

MS Graduate Student Handbook

Geology and Environmental Sciences & Policy

School of Earth and Sustainability
2022-2023

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Useful Contacts

School of Earth and Sustainability
Northern Arizona University
Flagstaff, AZ 86011-4099
<https://nau.edu/ses/>

Clare Aslan, Director/Chair of SES (928) 523-2487
Michael Smith, Associate Director SES (928) 523-8965
Ryan Porter, GLG Graduate Program Chair (928) 523-2429
Rebecca Best, ESP Graduate Program Chair (928) 523-8155
Tracy Tiedemann, Graduate Program Coordinator (928) 523-0932
Sarah Colby, SES Financial Manager (928) 523-7184
Bob Lenegan, Lab Manager (928) 523-1759
Tony Wolkowsky, Lab Supplies Controller (928) 523-7177

For resources and forms relevant to your degree please see:

<https://nau.edu/ses/resources-for-current-graduate-students/>

Here you will find both SES documents and links to Graduate College forms and documents.

The Graduate College's forms website is <https://nau.edu/graduate-college/forms/>

Graduate College
Northern Arizona University
Room 107, Ashurst Bldg.
Flagstaff AZ 86011-4125
<https://nau.edu/graduate-college>

General Information (928) 523-4348
Dr. Maribeth Watwood, Dean (928) 523-4348
Laura Bounds, Associate Dean (928) 523-6320
[Where to direct your email](#)

International Graduate Student resources are available through nau.edu/cie. Contact gradinternational@nau.edu if you have questions about your visa or maintaining your status.

Northern Arizona University does not discriminate on the basis of race, color, age, religion, gender, national origin, disability, or veteran status in our admissions, employment and education programs or activities.

1. FOR ALL MS STUDENTS

This handbook is designed to guide you through the policies and procedures governing your career as a Master's student in the Geology or Environmental Sciences & Policy Program at NAU. These two Master's degree programs are part of the School of Earth & Sustainability (SES), which also has a MS Climate Science and Solutions program and an Earth Sciences and Environmental Sustainability PhD. We recognize that graduate study is much more than the meeting of deadlines, and your scholarly development is of paramount importance to the faculty. Your growth is cultivated individually throughout your graduate experience as you develop the foundation, independence, intellectual curiosity, and self-discipline necessary to be a productive scientist. The awarding of the Master's of Science degree recognizes your achievement of these goals. We hope that these guidelines make necessary procedures and events clearer so that you can direct your efforts toward your education and completion of your degree in a timely manner.

The **Graduate College** sets the policies and deadlines that govern all graduate students at NAU (documented in the [Academic Catalog](#)). In addition, **SES** has guidelines to ensure high standards in our graduate programs (documented in this handbook). **You should be aware of both sets of policies and review them periodically.** You can bring any questions about any of these policies or requirements to (1) **your thesis advisor**, (2) the staff Graduate Program Coordinator (**Tracy Tiedemann**), or (3) your Graduate Program Chair (**Dr. Ryan Porter for Geology and Dr. Rebecca Best for Environmental Sciences and Policy**). They can help with any questions or concerns regarding your academic progress and personnel issues affecting your graduate studies. Do not rely on hearsay information from other students: see it in writing. It is your responsibility to see that any changes, exceptions, or other dispensations made on your behalf regarding any policies contained in this manual are documented **in writing**. **Be certain that any such documents are filed in your permanent records** (managed by the Graduate Program Coordinator) and if applicable, **the Graduate College**. **Be sure to keep a personal copy.**

1a. Timeline for successful completion in 2 years

As a full-time graduate student, you should be able to complete your graduate program in approximately two years. This requires careful planning and an early start on thesis research. Financial support in the third year is not guaranteed. If you enter the program with deficiencies and/or cannot complete data collection before the beginning of your second year, it is likely you will need at least an extra semester to complete the MS degree. Some professors have projects in hot-weather climates or internationally, and in some cases, fieldwork cannot be done until the second winter of a student's graduate career. Be sure to discuss this with your thesis advisor. Your progress in the program is reviewed yearly and you will receive written notice if your progress is not satisfactory (see section 1e on Satisfactory Progress).

Prior to the Beginning of Your First Semester

- Meet with your thesis advisor (in person or via phone/email) to discuss what classes you should take in your first semester. See section 1c Program of Study (PoS) for guidance.
- Discuss research topics and any potential challenges to your 2-year timeline.

During the First Year

- Complete any course deficiencies outlined in the offer letter.
- Complete 2 semesters of full-time (9-12 credits per semester) graduate study at NAU with GPA ≥ 3.0 . You will need approval to go over 12 credits in a single semester. You do not need to register for any credits in winter or summer semesters unless you are graduating during that winter or summer.
- Register as a resident of AZ if applicable (see section 1f).
- Work with your thesis advisor to select your thesis committee.
- Meet with your thesis committee to present your thesis proposal and Program of Study.
- Complete any revisions needed for your proposal to be approved.
- Attend the thesis defenses of your graduating colleagues: this will give you both inspiration and specific goals and expectations for your own final year.

After Advancement to Candidacy but Before Your Final Semester

- Take at least one credit of EES 699 (Thesis Research) per semester, after consulting with your thesis advisor about the work you will complete for these credits. This should be viewed as a contract. Your advisor will judge each semester whether the work was completed, and whether you are making satisfactory progress.
- [Apply to graduate](#) by the deadline, which is usually **December 1** for spring graduation and **May 1** for fall graduation (but can vary, so check that website!).

