave status. This request must be filed and approved the semester before the anticipated absence. The form and the policies related to continuous enrollment are located on the Graduate Education Office website at: https://graduate.asu.edu/key-policies .The student should briefly state the reason for needing leave status and the duration (not to exceed two semesters per Graduate Education Office guidelines). This petition should be turned in to the Graduate Coordinator once all committee members have signed the form. A student on leave is not required to pay fees, but is also not permitted to place any demands on university faculty or use any university facilities.

Failure to maintain continuous enrollment without prior approval will result in the student being discontinued from the graduate program. A student removed from the Graduate Education Office for this reason may re-apply for admission; the application will be considered along with all the other new applications to the degree program.

Time to Degree Limit for Ph.D.

The time that a student will spend in graduate school varies considerably, depending on a number of factors such as background preparation and the nature of the research. SESE students should reasonably expect to complete the requirements for the Ph.D. degree within five calendar years.

The Graduate Education Office requires that a Ph.D. must be completed within a ten-year (10) period from the start date of the program or 5 years after passing the comprehensive examinations, whichever comes first. Any exception to this timeline must be approved by the student's Supervisory Committee, the Graduate Oversight Committee and the Graduate Education Office. To submit this request, students must file a petition to Graduate Education (https://graduate.asu.edu/node/72). Approval of this petition may involve the repetition of the comprehensive examinations or the technical review. A recommended timeline for the Ph.D. degree is listed at the end of this guidebook.

Course Requirements for Ph.D.

The student will complete at least eighty-four (84) credit hours of graduate credit. At ASU, graduate courses are defined as courses numbered 500 level or greater, but up to 6 credit hours of 400 level classes may be included with the approval of the research advisor, the Associate Director of Graduate Education and the Graduate Education Office. A maximum of 30 credits from a previously awarded M.S. degree may be applied toward this requirement. At least 25 hours of this total will consist of formal coursework other than Research and Dissertation. The courses chosen should serve the individual needs of the student, with due attention to breadth and depth of development. Coursework from a previously awarded M.S. degree may count towards these 25 credits. A cumulative average GPA of 3.33 or better must be maintained at all times in graduate coursework approved by the Graduate Oversight Committee or the student's Supervisory Committee, excluding Research and Dissertation credits. The following courses are required of all students seeking a Ph.D. degree in SESE:

- Faculty Research Seminar (AST/GLG591) During the first semester in residence, all entering graduate students are required to take this one-hour seminar that is devoted to a weekly series of talks by ASU faculty on their current research.
- Colloquium (GLG 500) All graduate students are required to take the SESE colloquium for at least one semester. A research paper may be required as part of this course.
- Research (AST/GLG 692 or 792) Most students will register for research hours during semesters in which they are actively engaged in research. There is no credit requirement for research hours. Students who are TA/RA's often use research hours to meet the minimum registration requirement. Ph.D. students who wish to seek an MIP should take AST/GLG 692 for research until the MIP is completed. All other Ph.D. students (those who already have an M.S. or those who will not seek an MIP) should register for AST/GLG 792 for research. Students should consult with the faculty advisor on how many credit hours of research, if any, should be taken in a given semester.
- Dissertation (AST/GLG 799) During their course of study, students must complete exactly 12 hours of Dissertation, which involves the preparation of a written dissertation on an original research topic. Students must be admitted to candidacy before registering for dissertation hours (i.e., the semesters following the oral comprehensive examination).

Students in the Ph.D. Astrophysics program are required to take a series of core courses. These courses provide graduate training in the major fields of astrophysics. A student involved in interdisciplinary research may petition the Graduate Oversight Committee to be excused from any of the courses that may not be applicable to the research topic of the student. The required core courses for students in the Astrophysics Ph.D. include:

- AST 521 (Stars and Interstellar Medium I)
- AST 522 (Stars and Interstellar Medium II)
- AST 523 (Stars and Interstellar Medium III)
- AST 531 (Galaxies and Cosmology I)
- AST 532 (Galaxies and Cosmology II)
- AST 533 (Galaxies and Cosmology III)

Students in the Ph.D. Exploration Systems Design program are required to take a series of core courses based on their chosen concentration:

Instrumentation students must take 3 of the following 6 courses (9 credit hours):

- EEE 425 Digital Systems and Circuits
- EEE 433 Analog Integrated Circuits
- EEE 481 Computer Controlled Systems
- EEE 523 Advanced Analog Integrated Circuits
- EEE 527 Analog to Digital Converters
- EEE 539 Introduction to Solid State Electronics

Sensor Networks students must take 3 of the following 6 courses (9 credit hours):

- CSE 534 Advanced Computer networks
- CSE 535 Mobile Computing
- CEE 581 Advanced Earth Systems Engineering and Management
- EEE 507 Multidimensional Signal Processing
- EEE 551 Information Theory
- EEE 554 Random Signal Theory

Systems Engineering students must take 3 of the following 8 courses (9 credit hours):

- CSE 571 Artificial Intelligence
- CSE 574 Planning and Learning Methods
- IEE 547 Human Factors Engineering
- IEE 552 Strategic Technological Planning
- IEE 572 Design Engineering Experiments
- IEE 573 Reliability Engineering
- MAE 525 Mechanics of Smart Materials and Structures
- MAE 547 Modeling and Control of Robots

In addition, Exploration Systems Design students must take two elective science courses (6 credit hours total) among AST, SES, or GLG topics. The student's research advisor must approve these courses. These courses will be applied toward the 25 credit hours of coursework that is required for the degree.

