GRADUATE STUDENT HANDBOOK

Policies and Procedures for Graduate Studies

School of Forestry
Northern Arizona University

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CHAPTER 1 – INTRODUCTION

This handbook applies to all Master of Science, Master of Forestry, and Ph.D. students in the School of Forestry admitted for the Fall 2021 semester or later. Students admitted before this semester have the option of continuing under either the previous requirements or these requirements.

- To speak with someone about the graduate program, please contact the current Graduate Coordinator, ForestryGradCoordinator@nau.edu
- Information about graduate programs at NAU can be found on the Graduate College website: https://nau.edu/graduate-college

The Graduate Student Handbook summarizes the requirements and responsibilities of faculty and graduate students in the School of Forestry at Northern Arizona University. It provides students and faculty with information needed to successfully complete or direct graduate programs. Detailed information regarding general NAU Graduate College requirements is available in the on-line Graduate catalog (http://catalog.nau.edu/) and on the Graduate College website (https://nau.edu/graduate-college). Some of the information presented in those documents is duplicated here for clarity. The Graduate College has final authority on all policy matters. Changes in Graduate College policy usually automatically change School of Forestry policies and procedures. This handbook is housed online under the School of Forestry webpage: https://nau.edu/forestry/internal-resources/graduate-student-handbook/

It is the student's responsibility to become aware of and adhere to all policies and requirements established by the Graduate College and the School of Forestry. The final responsibility for meeting all School, Graduate College, and University requirements and deadlines rests with the student.

CHAPTER 2 - ADMISSION TO GRADUATE PROGRAMS

A. ADMISSION REQUIREMENTS FOR ALL FORESTRY GRADUATE PROGRAMS

1. **A minimum grade point average of 3.0 (on a 4.0 point scale) in all college and university work is required for admission.** The prospective Major Professor of an applicant may petition for admittance of a student with a lower grade point average. Such a petition must clearly explain why an exception should be granted.

2. **No student will be admitted to either the master's or the Ph.D. programs without a faculty member in the School of Forestry agreeing to serve as that student's major professor.** The major professor must be a regular member of the School's faculty, or a Research Professor in the School of Forestry. Applicants are encouraged to contact a professor in their field of interest in the School before application to establish a basis for acceptance.

3. **International students applying to the graduate program who lack a college degree from the United States (U.S.) must take the and arrange for submission of their scores to the Graduate College as part of the admission application.** Detailed information can be found here: https://nau.edu/graduate-college/international-graduate-admission/; basic information is summarized below.

   If English is not your native language, you must provide proof of English proficiency from *one* of the following testing agencies:

   - Test of English as a Foreign Language (TOEFL)
     Scores are sent directly to NAU from ETS
     NAU's Institutional Code is 4006.
   - DuoLingo
     Scores are sent directly to NAU from DuoLingo
   - International English Language Testing System (IELTS)
     Scores are sent directly to NAU from IELTS. The address to send IELTS scores is:

   Center for International Education- NAU
   Attention: Meaghan Gruber
   523 S Knoles Drive
   PO Box 5598
   Flagstaff, AZ 86011

i. The English proficiency test requirement is waived for the following applicants: native speakers of English; holders of a bachelor's or master's degree from a U.S. university; and holders of college or university degrees where English was the primary language of instruction.
ii. Applicants who do not achieve the minimum English proficiency test score but meet other admission criteria may be admitted conditionally and required to complete the Program in Intensive English (PIE; http://nau.edu/CAL/PIE/Program-Overview/) in the first semester of enrollment.

B. ADMISSION REQUIREMENTS FOR THE MASTER OF FORESTRY (M.F.) AND MASTER OF SCIENCE (M.S.) PROGRAMS

1. REQUIREMENTS FOR STUDENTS WITH A BACHELOR OF SCIENCE DEGREE IN FORESTRY

If you are a successful applicant for the Master of Forestry (M.F.) or the Master of Science in Forestry (M.S.) program (meeting all the general admission requirements detailed above, and having a Bachelor of Science degree in forestry or natural resources from a Society of American Foresters-accredited program), you will be admitted with regular standing.

2. REQUIREMENTS FOR STUDENTS WITHOUT A BACHELOR OF SCIENCE DEGREE IN FORESTRY

Successful applicants for the M.F. and the M.S. programs meeting all the general admission requirements detailed above, but not having a Bachelor of Science degree in forestry or natural resources from a Society of American Foresters-accredited program, will be admitted conditionally.