During Your Final Semester (see also section 1d for a full list of Thesis preparation steps)

- Register for at least 1, but more likely ≥ 3 credit hours of EES 699 to reflect the amount of faculty time on your project.
- Meet with your committee at least **3 months** before your defense target date to obtain their approval to set a formal thesis defense date. Prepare to provide at this meeting:
 1. evidence that you have acquired all (or nearly all) the field and lab data necessary to complete the thesis, and you have completed all (or nearly all) analysis of the data;
 2. a very detailed outline or completed first draft of your thesis;
 3. compilation of most references;
 4. presentation of the main conclusions of your thesis.
- Review the deadlines and procedures for preparing your thesis and your thesis defense found in this handbook and on the [Graduate College thesis website](#).

- Schedule your formal thesis defense date in consultation with the Graduate Program Coordinator to avoid scheduling conflicts. See the [SES website](#) for instructions.
- When your advisor has approved a complete thesis draft, send this to your committee for review at least **4 weeks** before the defense date, and confirm with your committee members that the thesis is ready to defend.
- Submit your thesis to the Graduate College's format editor (ETD@nau.edu) for initial format check at least **2 weeks** prior to your defense. Failure to do this could delay graduation.
- **Pass your thesis defense no later than the last day of classes.**
- **To graduate in the current semester, complete revisions and submit your thesis in electronic format by the end of the semester.** Consequences of missing this deadline are summarized below. All deadlines are published on the [Graduate College thesis website](#).

Date you submit your thesis	Semester your degree will be awarded	Tuition consequences	Official policy link
Last day of current semester	Current semester	none	Link
10 business days grace period after end of current semester	Following semester	none	Link
Last day of following semester	Following semester	must enroll in at least 1 credit of 699 per semester	Link
Per-credit summer tuition and fees:			Link

Summer Thesis Defenses

The Graduate College strongly discourages summer defenses. Only in extenuating circumstances will such defenses be considered, and only if the candidate obtains the approval of all members of their thesis committee. Faculty are not paid by NAU during the summer months and are under no obligation to participate. No defenses are permitted during the month of August before the beginning of fall semester. You may not change the members of your committee for the purposes of defense scheduling.

1b. Coursework: The Program of Study

The [Program of Study form](#) outlines the courses you will complete for the MS Degree. You must consult your thesis advisor about the courses you should take in your first semester before enrolling, and you must have an approved initial Program of Study form by the end of your second semester. The GLG and ES&P programs have different requirements for coursework; **see the section of this handbook specific to your program (sections 2 and 3) for guidance on choosing your classes**, and contact your Graduate Program Advisor (Rebecca Best for ESP; Ryan Porter for GLG) if you and your thesis advisor have any questions. All MS students must take EES 605 in the first semester and EES 606 in the second semester, as well as one credit of EES 698 (the School of Earth and Sustainability Seminar Series) in the semester of your choice. After advancement to candidacy, enroll in thesis research credits using EES 699. You need 6 credits of EES 699, and no other course numbers can be substituted for these. You may end up taking more than 6 credits of 699 (especially if you continue in your degree beyond two years because you must enroll in EES 699 each semester after candidacy) but you may only count 6 of those credits towards your degree.

Additional NAU-wide rules about courses you can count towards your MS degree	Official policy link
The Program of Study for your program in either the year you began or the current year specifies your required courses. In addition, NAU rules for all MS degrees require that at least 18 credits of your coursework must be 500- or 600-level graded courses. Pass/Fail classes such as EES 605/606 and P/F versions of EES 685/697/698 will not contribute to these 18 credits.	Link
You may take a maximum of two 400-level courses (6 credit units) at NAU as part of your MS program with prior approval by your committee. You must file an Out of Career form (available on the Registrar's Office website), to get credit, but these do not count towards the 18 graded-course units.	Link

If you have obtained graduate credit for courses at another institution that did not count toward your undergraduate degree at that institution, you must obtain approval from your thesis committee as part of the Program of Study to apply these credits to your NAU program. In addition, you must submit a [Petition for Transfer Credit](#) to the Graduate College and receive approval. A maximum of 8 credit hours of graduate courses with a grade of **B** may be transferred from another college or university. [Criteria for acceptance of transfer credit](#) are given on the Graduate College website. Note that Graduate College approval is granted on a case-by-case basis and is not guaranteed.

KEY STEP: After discussion at your first committee meeting, your PoS form must be signed by your thesis advisor and the SES Director. Submit the signed form to the Graduate Program Coordinator and upload it to LOUIE in your Student Center under “Milestones.” This will trigger eligibility to apply for graduation. When you and your advisor agree that your coursework and thesis will be finished in time, submit an [application for graduation](#) and pay the filing fee prior to the deadline listed at that link (usually **December 1** for spring graduation and **May 1** for fall graduation). If your course plan changes after this point, you will need to upload to your LOUIE Student Center a final PoS, which gives an accurate account of the classes you have taken, matching your official transcript. Either way, your final PoS must be signed by both your advisor and the SES Director/School Chair.

1c. Thesis Proposal and schedule

Timetable for Completion of Thesis in Two Years

End of second semester: Submit and obtain approval of thesis proposal and Program of Study.

Summer between first and second year: Complete field and/or laboratory research.

Third Semester: Organize first draft of thesis.

Fourth Semester: Submit first draft of thesis early in the term.

Selection of Thesis Topic and Committee

Following selection of a thesis topic, you and your advisor need to identify two (or more) additional committee members who will bring expertise to your research effort. Committee members may be selected from the regular faculty at NAU, adjunct professors at NAU, professors at other academic institutions, or professionals from science agencies or museums.

Committee members must have a PhD degree or be considered an expert in a field relevant to the student's research project, and two of the committee members must be from SES. ESP students: **see the ESP section for additional requirements about committee composition.**

During your graduate study, you or your thesis advisor may choose to discontinue the relationship. You can make this difficult decision on your own and should not feel pressure to stay with your original advisor if the relationship is not working for you. Your Graduate Program Advisor is an important resource if you need consultation on these matters. Depending on the timing or cause for this change, you might have to also change thesis topics and resubmit a thesis proposal. Such changes are unusual, but do occur due to illness, sabbatical leave, or other circumstances. A change of thesis advisor or any member of the committee must be approved by the new thesis advisor, the thesis committee, and your Graduate Program Advisor.