Demonstration of Competence in Comprehensive Examination

The process of qualifying for Ph.D. candidacy serves three purposes:

- To assess in a timely manner the suitability of a student to continue working toward a Ph.D.
- To broaden students' scientific vision before they focus on the details of their dissertation research.
- To better prepare students for the process of doing scientific research.

Ph.D. candidacy will be earned on the basis of a written component and an oral component. The written portion of the comprehensive exam will be in the form of two written research project reports. The oral portion of the comprehensive exam will consist of an oral defense of the two project reports.

Project Selection and Preparation for Exams

The two projects must be carried out with two different faculty advisors (most typically these advisors will be members of the SESE graduate faculty who are authorized to chair or co-chair Supervisory Committees as documented by the Graduate Education Office). Primary and

secondary advisors must be identified for each project. Students should consider the following in regards to the selection of their project topics:

- Students admitted with an M.S. degree may, upon successful petition to the Graduate Oversight Committee, base one of their projects on work related to their M.S. thesis.
- It is expected that at least one of the two projects will lead to the research the student intends to pursue as a significant component of their dissertation research.
- Presentation of both projects must include, at the very least, some preliminary research results (e.g., new data, results of model runs, or new analysis of data, etc.). Significant progress on both projects is expected.
- The two projects must utilize substantially different methodologies and involve work in substantially different fields.
- At least one of the projects should be experimental or observational (i.e., "hands on") in nature.
- Project titles, a 1 paragraph abstract summarizing each project, and a short description of how the projects are different will be submitted to the Graduate Oversight Committee for approval by March 1 of the 2nd semester in residence for fall admits or the 3rd semester in residence for spring admits. Each submitted title/abstract must carry the signature of the primary advisor for that project.
- For ESD Ph.D. students, one project must have an engineering focus with a system or component design as a primary subject. The other project must have a science focus.

Proposed projects will be reviewed for appropriateness and **sufficient breadth** by the Graduate Oversight Committee. Pairs of projects judged to be too similar will be returned for refinement to the student. The idea of sufficient breadth is central to the Ph.D. in the School of Earth and Space Exploration. Its satisfaction helps to ensure that SESE Ph.D. graduates are capable of achievement throughout the wide range of activities that will ensue during their professional careers. Demonstration of breadth is in the long term interest of the student and should not be avoided for short term efficiency. The projects will be separated at least:

- by topics in different fields represented by SESE
- with different tools of inquiry (observation and theory)
- by collaborations with different advisors

Project Format and Scope

Project reports will be submitted to the Graduate Oversight Committee for approval by March 1 of the 4th semester in residence for fall admits or the 5th semester in residence for spring admits. Each submitted report must be approved by the primary advisor for that project, either via a signature on a hard copy of the report, or via an email to the Associate Director for Graduate Studies. Failure to submit signed reports for the two projects will result in the student discussing the issue with the Graduate Oversight Committee. Students should consider the following in regards to the preparation of their project reports:

- At least one of the two project reports will be written and formatted following the style of a manuscript being submitted to a major professional journal in the field relevant to the research.
- The second project report may be written up in the style of a manuscript (noted above) or as a research proposal following the style of a real funding program (e.g., NSF, NASA, DOE, etc.) that includes the results of the project to date to seed the motivation for the proposed future work. Note that details such as a budget, CV, funding history, etc., which are necessary for a proposal to a funding program, are not a necessary component of the project report, but the presentation of results are essential.
- The report should be detailed and concise. The length of text should be a minimum of 5 pages and no longer than 10 pages, with figures, tables and references in addition to this length. It will be single-spaced with 12 point font. It must include an abstract, sufficient background material that demonstrates familiarity with the subject, relevant equations and figures, a discussion of the work completed to date, a description of the work necessary to complete the project, and references.
- When submitted to the Graduate Oversight Committee on March 1, each project report should be a complete draft. Significant additional progress should occur on the documents as the exam date approaches after March 1.
- The final versions of the two written project reports must be submitted to the student's Comprehensive Exam Committee at least two weeks in advance of the oral portion of the Comprehensive Examination. Failure to do so may result in the rescheduling of the exam.
- Work on both of the projects should consume a substantial portion of the student's effort during the 2 years prior to the oral examination. Students will normally be expected to register for 3 hours of research in addition to courses (maximum of 12 hours total) in their 2nd and 3rd semesters to allow them to focus on their projects.
- It is expected that one of the two projects will lead to a student's Ph.D. dissertation research. To as great a degree possible, given realities of funding and other considerations, the second project (the one that does not become the Ph.D. research subject) should be of the student's own design and carried out in as independent a fashion as possible.

At the time of project report submission and in preparation for candidacy exams, each student is responsible for confirming that they have a current and approved Program of Study (POS) filed with the Graduate Education Office. Per Graduate Education Office requirements, students who do not have a current and approved POS before the time of their Comprehensive Exam will either not be allowed to take their exam, or the exam itself could be nullified.

Once the project report drafts are approved by the Graduate Oversight Committee by March 15 or sooner, the student should expect to take their Comprehensive Examination between April 1st and the last day of classes of Spring semester (refer to academic calendar for exact date: https://students.asu.edu/academic-calendar). In extenuating circumstances (requiring appeal to the Graduate Oversight Committee), the Comprehensive Exam may be taken in the following fall semester (5th semester in residence for fall admits or the 6th Semester in residence for spring

admits). However, the student should plan to take their exam as soon as possible after the project reports are approved by the Graduate Oversight Committee. Prior to exams, students must work with the Graduate Coordinator to obtain candidacy exam procedures and evaluation forms for the exam committee.