- A conditional admission means you will be required to complete at least 15 semester hours of remedial coursework in forestry with an average grade of "B" or higher. The intent of these requirements is to assure that a student who graduates with an M.F. or M.S. has a breadth of knowledge in forestry. The student's thesis committee or major professor may specify additional remedial requirements.
- *Note:* Some students may be conditionally admitted based on a low undergraduate grade point average (GPA). Such students need to successfully complete a full semester of coursework and achieve 'A' and 'B' grades in all courses to achieve regular admission.

C. ADMISSION REQUIREMENTS FOR THE PH.D. PROGRAM

Entrance to the Ph.D. program is contingent on a student having demonstrated competence in scientific research:

- A Master of Science (thesis option) serves as the standard for such demonstrated competence.
- Other advanced post-baccalaureate degrees with demonstrated scientific research outputs equivalent to a master's thesis may qualify a student for admission.
    - Examples include:
        - a Master of Arts with a thesis requirement,
        - a non-thesis master's degree with research outputs such as primary author of peer reviewed publications.
- Students lacking a master's degree or similar post-baccalaureate degree can

demonstrate competence in scientific research by having substantial research experience, such as authorship of peer-reviewed publications.

- Students seeking admission to the Ph.D. program should include in their applications an explicit statement of how their education and experience satisfies the intent of this requirement.
- Applicants for the Ph.D. program lacking a master's or similar post-baccalaureate degree must meet admission requirements for grade point average in all college and university coursework, and GRE scores, with no exceptions.

1. REQUIREMENTS FOR STUDENTS WITH A BACHELOR OF SCIENCE DEGREE IN FORESTRY

If you are a successful applicant for the Ph.D. program (meeting all the general admission requirements detailed above and having a Bachelor of Science degree in forestry or natural resources from a Society of American Foresters-accredited program), you will be admitted with regular standing.

2. REQUIREMENTS FOR STUDENTS WITHOUT A BACHELOR OF SCIENCE DEGREE IN FORESTRY

Successful applicants for the Ph.D. program meeting all the general admission requirements detailed above, but not having a Bachelor of Science degree in forestry or natural resources from a Society of American Foresters-accredited program, will be admitted conditionally.

- These students must complete, at a minimum, 15 semester hours of remedial coursework in forestry with an average grade of 'B' or higher. The student's dissertation committee may specify additional remedial requirements.
- These requirements must be successfully completed before the student can advance to Candidacy. See Chapter 7 for further details.

D. APPLICATON PROCESS

- All applications and supporting materials are submitted online through the NAU Graduate College (https://nau.edu/graduate-college). To apply for fall semester admissions, submit all materials by February 15. For spring semester admissions, submit all materials by October 15.
    - Applications received after these dates, including those partially complete, will receive consideration only after full consideration of completed applications received by the deadline.
- Applicants may be provided earlier deadlines by specific faculty. For example, those filling competitive graduate assistantship positions or meeting other fellowship deadlines may need to evaluate applications early.

All applicants must submit the following application materials as part of their application:

1. **English language proficiency test scores (International Students Only):** International student applicants must request Educational Testing Services (ETS) to submit official scores directly to the NAU Graduate College.

   If English is not your native language, you must provide proof of English proficiency from *one* of the following testing agencies:

   - Test of English as a Foreign Language (TOEFL)
     Scores are sent directly to NAU from ETS
     NAU's Institutional Code is 4006.
   - DuoLingo
     Scores are sent directly to NAU from DuoLingo
   - International English Language Testing System (IELTS)
     Scores are sent directly to NAU from IELTS. The address to send IELTS scores is:

     Center for International Education- NAU
     Attention: Meaghan Gruber
     523 S Knoles Drive
     PO Box 5598
     Flagstaff, AZ 86011

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3. **Transcripts:** Applicants must request official transcripts of all college and university work to be submitted directly to the NAU Graduate College.

4. **Statement of Research Interests and Professional/Career Goals:** Applicants must submit a detailed Statement of Intent (250 to 500 words in length) that clearly defines the applicant's educational and professional background, interests, and career objectives. An electronic copy of this statement can be attached to the online application to the Graduate College.

5. **Three letters of recommendation:** Applicants must have three letters of recommendation to support their application. Applicants are encouraged to arrange for recommendations from individuals with whom they have recent familiarity. One

letter of recommendation can be from the student's proposed major professor.