Thesis Proposal

The purpose of the thesis proposal is to help you focus your research ideas, review and synthesize the scientific problems that are part of your research program, and detail the methods that will help solve the problem you are investigating. The thesis proposal is not a contract, it is a proposal. Your ideas about the research problems and the methods necessary to solve the problem might evolve as you do the work. The selection of the research problem and writing of a research proposal is the responsibility of you and your thesis advisor. The proposal will be written as part of EES 605/606 in the first year. When approved by your committee, the thesis proposal constitutes permission to begin the proposed research.

Proposal Format

A thesis proposal should be a **concise** statement of your research problem and how you intend to solve it. It includes a 250-word abstract, approximately 8-10 pages of double-spaced text, and supporting maps, graphs, tables, and references. In some cases, at the advisor's discretion, a longer proposal will be necessary. The proposal should be sufficiently well documented with citations from pertinent literature to demonstrate that you are aware of the work of other investigators in the proposed and related fields. Your thesis committee will assist you in writing a concise proposal and will consider the proposal carefully before endorsing it. The general format of a thesis proposal is discussed in EES605/606, but the specific parts are agreed upon by you and your thesis advisor.

Thesis Committee Meetings

You are required to meet with your thesis committee at least once each academic year. This includes: (1) a meeting during the second semester to discuss the thesis proposal and Program of Study prior to advancing to candidacy, (2) a meeting during the second year to report on progress and to discuss the thesis wrap-up, and (3) a meeting three months prior to the proposed defense date. Depending on the status of the thesis project, meetings 2 and 3 can be the same. At the "three-month" meeting, you should schedule a date for your defense. If you have moved out of Flagstaff but are actively pursuing your degree, evidence of an internet meeting once a semester must be filed with the Graduate Program Coordinator.

KEY STEP: When your committee has approved your thesis proposal, have your thesis advisor send (1) the cover page of your thesis proposal signed by all committee members, and (2) confirmation your first committee meeting has occurred to the Graduate Program Coordinator. This, along with your Program of Study, will advance you to candidacy for the MS degree and allow you to enroll in thesis credits (EES 699). If you do not meet these deadlines, you will be at risk of entering academic probation (see section 1e on Satisfactory Progress).

1d. The Thesis

Review the current requirements for [thesis formatting and deadlines](#) on the Graduate College website. This is an **extremely important resource, so read it carefully**. You must follow these guidelines carefully to have your thesis accepted by the Graduate College and to graduate on time. Determine all deadline dates for the semester you plan to graduate and mark them on your calendar. You will see that **you must be highly organized during your final semester**. Remember, you are not working on this alone, and you are relying on the efforts of three other very busy people, your thesis committee.

You should have extensive discussions with your thesis advisor and your committee before and as you write your thesis. Every advisor follows a different procedure. You should write in a style equivalent to a professional journal. ***Your advisor may reasonably expect at least two weeks to read and comment on your work for each draft.*** You should expect numerous rounds of revisions before you have achieved a draft your advisor deems acceptable to be distributed to your committee members.

When your advisor is satisfied with the thesis, you will distribute it to other members of your committee for review. The committee should be given your complete thesis, including nearly final figures, maps, references and text with figure and reference citations, **at least 4 weeks before your defense**. In the event that professional and/or subject-matter disagreement develops within the thesis committee, the thesis committee chair will make the final decision. In the rare event that your committee objects to the action of your primary advisor, the member(s) may ask for a review by the Graduate Council, who will attempt to resolve the problem, although the final decision is still the responsibility of the thesis committee chair (usually your advisor). If the member(s) or committee chair is still unsatisfied, they may request to be removed from the committee without prejudice and a replacement will be made.

Thesis Defense

The thesis defense must occur by **the last day of classes** during the semester you wish to graduate. The Graduate College does not permit thesis defenses during finals week, during school holidays, or on weekends. Committee personnel shall not be changed to facilitate scheduling. To advertise your defense, send an announcement email to SES.Admin@nau.edu 7-10 days before your defense. [See the SES Graduate Student Resources webpage](#) for instructions.

The thesis defense consists of two parts: (1) a formal oral presentation; and (2) the closed-door oral examination. In the oral presentation, you will present a summary of your thesis, emphasizing the major conclusions of the research. This presentation is typically 30-40 minutes long and is open to a public audience. Following the presentation, the public audience may ask questions related to the thesis. Members of the thesis committee normally refrain from questioning the candidate during the public portion. At the end of this brief discussion period, the

public audience will be excused, and the oral examination begins, in which you will be examined by the thesis committee. To prepare for this examination, you are advised to review all graduate course work, all details of the thesis, and all current literature related to the thesis. The committee will be examining you to determine whether you have developed a sufficient foundation with both depth in the thesis field and breadth in the degree topic. You must be able to defend the findings and methodology of the thesis and to demonstrate a comprehensive understanding of the principles upon which the thesis research was based and how your findings relate to relevant literature. You may also be called upon to extend your thinking beyond straightforward content knowledge, thus testing the use of sound scientific reasoning.

Following the oral examination, you will be dismissed, and the examination committee will evaluate your performance. Successful completion shall be by majority vote of the examining committee. The committee will complete and sign [Thesis/Dissertation Oral Defense Form](#) – Part I. This form will specify what edits are required before the thesis can be submitted, and who will approve the edits. Often your advisor will approve all edits, but your committee may request to re-review one or more chapters or the entire thesis. Failure of the oral examination is rare, but should it occur, the committee chair can reschedule the examination no sooner than 30 days. A second failure of the oral examination will terminate your program.