Composition of the Comprehensive Exam Committee

In addition to the project faculty mentor, students will be expected to discuss each of the two projects with a second faculty member or academic professional working in a related field, who should be a member of the SESE Graduate Faculty as defined by the Graduate Education Office. This secondary mentor will provide an independent check on the suitability of the work for a student project, and agree to be available to discuss the project with the student during the course of the research.

The five members of the Comprehensive Exam Committee will consist of the primary faculty mentors for each of the 2 projects, the secondary advisors for both project reports, and a fifth member appointed by the Graduate Oversight Committee. An Exam Committee member who is not one of the student's two primary advisors on the two projects shall chair the Examination Committee.

Timeline for Comprehensive Exam

Students should take the following timeline into consideration when preparing for comprehensive exams:

- By the end of their first semester, students should be talking seriously with faculty members about possible research projects. The student should begin earnest work on one of the projects early in their second semester.
- Project titles, a short description of their differences, and a 1 paragraph abstract will be submitted to the Graduate Oversight Committee for approval by March 1 of the 2nd semester in residence for fall admits or the 3rd semester in residence for spring admits. Each submitted title/abstract must carry the signature of the primary advisor for that project.
- Work on the two projects should be carried out during the student's second and third semester, as well as the summer between their first and second years. (Students are strongly encouraged to include summer support in their discussions with faculty mentors.)
- Draft project reports will be submitted to the Graduate Oversight Committee for approval by March 1 of the 4th semester in residence for fall admits or the 5th semester in residence for spring admits. Each submitted report must carry the signature of the primary advisor for that project.
- The Graduate Oversight Committee will review the draft project reports for breadth and possibly iterate with the student to finalize the two project reports by March 15 after which the students will be authorized to schedule the exam.

- The two project reports in final form will be submitted to the student's Comprehensive Examination Committee at least two weeks in advance of the oral portion of the Comprehensive Examination.
- It is the student's responsibility to schedule the oral portion of the examination with their Comprehensive Examination Committee. The student has until the last day of classes of the 4th semester in residence for fall admits, or the 5th semester in residence for spring admits, to take the Comprehensive Exam (refer to academic calendar for exact date: https://students.asu.edu/academic-calendar). However, the student should plan to take the exam as soon as possible after the Graduate Oversight Committee has reviewed the project reports.
- Following successful defense of the projects, all orals paperwork should be submitted by the exam chair to the Graduate Coordinator. This step makes the student eligible for pay at the Ph.D. Candidate rate. The new rate will go into effect at the beginning of the following spring or fall semester.

See Appendix for a more abbreviated timeline.

Structure of Comprehensive Examination

- Following the review of the project reports by the Graduate Oversight Committee, the reports must be submitted to the Comprehensive Exam Committee at least two weeks before the oral portion of the comprehensive examination or the exam may be rescheduled.
- In the exam, the student will present a 10-minute overview of each project report. A typical exam will consist of (in order):
    1) The presentation by the student of the 1st report
    2) Questions from the Exam Committee regarding the 1st report and related topics
    3) Presentation by the student of the 2nd report
    4) Questions from the Exam Committee regarding the 2nd report and related topics
    5) A final round of questions from the Exam Committee.
    6) The total length of the examination of the student should not exceed 3 hours.
- The Comprehensive Exam Committee will approach review of the projects as they would the review of a paper or research proposal, and the student will be expected to defend the projects at that level. This includes an ability on the part of the student to discuss the scientific underpinnings of the work being presented.
- Topics discussed during the exam should not be limited to formal coursework taken by the student. In its assessment, however, the Comprehensive Exam Committee should be cognizant of the formal training of the student.

Evaluation of Comprehensive Examination

An Exam Committee member who is not one of the student's two primary advisors on the two projects shall chair the Exam Committee. Immediately following the examination, the members

of the committee will discuss the student's performance and each will complete a Ph.D. Comprehensive Exam Evaluation. The results of the exam are reported by each member on a SESE Ph.D. Comprehensive Exam Report form. The chair of the committee will tally numerical scores (on a 0 to 5 scale) assigned by each committee member to determine an average score. These results will be reported on the chairperson copy of the SESE Ph.D. Comprehensive Exam Report form. The chair of the committee will prepare a memorandum (with committee input and review) summarizing the exam outcome. The memo should be emailed to the student and copied to the exam committee and Graduate Coordinator. The exam chair must also return the completed evaluation forms to the Graduate Coordinator. Based on the value of the average score, the following recommendations may be made by the Comprehensive Examination Committee:

- Pass (score of 5.0 – 3.5): The student is recommended for admission to candidacy for the Ph.D. degree.
- Deferred Decision (score of 3.4 – 2.5): The Examination Committee may find that the examination is not satisfactory because of deficiencies in project reports, exam preparation, or background knowledge. In the case of a deferred decision, the Committee will discuss the deficiencies with the student and specify conditions for continuation in the Ph.D. program. This discussion will be reflected in the Exam Evaluation documentation and memorandum. The Committee will require one of the following:
    - Continuation of exam The examination may be continued following additional preparation by the student. In most cases, the student should complete the exam within 6 months of the initial exam date, but additional time may be specified by the Examination Committee. Only one deferred decision is allowed.
    - Other Conditions The Examination Committee may require coursework, completion or presentation of a project or projects, or other actions to rectify the student's deficiencies. The conditions will be specified on the Comprehensive Exam Report along with a date by which the specified actions must be completed.
    - Transfer to the M.S. degree program For students who do not already hold an M.S. degree, the Examination Committee may require that the student complete an M.S. degree before attempting to advance to candidacy in the Ph.D. program. After completion of the M.S. degree, the student must apply for admission to the Ph.D. program. If re-admitted to the Ph.D. program, the student begins with a "clean slate" with respect to the comprehensive exam.
- Fail; Option to Retake (score of 2.4 – 1.5): The Examination Committee may find that the examination is not satisfactory because of deficiencies in project reports, exam preparation, or background knowledge. In the case of a conditional fail, the Committee will discuss the deficiencies with the student and specify conditions for continuation in the Ph.D. program. This discussion will be reflected in the Exam Evaluation documentation. The Committee will require one of the following:
    - Re-examination The examination may be retaken after close consultation with the members of the Examination Committee, and with approval of the SESE

Associate Director for Graduate Studies and the Dean of the Graduate Education Office. The ASU Graduate Education Office requires that the re-examination take place no sooner than 3 months and no later than 1 year from the date of the original examination. Only one re-examination is permitted. The Examination Committee will inform the student of the requirements of the second examination, but in general the student should follow the same procedure as for the first examination.

  - Transfer to the M.S. degree program For students who do not already hold an M.S. degree, the Examination Committee may require that the student complete an M.S. degree before attempting to advance to candidacy in the Ph.D. program. After completion of the M.S. degree, the student must apply for admission to the Ph.D. program. If re-admitted to the Ph.D. program, the student begins with a "clean slate" with respect to the comprehensive exam.

- Fail (score of less than 1.5 on the first examination or less than 3.5 on the second examination): Students may be failed without opportunity for re-examination. For students who do not already hold a M.S. degree, a terminal M.S. may be recommended pending successful completion of the M.S. degree requirements. Funding supporting the student may be withdrawn at the end of the semester during which the exam was failed. Students will be notified in writing if funding is terminated.

Research

The faculty emphasizes that the basic requirement for the Ph.D. degree is that the candidate demonstrate the capacity for independent, original research. Students are encouraged to begin their professional careers in science early by preparing their Ph.D. research for publication in refereed journals, and to view such activity as part of the preparation of their dissertations. Students are encouraged to prepare their dissertations in a manner that would permit (or have already permitted) individual chapters to be submitted (or already published) as individual journal articles.

Dissertation Technical Review

When the student and the faculty advisor decide that the major research results are near completion, the student will convene his or her Supervisory Committee for a technical review of the research results. The objective of the technical review is to:

- Allow the Supervisory Committee to establish whether an appropriate research has been carried out and that the results are sufficiently sound to warrant completion and defense of a dissertation.
- Ensure that the student receives substantive feedback from the entire Supervisory Committee well in advance of the dissertation defense.
- Identify any technical problems with analyses done or any additional analyses that need to be completed.
- Advise the student on how best to present their material at the defense.

The technical review for a Ph.D. must be held at least 6 months in advance of the desired final defense date in order to accommodate any recommendations that emerge from the technical review. The Graduate Oversight Committee must approve shorter time intervals between the technical review and final defense. The student is urged to schedule the technical review as soon as possible after the major research results are available in order to ensure that advisor, student, and Supervisory Committee are in agreement that an appropriate research effort will be completed. If the topic of a student's dissertation changes after the completion of a technical review, a new technical review on the new thesis topic must be performed. A majority of the Supervisory Committee must be present in person for the technical review. Other committee members not available in person should attend via either teleconference or videoconference. If a majority is not present in person, the technical review must be rescheduled.

The student will provide to the Supervisory Committee an extended abstract and an outline of the dissertation research at least one week before the review. The technical review shall consist of an oral presentation of results and appropriate interpretations (typically a 30-minute seminar-type presentation) followed by discussion of progress to date and future work needed for a successful dissertation defense. Technical reviews typically last between 2 and 3 hours. The student and research advisor will work together closely to help the student understand the purpose and flow of the technical review process. Further, the research advisor should work with the student to ensure that the content of the presentation is appropriate for a technical review.

At the conclusion of the technical review, the Supervisory Committee will indicate any concerns regarding the dissertation research. The committee members may identify specific areas that need further investigation and/or consideration. The manner in which the student subsequently addresses these areas is subject to evaluation at the dissertation defense. These comments will be transmitted to the student via a detailed memo from the student's advisor. The memo should note the outcome of the technical review and any action items that must be completed for the defense. Students must also have their committee members sign off on the Technical Review Report form (see Appendix). Both the form and a copy of the memo (electronic or hardcopy) should be given to the Graduate Coordinator after the technical review.

If the dissertation is not defended within one year of the technical review, an additional review meeting with the Supervisory Committee will be required.

Final Oral Dissertation Defense

A final oral defense of the completed dissertation is required by the School of Earth and Space Exploration and the Graduate Education Office. The Supervisory Committee conducts this examination and all members of the Supervisory Committee must be present for the defense. A majority of the committee including the research advisor(s) must be physically present. Virtual presence of the remaining committee members may be permitted upon approval of the graduate oversight committee. A dissertation defense typically lasts between 2 and 3 hours and begins with a 30-minute seminar-type presentation by the student. The completed dissertation must be submitted to the Supervisory Committee at least 2 weeks prior to the examination or the student

may be required to reschedule the defense. Students must be active and enrolled in at least one credit during the semester of the defense.