Successful finalization of your thesis research will very likely be contingent upon completion of final edits to your thesis. After these changes are made, your advisor and possibly other committee members will complete the [Thesis/Dissertation Oral Defense Form](#)– Part II to confirm that required edits have been completed. Your thesis advisor will give you a copy of this form to help you answer questions during your thesis submission.

Thesis Submission

KEY STEP: When your final revised thesis is approved, submit your thesis at www.etsadmin.com/nau. The Graduate College has [detailed instructions](#) about submitting electronic theses and dissertations (ETDs). All deadlines are listed on the [Graduate College thesis website](#). You must submit your thesis by the end of the semester. Also submit a pdf file of your entire thesis, including appendices, to your thesis advisor and to the Graduate Program Coordinator (Tracy).

If necessary, you may use a **ten-day grace period for your final submission following a defense that has occurred before the end of term**. If you are not able to submit your final thesis within the grace period, you will need to enroll in at least one thesis hour for the subsequent session to fulfill graduation requirements. Note that a thesis submitted during this “grace period” has a graduation date of the *following semester* (e.g., if you use the grace period to submit your thesis in late December, your thesis will have the date of the following year). If you miss the Graduate College deadline for final submission of your thesis, contact gradgraduation@nau.edu to withdraw your graduation application and re-apply for graduation during the next term. If the final thesis copy is not submitted within one year of successful completion of the defense, you will be required to update and re-defend the thesis.

Archiving your Research Materials

Research done while a student at Northern Arizona University is the property of the University and therefore samples or other material or data may need to be archived; arrange this with your thesis advisor.

1e. Satisfactory progress

Academic Standards

You must maintain a 3.0 grade point average for all courses taken as a graduate student. Grades of **D** or **F** do not earn graduate credit. No more than 3 hours of graduate course work with a grade of **C** can be accepted for the Master's degree program in SES. Receiving a grade of **C** or lower **in six or more course units, or a GPA dropping below 3.0**, will place you on academic probation. You will lose your TA or RA position, and will need to create a written action plan with your advisor (see NAU [Graduate College policy](#) for more information). The action plan must outline steps to remediate problems that led to probation. This action plan must be submitted to your Graduate Program Advisor, the SES Director, and the Graduate College for final approval. If you cannot then meet the goals for improvement, you will likely be dismissed from the program. You may apply for re-admission into the program only once. An incomplete grade (I) received must be completed within one semester or you will be put on probation. If there are extenuating circumstances, an extension may be granted by your Graduate Program Advisor, with approval of the Graduate College.

Continuous Enrollment

You must be enrolled continuously in the ES&P or GLG Program while pursuing a Master's degree. Additionally, once you enroll in EES 699, you must register each subsequent semester until the thesis defense. If you have approval from your committee to conduct a summer defense, you must be registered for at least one unit of EES 699 during the summer term. If circumstances require you to break your time in residence, a [Petition for a Leave of Absence](#) form should be submitted to the Graduate College. **There is a six-year limit for completion of requirements for the M.S. degree**, although extensions may be granted in extenuating circumstances. See the Graduate College's [Continuous Enrollment Policy](#) for more info.

Unsatisfactory Progress

If you fail to meet key deadlines such as the submission and review of a thesis proposal by the end of your first year or defense by the end of your second year, the Graduate Council may review your progress. This review will consider completion of course deficiencies, filing of Program of Study and thesis proposal, course grades, thesis work, committee meetings, and performance as a teaching or research assistant. If the Graduate Council determines you are not making satisfactory progress, you may be placed on academic probation. You will be notified of specific problems that must be corrected during the first semester of probation through an academic improvement plan that you write with your thesis advisor. If these problems are not resolved or if there is further unsatisfactory progress during any subsequent semester, you will be placed on a second semester of probation and be ineligible for an assistantship or scholarship from SES or the university except under exceptional circumstances. If progress is still unsatisfactory at the end of the second semester of probation, you will be dismissed from the program. You may challenge these decisions according to the [Academic Appeal Policy](#).

1f. Financial support

Financial support might be obtained from a variety of sources: (1) teaching assistantships (TAs) granted by the Graduate College upon the recommendation of SES; (2) research

assistantships (RAs) in conjunction with funded research of individual faculty members; (3) fellowships and scholarships awarded by the Graduate College and SES; (4) grants-in-aid of research awarded by off-campus organizations. If you are interested in financial support, it is your responsibility to seek information from the variety of sources and follow the guidelines required. The Financial Aid office has a [scholarship directory](#) that you might find helpful.

Teaching Assistantships

The Graduate College and University allocate state-funded graduate assistantships to departments. In SES, most of these positions are used for graduate student teaching of undergraduate laboratory sections or field classes. If you were offered two years of graduate assistantship in your offer letter, then you will be automatically considered for a TA unless you have a research assistantship. SES will support most MS students who are accepted into the program for two academic years provided that you perform duties and maintain academic progress in a satisfactory manner (see Section 1e Satisfactory Progress). In some cases, TA support, if available, will be granted to third-year MS students. Students interested in this extra support should contact the Graduate Program Coordinator as soon as they are aware that this may be necessary. Master's students interested in teaching careers can access information available through the [Center for Science Teaching and Learning](#) web site.

Research Assistantships

Research assistantships are typically funded by agencies outside of the university, such as the National Science Foundation, but are administered through NAU. The duties of the student are controlled directly by the grantee, who is usually a faculty member in SES or an affiliated agency. Students are selected for these positions by the grantee. These positions carry the same rules and regulations as for teaching assistantships, but the type of work required depends on the project. The student is directly responsible to the grantee. Research assistantships are generally granted on a semester-by-semester basis.

Tuition Waivers

A few tuition waivers are available each year to graduate students in SES. Students must be Arizona residents to receive a full waiver of tuition. Non-residents qualify for a waiver of the non-resident portion only and are still responsible for paying the resident tuition rate. Teaching and research assistantships automatically carry a waiver for full tuition regardless of your residency status.