No later than the semester of the defense, students should:

- Confirm that the information on the POS is current and that all requirements are met, including advancement to candidacy (which should have occurred shortly after the student passed comprehensive exams). Students are encouraged to do a POS check a few months prior to the anticipated defense to avoid any issues with scheduling the defense.
- Submit an application for graduation.

A minimum of two weeks (ten business days) before the scheduled defense, it is the student's responsibility to:

- Submit a complete copy of the dissertation to the Supervisory Committee. The Supervisory Committee needs sufficient time to review the dissertation in preparation for the defense. Failure to provide them with two weeks of review time may result in the postponement of the defense.
- Provide pertinent information for the defense announcement to the Graduate Coordinator. Pertinent defense abstract information includes a title, an abstract, the name of the research advisor(s), the names of the Supervisory Committee members, and the date, time, and location of the defense. Abstracts should be a few paragraphs in length (no more than one page). Once received the Graduate Coordinator will distribute the announcement to the SESE community.
- Officially schedule the defense with the Graduate Education Office via the 'Defense' tab within the 'My Programs and Degree Progress' section of their MYASU. Once the defense has been officially approved, the details of the defense will appear in this area of MYASU.

A minimum of ten calendar days before the scheduled defense, it is the student's responsibility to submit a complete copy of the formatted dissertation to the Graduate Education Office for format review.

No more than 10 days after the defense, students must submit a copy of the form to the Graduate Education Office with the appropriate level of pass or fail noted and a brief description of revisions that need to be made.

After the defense and within the semester graduation deadlines, students should:

- Complete format revisions of the dissertation as required by the Graduate Education Office.
- Complete content revisions of the dissertation as documented by the Supervisory Committee at the defense.
- Submit the final defense form to the Graduate Education Office confirming the completion of the dissertation requirements by the student's advisor.

- Submit final copy of dissertation to ProQuest for publication.

Students can view the Graduate Education defense procedures and deadlines via the 'Defense' tab within the 'My Programs and Degree Progress' section of their MYASU homepage or they can visit the Graduate Education site directly at: https://graduate.asu.edu/completing-your-degree .

Masters in Passing

Obtaining a Master of Science in Passing (MIP) degree is completely elective. It is an option for graduate students who wish to obtain an M.S. degree on the way to the Ph.D. degree. Students who already have a related M.S. degree from another school are not eligible for the MIP option. The following coursework requirements apply to the MIP:

- Students need 30 units minimum for the MIP program of study. The 25 credit hours of coursework that are required for the Ph.D. may be used toward MIP program of study.
- The 30 credits will be a combination of coursework and GLG692 or AST692. The typical GLG792 or AST792 that students typically take for the Ph.D. will not count for the MIP. Students who anticipate seeking an MIP must plan and register for research hours accordingly.

Within one calendar year after passing the Comprehensive Examination, students must complete the following steps to be eligible for the MIP:

- Submit a paper to a refereed journal with their advisor's approval (the Graduate Education Office "Written Exam")
- Deliver a public talk to SESE about the work submitted to the journal (the Graduate Education Office "Applied Project"). A majority of the Supervisory Committee should be present for the presentation and it should be followed by a question and answer period. Two weeks prior to the talk, the student must send an announcement to the Graduate Coordinator for distribution to the SESE community. The announcement should include the title and a brief summary of the talk along with the date, time and location.

The advisor should submit a short memo to the Graduate Oversight Committee and Graduate Coordinator documenting completion of the submitted journal article and public talk. Following completion of these requirements, the student will work with the Graduate Coordinator to complete all necessary Graduate Education Office MIP degree paperwork. Material used for the MIP degree may not be used verbatim for the Ph.D. thesis. However, if sufficient enhancements are added to the body of work, then, subject to the Supervisory Committee's approval, this material may be used as part of the Ph.D. dissertation.

If this degree is desired, the student should be in contact with the Graduate Coordinator in advance of the Comprehensive Examination to ensure all requirements have been identified.

Financial Support

The majority of students accepted in to a SESE graduate program are offered financial support for the academic year (August-May) by means of a Graduate Assistant/Associate position. M.S. students typically receive 2 years of guaranteed financial support and Ph.D. students typically receive 5 years of support. Renewal of support is contingent upon students maintaining satisfactory academic progress in the graduate program and satisfying all requirements and obligations of their assistantships. (Please refer to Academic and Research Performance Evaluations section for more information on Satisfactory Academic Progress). Financial support may extend beyond these timeframes pending availability of funds. Financial support includes a stipend, tuition remission, and health insurance for the student. Tuition remission does not cover class fees or tuition-related fees and taxes. Students not requiring financial support from SESE may elect not to receive an assistantship/associateship and should indicate this in their admissions application. For students who have applied for and/or received federal financial aid, acceptance of RA/TA positions may decrease financial aid eligibility.

Support as a Graduate Teaching Assistant (TA) for M.S. students may be limited to two semesters. Support as a Graduate Teaching Associate (TA) for Ph.D. students may be limited to four semesters. T A Financial support beyond the fifth year is contingent on approval from the student's Research Advisor and Associate Director for Graduate Studies. Eligibility for a TA position is not a commitment for funding. Students are strongly encouraged to switch to Research Associate (RA) funds for support as soon as possible. Research Assistantships are contingent on funds available to research advisors and are awarded at their discretion. Students should seek approval from SESE at the earliest opportunity for proposed changes in the status of their support.

Graduate Assistants/Associates must meet program requirements and be enrolled in a minimum of 6 credit hours and no more than 12 per standard semester (fall or spring). Students supported by a fellowship must meet the requirements specified by the fellowship.

Summer financial support for graduate students is not guaranteed and should be coordinated with the student's faculty advisor. During the summer, students can be supported as hourly employees or as TAs/RAs. Students supported as hourly employees during the summer should take the following into consideration:

- Hourly summer positions do not provide tuition remission and students do not need to register during that time. If a student in an hourly position does register for summer courses, the tuition will be out-of-pocket.
- If the student held a TA/RA position in the spring semester prior to the summer hourly position and received health insurance during this time, it should continue through the summer.
- Hourly positions require submitting a time sheet and will be administered by the SESE Business office.

Summer RA/TAs should register for at least 1 credit per summer session (session A and session B) to avoid FICA (The Federal Insurance Contributions Act) taxes from being deducted

each pay period. Students typically sign up for research, thesis, or dissertation over the summer depending on degree progress.

Students funded by the department or university may not hold additional employment of any kind.

If English is not a student's native language, he/she must pass the English language SPEAK Test upon arrival. Full English Certification for TA positions must be obtained as soon as possible.

Students should review the TA/RA handbook for more information regarding the policies and procedures of Graduate Assistant/Associate positions: https://graduate.asu.edu/ta-ra.

Family Leave Information for Graduate Students

Graduate student employment status includes eligibility for parental leave. Students seeking this benefit should work closely with her faculty advisor, the Graduate Oversight Committee and the SESE Business Office. The relevant documentation is available from http://provost.asu.edu/academic_personnel/parental_leave.

This excerpt is relevant:

"6. Postdoctoral scholars and graduate students with a 0.50 FTE research or teaching assistantship (RA/TA) appointment who have completed at least one academic year's service are eligible for up to 6 weeks of paid parental leave and will continue to receive their stipend and associated benefits (health insurance and tuition remission) during this six-week period. The department is responsible for funding these costs. The RA/TA must maintain a minimum enrollment of 6 credit hours during the term of paid leave. Any portion of the 6 week period for recovery from childbirth that falls outside the appointment term will reduce the amount of available paid parental leave on a pro-rated basis. The accommodation period does not include adoption or paternity leave."

Please note that employees should have the approval of their faculty advisor and Associate Director for Graduate Studies before applying for leave. The employee will then work with the SESE Business office in regards to the processing of paperwork and establishment of Parental, Sick, & Vacation pay.

Additional Links:

PARENTAL LEAVE
http://provost.asu.edu/academic_personnel/parental_leave
http://www.asu.edu/aad/manuals/acd/acd710.html

FMLA LEAVE POLICY
http://www.asu.edu/aad/manuals/acd/acd702-03.html

FORMS AND OTHER INFORMATION ON LEAVES
http://cfo.asu.edu/hr-leavesmanagement

Appendix

M.S. Student Timeline
School of Earth and Space Exploration

	Fall Semester	**Spring Semester**
Year 1	Orientation Week (1) Meet with advisor to draft tentative course schedule. This can be done prior to orientation week if possible. (2) Meet with **GOC** to receive general graduate information and answer questions. End of semester: Meet with advisor and potential **SC** members to discuss possible research topics.	Beginning of semester: Finalize advisor and **SC**. Begin work on thesis. Submit Program of Study to Graduate Education Office. Notify Graduate Coordinator once the POS is submitted. Meet once per year with **SC** members to discuss thesis progress and submit Annual Committee Report by Oct.15.
Year 2+	Meet with advisor and **SC** as necessary to review progress. Submit Annual Progress Report, Narrative, and updated CV on Oct. 15. Meet once per year with **SC** members to discuss thesis progress and submit Annual Committee Report Oct. 15. Hold technical review of thesis results (at least 3 months before defense). Work on suggestions/ revisions to thesis given at technical review. Make any necessary adjustments to Program of Study in preparation of defense. Notify Graduate Coordinator of any submitted changes.	Schedule defense if ready. Make sure to follow appropriate steps/ timeline as required by Graduate Education Office and SESE. **A min of two weeks (10 business days) before defense**: 1) Distribute full copies of thesis to **SC** committee for review. 2) Officially schedule defense through the Graduate Education Office website. 3) Provide defense announcement info to Graduate Coordinator for dispersal. **A min of 10 calendar days before defense**, submit a complete copy of thesis to Graduate Education for format review. Complete other defense and necessary revisions/requirements for graduation.

GOC = Graduate Oversite Committee (Faculty presiding over all graduate students)

SC = Supervisory Committee (Committee of 3 faculty who supervise thesis)

*Annual reports are due **October 15 of each year**. Students must hold a meeting with their **SC** to discuss their progress and submit annual committee report on **October 15**.