Important Note Regarding Residency

In order to qualify for some types of financial aid you need to be considered by NAU an [Arizona resident](#) for tuition purposes (follow the link for more information as well as forms and deadlines). If you plan to remain in Arizona after you graduate, you should gain this status as soon as possible. Note: NAU determines residency for tuition purposes independently of any other residency related to drivers licenses or taxation.

2. INFORMATION FOR THESIS ADVISORS

Rebecca Best is the Chair of the ES&P Graduate Program; Ryan Porter is Chair of the GLG Graduate Program. If you and/or your students have any ideas, concerns, or queries about either program or about this handbook, please speak with one of them.

Key Deadlines in Year 1:

- Before the start of Year 1, advise your student on course selection and TA and RA positions. The student will need to complete a **Program of Study** form. Please see the individual program sections that follow for detail on the PoS.
- During Year 1, the student must complete a **Thesis Proposal**. EES 605 and 606 guide students through the proposal-writing process, but it is crucial that you work with your student and set guidelines that will help the student complete the proposal on time.
- Early in the second semester, first-year students will need to assemble a **Thesis Committee**. GLG and ESP have different guidelines for who may serve on a committee (see the individual program sections). By the end of the second semester, the student must meet with their entire committee and discuss the thesis proposal and any revisions that are needed. Please have **all committee members sign the proposal cover sheet** when the proposal is accepted, and **email this to the Graduate Program Coordinator noting that the meeting has occurred**, along with a completed preliminary **Program of Study**. To help guide student progress please also fill out the **Thesis Proposal Evaluation form** and discuss thesis proposal feedback with your student.

Key Deadlines in Year 2:

- Check that your student has applied to graduate by the deadline in the second-to-last semester. To apply they will need an updated **Program of Study** signed by you and the SES Director.
- A “3-month meeting” is required of all students to ensure the thesis is close enough to finished to be defensible.
- In the student’s final semester, which is ideally the fourth, be sure that the thesis defense is scheduled as far before the last day of classes as possible. At minimum, you and the student must be in Flagstaff for the defense; other members can participate remotely. As part of the defense, you must complete the [Thesis/Dissertation Oral Defense Form – Part I](#). The Graduate Program Coordinator can obtain the Director’s signature and submit this for you within 48 hours.
- The final, revised thesis must be submitted by the end of the semester. Before the student can upload the final document, you must submit the [Thesis/Dissertation Oral Defense Form – Part II](#) directly to ETD@nau.edu. Give a copy to the student to answer questions about copyright. The School no longer requires a printed and bound copy of the thesis.
- A student may have a 10-day “grace period” from the last day of finals, but in this case, graduation is dated the following semester and the student must reapply for graduation. The student is not required to register for any thesis hours in this case.
- Complete the **Pre/Post-Program Evaluation of Student Development form** again and submit to the Graduate Program Coordinator. Forms are located in the SES Google Shared Drive.

3. ADDITIONAL INFORMATION FOR GLG STUDENTS and ADVISORS

MS Division of Geosciences 2022-2023

The faculty, staff, and students in the Division of Geosciences welcome you! Please feel free to talk to the Graduate Program Chair/Advisor (Ryan Porter) or the Graduate Program Coordinator (Tracy Tiedemann) at any time. The 2nd-year students were in your place last year and are a great resource as well.

Coursework: The Program of Study

Geology students take at least 24 credit hours of course work and at least 6 hours of additional thesis research (EES 699). All students must complete EES 605 and EES 606 during the fall and spring of their first academic year, for one credit each; additionally you will take one credit hour of EES698-01, the discussion section that accompanies our speaker's series. Of the remaining 21 credit hours, 18 must be geology courses, and you must take courses from at least three of the disciplinary distribution blocks described below. The remaining three credit hours can be combinations of any NAU geology graduate courses (including the courses below), transfer credits, and 400-level-or-above courses in other NAU departments. Any exceptions require approval by the geology graduate committee. To fully prepare for thesis work and a professional career, some students might find it necessary to complete more than 24 hours of course work.

The Program of Study is constructed such that in one block you list the 9-12 hours of "distribution" courses, and then in the second the 12 hours of other courses (note that this adds up to the same ≥ 21 hours described above).

To encourage breadth in your graduate curriculum, you are required to complete at least one course in **three** of the four fields of emphasis (blocks) identified below.

Fields of Emphasis: Distribution Blocks for MS Program in Geosciences

Igneous and Metamorphic Geology

GLG 520 Volcanology
GLG 570 Geochemistry
GLG 612 Igneous Petrology
GLG 615 Metamorphic Petrology
GLG 516 Petrologic Phase Equilibria
GLG 617 Isotope Geology

Sedimentary Geology

GLG 530 Vertebrate Paleontology
GLG 625 Siliciclastic Petrology
GLG 627 Depositional Systems
GLG 629 Evolution of Sedimentary Basins

Hydrogeology and Quaternary Geology

GLG 537 Quaternary Geology
GLG 572 Stable Isotope Geochemistry
GLG 575 Geochemistry of Natural Waters
GLG 637 Geochronology of Quaternary
Depositional Systems
GLG 670 Advanced Hydrogeology

Geophysics, Structure, and Tectonics

GLG 542 Advanced Structural Geology
GLG 560 Introduction to Applied
Geophysics
GLG 561 Regional Tectonics
GLG 565 Intro. to Solid Earth Geophysics

Specifics of course applicability to the program of study are listed below. The Geology Graduate

Committee must in some cases be petitioned for course credit to be applied towards the degree. An example of the Program of Study for the M.S. in Geology is included at the end of this section.

A) You may take up to two courses from outside the Geology Program with your committee's approval. Additional courses taken outside of Geology require Graduate Committee approval, and only 4 credit hours count towards the degree.