Ph.D. Student Timeline
School of Earth and Space Exploration

	Fall Semester	**Spring Semester**
Year 1	Orientation Week (1) Meet with advisor(s) to draft tentative course schedule. This can be done prior to orientation week if possible. (2) Meet with **GOC** to receive general graduate information and answer questions. End of semester: Meet with advisor and potential **SC** members to discuss possible research topics.	Beginning of semester: Start serious work on at least one project. **No later than March 1**: Submit project titles and abstracts for 2 projects to **GOC**. Continue working on both projects. Make necessary changes as recommended by **GOC** after review of project abstracts. Meet once per year with **SC** members to discuss dissertation progress and submit Annual Committee Report October 15 or earlier.
Year 2	Continue work on projects. Meet with advisor(s) and **SC** as necessary to review progress. File Program of Study with Graduate Education Office. Notify Graduate Coordinator once the POS is submitted. Submit Annual Progress Report, Narrative, and updated CV on Oct. 15. Meet once per year with **SC** members to discuss dissertation progress and submit Annual Committee Report Oct. 15.	**No later than March 1**: Submit both written project reports in complete draft from to **GOC.** **By March 15: GOC** authorizes student to schedule oral exam. Submit final project reports to **EC** no less than 2 weeks before exam. **Complete Comprehensive Examination by end of spring semester**. See academic calendar for semester deadlines: https://students.asu.edu/academic-calendar . After successful completion of comprehensive exams, work with Graduate Coordinator to ensure that advancement to candidacy occurs. Students will receive a stipend raise the semester after passing comprehensive exams and advancement to candidacy.
Year 3	Submit Annual Progress Report, Narrative, and updated CV on October 15.	Meet once per year with **SC** members to discuss dissertation progress and submit Annual Committee Report October 15 or earlier.
Year 4	Submit Annual Progress Report, Narrative, and updated CV on October 15.	Meet once per year with **SC** members to discuss dissertation progress and submit Annual Committee Report October 15 or earlier. Hold technical review of dissertation results, if ready.

Year 5	Meet with **SC** members to work though suggestions/revisions given at technical review OR hold technical review if not already done (must be 6 months before defense). Make any necessary adjustments to Program of Study in preparation of defense. Notify Graduate Coordinator of any submitted changes.	Schedule defense if ready. Make sure to follow appropriate steps/ timeline as required by Graduate Education Office and SESE. **A min of two weeks (10 business days) before defense**: 1) Distribute full copies of dissertation to **SC** committee for review. 2) Officially schedule defense through the Graduate Education Office website. 3) Provide defense announcement info to Graduate Coordinator for dispersal. **A min of 10 calendar days before defense**, submit a complete copy of dissertation to Graduate Education for format review. Complete other defense and necessary revisions/requirements for graduation.

GOC = Graduate Oversight Committee (Faculty presiding over all graduate students)

EC = Examination Committee (Committee of 5 faculty administering oral exam); will not usually include all members of the SC.

SC = Supervisory Committee (Committee of 5 faculty supervising dissertation research and defense)

*Annual reports are due **October 15 of each year**. Students must hold a meeting with their **SC** to discuss their progress and submit annual committee report prior to **October 15**.

M.S. Annual Report Form

An electronic version of this is due on October 15

PROGRAM INFORMATION

Student Name _____

Advisor(s) _____

Supervisory Committee _____

_____

Date of Admission to Program _____

Current GPA _____

TECHNICAL REVIEW/DEFENSE INFORMATION

Have you completed your technical review? _____ If so, when?_____

If not, please include your scheduled/anticipated technical review date:_____

Have you already scheduled your defense? _____ If so, when?_____

If not, please include your anticipated defense date:_____

RESEARCH

Before submitting this report, please note that per SESE graduate guidelines you must meet with your Supervisory Committee and present your current research progress in the form of a short research talk. In addition, you must provide your committee with a 1-3 page write up of your progress over the past year. This report should include:

- Topic/title of thesis research
- Funding source(s)
- Professional activities (abstracts, papers, presentations)
- Summary of research progress since last meeting

Please attach this write up to your report (including any recommended modifications per discussion with your committee). Following the meeting, your committee will generate a memo summarizing the content of the meeting.

VERIFICATION

This student has met with her/his Supervisory Committee in the past year and has presented an adequate report of their research progress. The signature(s) below represents approval of their progress to date as outlined in this report.

Research Advisor: _____ Date:_____

Research Co-Advisor: _____ Date:_____
(if applicable)

Ph.D. Annual Report Form

An electronic version of this is due on October 15

PROGRAM INFORMATION

Student Name _____
Advisor(s) _____
Supervisory Committee _____
_____
_____
_____
Date of Admission to Program _____
Candidacy exam date and result _____
Progress toward candidacy _____
Conditions (if applicable) _____
Current GPA _____

TECHNICAL REVIEW/DEFENSE INFORMATION

Have you completed your technical review? _____If so, when? _____

If not, please include your scheduled/anticipated technical review date: _____

Have you already scheduled your defense? _____ If so, when?_____

If not, please include your anticipated defense date:_____

RESEARCH

Before submitting this report, please note that per SESE graduate guidelines you must meet with your Supervisory Committee and present your current research progress in the form of a short research talk. In addition, you must provide your committee with a 1-3 page write up of your progress over the past year. This report should include:

- Topic/title of dissertation research
- Funding source(s)
- Professional activities (abstracts, papers, presentations)
- Summary of research progress since last meeting

Please attach this write up to your report (including any recommended modifications per discussion with your committee). Following the meeting, your committee will generate a memo summarizing the content of the meeting.

VERIFICATION

This student has met with her/his Supervisory Committee in the past year and has presented an adequate report of their research progress. The signature(s) below represents approval of their progress to date as outlined in this report.

Research Advisor: _____ Date:_____

Research Co-Advisor: _____ Date:_____
(if applicable)

Ph.D. Candidacy Exam (Orals) Procedures

Preparation

- Student needs to submit a POS several months ***before*** taking candidacy exam.
- Student needs to schedule a time when their exam committee members are all available.
- Student needs to schedule room, projector/laptop (if needed) through the SESE front desk staff.
- Student needs to notify graduate oversight committee and Graduate Coordinator of their exam date.
- Student does NOT need to notify Graduate Education Office before they take orals. They will be notified when the results are entered in the system.
- Students must be registered for at least one credit during semester of oral exams.
- Student's exam committee will need two different forms to fill out during the orals as well as two additional documents. These include:

    - Candidacy Exam Procedures sheet
    - 1 Copy of *Ph.D. Comprehensive Exam Report* (Chairperson copy)
    - 5 Copies of *Ph.D. Comprehensive Exam Evaluation* (Member copy)
    - Copy of student's transcript

The student is responsible for obtaining this paperwork from the Graduate Coordinator and bringing it to the exam.

After the examination is completed:

- Each member, including the committee chair, needs to fill out a 'committee member' evaluation form.
- After all evaluations are completed, the committee chair will summarize all of the results on the 'committee chair' evaluation form.
- The committee chair must work with the committee to prepare a memorandum summarizing the outcome of the exam and recommendations and conditions (if any) for the student. This needs to be done within two weeks of the exam.
- A copy of the exam memo should be emailed directly to the student and copied to the exam committee and Graduate Coordinator.
- The exam chair must also return the evaluation forms to the Graduate Coordinator for record keeping.
    - Salary raises are effective the semester after the student passes his/her orals and are contingent on the student being officially advanced to candidacy. Students should work directly with the Graduate Coordinator after passing exams to ensure that advancement to candidacy occurs in a timely manner.

Technical Review Procedures

- Student needs to schedule a time when all of their committee members can attend
- Student needs to schedule room, projector/laptop (if needed) through the SESE front desk staff
- Student does NOT need to notify the Graduate Education Office - technical reviews are a SESE requirement only
- Student needs a technical review form for their committee members to sign after the review.
- If desired, the committee chair or the student should visit the Graduate Coordinator to obtain printouts of the student's transcript, annual report memos, etc.
- Committee chair should summarize the results of the technical review in a memo distributed to the student, Supervisory Committee and Graduate Coordinator.
- Tech review form should be returned to the Graduate Coordinator.

Ph.D. students must complete their tech reviews at least 6 months prior to their planned defense date and M.S. students must complete them at least 3 months prior to planned defense date. Any exceptions must be approved by the SESE Graduate Oversight Committee.

Thesis/Dissertation Technical Review Report

Student_____

Date of Tech Review_____

Instructions:

- This form is to be completed by the committee chair at the end of the technical review.
- Please attach a memo outlining performance of student at technical review, as well as a summary of issues that must be addressed by the time of the oral defense.
- Copies of this completed form should be given to the student, the research advisor, and the SESE Graduate Coordinator for the student's file.
- **NOTE:** This form must be signed by all Supervisory Committee members, including those not present at the technical review.

Comments:

		Present	Not Present
Signatures:	_____	_____	_____
	_____	_____	_____
	_____	_____	_____
	_____	_____	_____
	_____	_____	_____

Signature_____ Date_____

Technical Review Chairperson

Defense Procedures

Students are ready to defend after they have successfully completed a technical review and have received approval from their committee to hold a defense. Students need to be following all of the defense policies and procedures outlined by Graduate Education. These can be found on their website at: https://graduate.asu.edu/completing-your-degree . Below is a general timeline of the steps for a defense:

No later than the semester of the defense, students should:

- Confirm that the information on the POS is current and that all requirements are met, including advancement to candidacy for Ph.D. students (which should have occurred shortly after the student passed comprehensive exams). Students are encouraged to do a POS check a few months prior to the anticipated defense to avoid any issues with scheduling the defense. If the student submits any changes to the POS he/she must notify the SESE Graduate Coordinator for approval.
- Submit an application for graduation.

A minimum of two weeks (ten business days) before the scheduled defense, it is the responsibility of the student to:

- Submit a complete copy of the thesis/dissertation to the Supervisory Committee. The committee needs sufficient time to review the thesis/dissertation in preparation for the defense. Failure to provide them with two weeks of review time may result in the postponement of the defense.
- Provide pertinent information for the defense announcement to the Graduate Coordinator. Pertinent defense abstract information includes a title, an abstract, the name of the thesis/dissertation advisor(s), the names of all members of the Supervisory Committee and the date, time, and location of the defense. Abstracts should be a few paragraphs in length (no more than one page). Once the student sends this information to the Graduate Coordinator, it will be distributed to the SESE community.
- Officially schedule the defense with the Graduate Education Office via the 'Defense' tab within the 'My Programs and Degree Progress' section of their MYASU. Once the defense has been officially approved, the details of the defense will appear in this area of MYASU.

A minimum of ten calendar days before the scheduled defense, it is the student's responsibility to submit a copy of the complete thesis/dissertation to the Graduate Education Office for format review.

At the defense students should make sure that all committee members sign the defense form. Around this time, students should have received format revisions from Graduate Education.

No more than 10 days after the defense, students must submit a copy of the form to the Graduate Education Office with the appropriate level of pass or fail noted and a brief description of revisions that need to be made.

After the defense and within the semester graduation deadlines, students should:

- Complete format revisions of the thesis/dissertation as required by the Graduate Education Office.
- Complete content revisions of the thesis/dissertation as documented by the Supervisory Committee at the defense.
- Submit the final defense form to the Graduate Education Office. On the form the advisor must sign off that all thesis/dissertation requirements/revisions are complete.
- Submit final copy of dissertation to ProQuest for publication.

Students can view the Graduate Education defense procedures and deadlines via the 'Defense' tab within the 'My Programs and Degree Progress' section of their MYASU homepage or they can visit the Graduate Education site directly at: https://graduate.asu.edu/completing-your-degree . Any questions regarding defense procedures should be addressed to the SESE Graduate Coordinator.