B) EES 698 seminar classes that focus on Geology may be used as credit towards the overall 22 credits, but cannot be used to satisfy the breadth requirement.

C) EES 599 classes may satisfy certain categories, but must use letter grading and be approved by the Geology Graduate Committee;

D) Only graduate courses offered on a letter grade basis (other than 605/606) apply to the degree;

E) EES 587 (Professional Development Seminar), EES 697 (Independent Study) and EES 685 (Graduate Research) credits are not typically counted toward the 22 graded credit hours, and require approval of the Graduate Committee. Please submit a written rationale of the request.

Sample two-year plan

Master's students are strongly encouraged to complete their degree within two years. Third-year students may receive GA support, but this is never guaranteed. The following is an example of a typical course load and milestones that need to be met to graduate in 2 years.

Fall, year 1

9-10 credits (including EES 605)
= 2-3 classes + EES 605.

Winter break: write thesis proposal

Summer break: field/lab work

Fall, year 2

4-6 course credits + EES 699 credits
= 1-2 classes; field / lab work; writing.
Create a timeline with advisor for
writing thesis

Spring, year 1

9-10 credits (including EES 606)
= 2-3 classes + EES 606.

Thesis proposal approved, obtain
candidacy by end of Spring.

Spring, year 2

EES 699 credits;
January – February: thesis drafts to advisor; “3-month” committee meeting in February; thesis submitted to committee by April; defend end of April. Submit thesis to ProQuest by the Graduate College deadline.

Course Deficiencies

When you received your letter of acceptance, you may have been told you have certain course deficiencies. The Graduate College requires you to fill these deficiencies within your first academic year, so be sure to work closely with your advisor, the Graduate Program Advisor, and the Graduate Program Coordinator to complete this task.

Geology MS Thesis Committee

Two of your three committee members must be regular NAU Geology faculty. The third member may be from the USGS, USFS, other NAU faculty, or many other options. Committee members must have earned a PhD or be recognized as experts in the relevant field. Note that in general, summer defenses are strongly discouraged. You may not replace a committee member in order to complete a defense in the summer.

External and Internal Financial Support

Several scientific societies provide modest funding for graduate-student research on a competitive basis. These societies include the NSF, American Association of Petroleum Geologists (AAPG), Geological Society of America, Four Corners Geological Society, Rocky Mountain section of SEPM, Arizona Geological Survey, and Sigma Xi (ask your thesis advisor for more ideas specific to your discipline). Most of these organizations require letters of reference and a short abstract regarding your thesis project. As a professional courtesy, you should ask your referees for letters **at least two weeks before** the deadline. The specific focus, deadlines, and formatting requirements of these grants can be found on society websites.

Several NAU-based scholarships and grants are also available to support students in the Division of Geosciences. Requests for proposals are circulated to students in early Spring and winners are announced during the spring banquet. An additional source of support is the NAU Geology alumni association called "The Friday Lunch Clubbe". This organization solicits proposals for fieldwork funding, and provides support ranging from \$50 to as much as \$1000. A nice mix of humor and good science is rewarded.

NORTHERN ARIZONA UNIVERSITY

Master of Science in Geology School of Earth and Sustainability PROGRAM OF STUDY (2022-23)

STUDENT INFORMATION

Name:	NAU ID:
NAU E-mail Address:	Phone Number:
Term of Admission:	Expected Graduation Term/Year:
Advisor:	Required Credits for Degree Program: 30

I. Required Courses (9 units required)

Course	Course Title	Replacement Course	Semester	Year	Units	Grade	T/P/I/A**
EES 605	Regional Topics in Earth and Environmental Science Policy						
EES 606	Research Methods in Earth and Environmental Science						
EES 698	Graduate Seminar- School of Earth and Sustainability Seminar Series						
EES 699+	Thesis						

II. Sub-Disciplines (9-12 units required):

Select coursework in consultation with your research committee to reflect breadth in THREE of the following four sub-disciplines of Geology.

- **“Hard-Rock” Geology (3-4 units required):** GLG 516, GLG 520, GLG 570, GLG 612, GLG 615, or GLG 617
- **“Soft-Rock” Geology (3-4 units required):** GLG 530, GLG 625, GLG 627, or GLG 629
- **Geophysics (3-4 units required):** GLG 542, GLG 560, GLG 561, or GLG 565
- **Quaternary Geology (3-4 units required):** GLG 537, GLG 572, GLG 575, GLG 637, or GLG 670

Course	Course Title	Replacement Course	Semester	Year	Units	Grade	T/P/I/A**

III. Subject Matter Coursework (12 units required):

Select coursework in consultation with your research committee to reflect breadth in subject matter. All of your coursework may be in geology, or you may include two courses from a related field.

Course	Course Title	Replacement Course	Semester	Year	Units	Grade	T/P/I/A**

ADDITIONAL INFORMATION

* Please note that only 6 units of thesis credit count toward your degree. However, master's students in geology average 12-14 thesis units because they must register for EES 699 each semester during which they work on their thesis.

This Program of Study documents your progress on your academic requirements for the degree and catalog year listed above. For Department of Defense-related requirements, it serves as the evaluated and approved educational plan.

In addition to all University and Graduate College policies, procedures, and requirements, graduate students must also adhere to the academic requirements, policies, procedures, and criteria outlined by their program's Graduate Student Handbook.

Students:

You must secure official approval by your advisor and Department Chair/Director before submitting the final Program of Study.

By signing or entering your name below, you agree to the following statement:

"Students are responsible for complete knowledge of Academic Catalog requirements in their degree plan for their catalog year and adhering to all policies in the Academic Catalog."

Advisors and Chairs/Directors:

Please indicate approval of the curriculum on the Program of Study by placing your signature (formal electronic signatures are permitted) in the space provided.

Student:	Date:
Advisor:	Date:
Chair:	Date:

****Transfer/Previous Graduate Degree/Internal Transfer/Accelerated (T/P/I/A)** – Must have Advisor approval

Transfer

T = Course transferred from another university

Previous Graduate Degree

P = Course taken at NAU from previous graduate degree

Internal Transfer

I = Graduate level course taken as undergraduate; Not applied to undergraduate degree

Accelerated Program "Dual-use"

A = Courses completed during the undergraduate career and used to satisfy both the Bachelors and Master's degree requirements. ONLY for designated Accelerated students.

4. ADDITIONAL INFORMATION FOR ESP STUDENTS and ADVISORS

Scope and Goals of the Program

The Master of Science degree in Environmental Sciences and Policy provides an advanced education for scientists and managers in the interdisciplinary environmental sciences. In-depth study of the environment has become increasingly dependent upon knowledge of the interactions between the natural world and human society. Neither today's environmental scientist, nor today's environmental policy analyst, can be content to specialize in a single field of study. Instead, researchers and managers are expected to be familiar with the interactions between natural resource disciplines such as ecology, geology, and chemistry, as well as social science disciplines such as policy and politics, communications, sociology and economics. Graduates of the program will obtain the skills necessary to (1) analyze and understand environmental systems, (2) interpret and apply environmental rules and regulations, (3) predict the impact of human activities on our environment, and (4) develop effective methods for addressing environmental issues from a rigorous, interdisciplinary perspective.

This program is unique in its focus on interdisciplinary study. Students are encouraged and required to think and learn across traditional disciplinary boundaries and situate their research in society. The Master's program involves significant cross-campus collaboration between a number of different departments and colleges spanning the physical, biological, and social sciences. Research topics range from local to international issues, and may involve field work, laboratory work, and quantitative and qualitative data analysis.

Structure of Decision Making and Where to Get Help

The SES Graduate Council oversees the ES&P graduate program. The Council consists of the SES Director (Clare Aslan) and Associate Director (Michael Smith), as well as all **Graduate Program Chairs** (Rebecca Best for ES&P, Ryan Porter for GLG, John Fegyveresi for CSS, and Nick McKay for PhD) and the **SES Graduate Program Coordinator** (Tracy Tiedemann) and SES Lab Coordinator (Bob Lenegan). This Council is responsible for periodic review of policies and procedures for graduate programs, as well as admission decisions, recommendations for different types of financial support, and resolving any issues related to graduate student success. If you have questions or concerns at any point in your degree, please get in touch with Rebecca and/or Tracy, or feel free to talk to any other member of the Graduate Council you feel comfortable speaking with.

ESP MS Thesis Committee

You will work with your advisor(s) to select an interdisciplinary thesis committee during your second semester. Each student's committee will consist of three or four faculty members. Two committee members must be NAU faculty members with appointments (regular, adjunct or affiliated) in SES, including the thesis committee chair or one of the two co-chairs, if this responsibility is shared. In addition, students and thesis advisors should look for opportunities to strengthen interdisciplinary learning by incorporating diverse perspectives and expertise on their thesis committee. For many students, this is an opportunity to include at least one member representing a social sciences or resource management perspective, and at least one member

representing a natural sciences perspective. In other cases, interdisciplinarity on the committee might be achieved by combining different approaches or training within the natural or social sciences. All committee members will sign the cover page of the MS Thesis Proposal by the end of the first year, and this becomes the official list of committee members. In cases of deadlocked committee decisions, the thesis committee chair (i.e., the thesis advisor) will have the deciding vote. Students may change their thesis advisors or committees during their program if a clear need/problem arises and opportunities for alternate advising can be developed, but this will need to be approved by the Graduate Council. If you need to discuss this possibility, please reach out to the ES&P Graduate Program Chair (Rebecca Best) to discuss your options. Committee changes may not occur within the final semester preceding thesis defense and graduation.

ESP MS Thesis

Your thesis should aim to contribute at least one published paper in your discipline. In addition, you are *encouraged* to work with your advisor and your thesis committee to consider the best ways to meet your interdisciplinary learning objectives. Again, we recognize that this might mean a variety of approaches across the breadth of our School. Where beneficial, you might choose one of the following options to be *part of your thesis or to complement your thesis*:

1. A paper that is inherently interdisciplinary, addressing both natural and social science/management objectives in an integrative way.
2. A paper focused in a natural science area that includes the societal, policy, or management implications/relevance of your work. If beneficial you may choose to supplement this with one of the following:
 - A literature review of relevant social science articles
 - A 1-2 page brief for policy makers or managers that interprets the findings of your thesis
 - A 1-2 page story map explaining the findings of your thesis to a non-academic audience
 - A 1-2 page analysis of public perceptions related to the research completed in your thesis
 - A focus group meeting with a relevant audience to share the findings of your thesis research with the aim of influencing decision-making
 - An equivalent product agreed upon by your thesis committee
3. A paper in a social science area that includes the natural science implications/relevance of your work. If beneficial you may choose to supplement this with one of the following:
 - A literature review of relevant natural science articles
 - An equivalent product agreed upon by your thesis committee

Coursework: The Program of Study (PoS)

The official Program of Study form for ES&P students starting in your semester is available on the [SES Graduate Student Resources page](#). In addition, we have prepared an annotated version of the PoS (see next page) with answers to common questions and a link to a large number of graduate courses you may find relevant to your studies in ES&P. Outside the required core courses, you and your thesis advisor may find a wide range of ways to best build the breadth and depth of coursework that supports and complements your research. If you have any uncertainties about course substitutions, please feel free to contact the Graduate Program Chair (Rebecca Best).

External and Internal Financial Support

Funds are available from a variety of sources to supplement student income and to defray some of the costs of thesis research and preparation. Our graduate students have been very successful at procuring this support in the past. Opportunities are detailed on the [SES Scholarships and Awards](#) webpage.

NORTHERN ARIZONA UNIVERSITY

Master of Science in Environmental Sciences and Policy

School of Earth and Sustainability

PROGRAM OF STUDY (2022-23)

STUDENT INFORMATION

Name:	NAU ID:
NAU E-mail Address:	Phone Number:
Term of Admission:	Expected Graduation Term/Year:
Advisor:	Required Credits for Degree Program: 34-36

NOTE: [SEE THIS SPREADSHEET](#) FOR A LIST OF CLASSES ESP STUDENTS OFTEN TAKE

I. Core Courses (15 units required):

- ENV 555, EES 605, EES 606, EES 698 (6 units required)
- EES 699 (6 units required) **NOTE:** if you take more, only 6 credits will count towards your degree. You can take EES 699 thesis credits only after your thesis proposal has been approved by your committee (i.e., in your second year). In your first year you can take research credits as EES 685, which can count towards your Specialty Courses. In both cases, you need to register for a section of EES 685 or 699 with your thesis advisor as the instructor. If one is not available in Louie they can easily have it set up.
- **Quantitative Data Analysis (3 units required):** In consultation with your program committee, select a BIO, EES, FOR, INF, MAT, POS, STA, or other course that will provide training in quantitative statistical analysis of data.

Course	Course Title	Replacement Course	Semester	Year	Units	Grade	T/P/I/A*
ENV 555	The Environmental Science-Policy Interface	NA	Fall	2022	3		
EES 605	Regional Topics in Earth and Environmental Science and Policy	NA	Fall	2022	1		
EES 606	Research Methods in Earth and Environmental Science	NA	Spring	2023	1		
EES 698	Graduate Seminar- School of Earth and Sustainability Seminar Series	NA	either	either	1		
EES 699	Thesis	NA	both	2023/24	6		
	A quantitative analysis class				3		

II. Emphasis Areas (19-21 units required): Select either Science and Policy or Paleoenvironmental Science Emphasis Areas.

Option 1: Science and Policy Emphasis (21 units required)

- **Areas (9 units required):** Select coursework from the following areas; select at least 3 units from each area.
 - **Natural Sciences:** BIO 571, BIO 577, BIO 663, CHM 440, ENV 430, ENV 530, ENV 540, ENV 540L, ENV 544, ENV 550, ENV 560, ENV 571, ENV 591, ENV 595, ENV 596, ENV 675, FOR 504, FOR 545, FOR 551, FOR 560, FOR 563, FOR 565, FOR 580, FOR 582, FOR 604, GLG 451, GLG 575, GLG 670, or additional courses chosen in consultation with your graduate committee.
 - **Social Sciences, Policy, and Management:** CENE 540, ENV 520, ENV 525, ENV 562, FOR 573, FOR 593, FOR 633, GSP 514, GSP 521, GSP 524, POS 659, or additional courses chosen in consultation with your graduate committee.

Course	Course Title	Replacement Course	Semester	Year	Units	Grade	T/P/I/A*

- **Specialty Courses (12 units required):** Choose at least 12 units of specialty courses, at the 500 level or above, chosen in consultation with your Program Committee. **NOTE: You may use 685/697/698 courses here, but not 699. See also the 18-credit formal coursework requirement below.**

Course	Course Title	Replacement Course	Semester	Year	Units	Grade	T/P/I/A*

Option 2: Paleoenvironmental Science Emphasis (19-20 hours required)

- **Areas (9-10 units required):** Select ONE course from each of the following areas:
 - **Paleoecology:** ENV 550 or ENV 572.
 - **Climatology/Paleoclimatology:** ENV 595, ENV 596, or ENV 675.
 - **Human Systems:** ANT 517, ANT 552, ANT 555, ANT 635, or ANT 636.

Course	Course Title	Replacement Course	Semester	Year	Units	Grade	T/P/I/A*

- **Specialty Courses (10 units required):** Choose at least 10 units of specialty courses, at the 500 level or above, chosen in consultation with your Program Committee. **NOTE: You may use 685/697/698 courses here, but not 699. See also the 18-credit formal coursework requirement below.**

Course	Course Title	Replacement Course	Semester	Year	Units	Grade	T/P/I/A*

Additional NAU-wide rules about courses you can count towards your MS degree:

You must complete at least 18 units of formal, letter-graded coursework, that is, courses other than such individualized studies as independent studies, directed readings, and research (i.e., 685, 697, 698, 699, as well as the Pass/Fail EES 605 and 606 courses). No 400-level courses may be used toward this 18-hour formal coursework requirement. [Policy link](#).

You may take a maximum of two 400-level courses (6 credit units) at NAU as part of your MS program with prior approval by your committee. You must file an "Out of Career form" ([available on the Registrar's Office website](#)), to get credit.

ADDITIONAL INFORMATION

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Students:

You must secure official approval by your advisor and Department Chair/Director before submitting the final Program of Study.

By signing or entering your name below, you agree to the following statement:

"Students are responsible for complete knowledge of Academic Catalog requirements in their degree plan for their catalog year and adhering to all policies in the Academic Catalog."

NOTE: Chair/Director = Clare Aslan. Tracy Tiedemann and/or your thesis advisor can arrange to get her signature.

Advisors and Chairs/Directors:

Please indicate approval of the curriculum on the Program of Study by placing your signature (formal electronic signatures are permitted) in the space provided.

Student:	Date:
Advisor:	Date:
Chair:	Date:

****Transfer/Previous Graduate Degree/Internal Transfer/Accelerated (T/P/I/A) – Must have Advisor approval**

Transfer

T = Course transferred from another university

Previous Graduate Degree

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Accelerated Program "Dual-use"

A = Courses completed during the undergraduate career and used to satisfy both the Bachelors and Master's degree requirements. ONLY for designated Accelerated students.