CHAPTER 3 - GRADUATE COORDINATOR AND MAJOR PROFESSOR RESPONSIBILITIES

The establishment and review of School of Forestry graduate policies and procedures are the responsibility of the Graduate Coordinator, in collaboration with the Executive Director and faculty. This Coordinator and Executive Director will recommend to the faculty changes in this document when Graduate College policies change and when policies herein no longer serve the interest of the Forestry Graduate Program. The faculty must approve all policies and procedures.

A. RESPONSIBILITIES OF THE GRADUATE COORDINATOR

The Graduate Coordinator is a member of the School of Forestry faculty appointed by the Executive Director of the School of Forestry. The responsibilities of the Graduate Coordinator are:

1. Correspond with prospective School of Forestry graduate students.

2. Prepare reports and documents on graduate programs, including program assessment.

3. Represent the School of Forestry as necessary in relations with the Graduate College and the University Graduate Council.

4. Inform faculty in the School of Forestry of changing procedures and programs in graduate education at NAU.

5. Screen graduate student applications to the School of Forestry, make admission decisions, and determine if remedial coursework is required and the number of credits (thesis/dissertation committee determines which courses are required).

6. Provide guidance to graduate students and faculty about graduate policies.

7. Serve as the first point of contact for graduate students wishing to discuss concerns about their graduate program or advising.

8. Promote, through various media and student recruitment, those programs established above.

9. Monitor policies and programs and recommend changes as necessary to the faculty and the Executive Director of the School of Forestry for approval.

10. Others as appropriate.

B. MAJOR PROFESSOR RESPONSIBILITIES

The major professor functions as research advisor, counselor, and mentor for the student. The major professor will work closely with students in all aspects of the graduate program. The major professor is also responsible for all of the following program, department, Graduate College, and university procedures. In addition, the major professor is expected to carry out the following functions for each graduate student advisee:

1. Meet with the student frequently to ensure student success in coursework, research, and professionalism. Work with the student to develop an improvement plan when appropriate.

2. Read and understand the School of Forestry Graduate Handbook and the NAU Graduate College Thesis and Dissertation Committee Roadmap document.

3. Working with the student, establish a program of courses for the first semester before the establishment of the thesis/dissertation committee.

4. Working with the student, develop a recommended Program of Study and Remedial Course Plan (when required) that meets the needs of the student and the requirements of the graduate program.

5. Working with the student, suggest potential thesis/dissertation committee members or profession paper readers, and ensure that the thesis/dissertation committee meets periodically and functions effectively.

6. Review and approve the student's thesis, dissertation or professional paper before submitting it to other members of the student's thesis/dissertation committee or professional paper readers for review.

7. Keep the student informed about what must be done to move smoothly through the graduate program.

8. Organize and administer the student's final oral presentation and defense of thesis/dissertation for M.S. or Ph.D. degree or final oral presentation for the M.F. degree.

CHAPTER 4 - FULFILLMENT OF REMEDIAL REQUIREMENTS

Graduate students admitted conditionally with a remedial coursework requirement, shall work with their major professor (M.F.) and committee (M.S. and Ph.D.) to design a remedial coursework program that develops basic competency in the field of forestry.

- The intent of these requirements is to assure that a student who graduates with a Master of Forestry (M.F.), Master of Science in Forestry (M.S.), or Doctor of Philosophy in Forestry (Ph.D.) has a breadth of knowledge in forestry.
- The courses used to meet remedial requirements should be documented in the form "Remedial Course Plan," which is available in the appendix of this document.

A. REMEDIAL COURSEWORK DISTRIBUTION

Remedial coursework is distributed in the following three areas (adapted from the Society of American Foresters Accreditation Standards):

- **Forest Ecology and Biology**
  Minimum of 6 semester credit hours in the following subjects:
  a. taxonomy, distribution, and ecological characteristics of trees and other important plants;
  b. physiology and anatomy of trees, including metabolism, growth and structure of wood;
  c. basic and applied genetics;
  d. ecological concepts and principles, including structure and function of ecosystems;
  e. soil formation, classification, composition, and properties;
  f. ecology of regeneration, forest stand dynamics and/or development
  g. fire ecology and use of fire;
  h. water in forest ecosystems, including plant-water relationships, watershed condition and forest water quality;
  i. entomology and pathology, including the study of representative forest organisms and the application of integrated pest management; and
  j. wildlife and fish biology and ecology.

- **Management of Forest Resources, and Forest Resource Policy and Administration**
  Minimum of 6 semester credit hours in the following subjects:
  This area of study integrates all aspects of forestry education. It provides the student with an understanding of the social, cultural, political, legal, economic, institutional,

and historical influences on forestry. Topics should include:

a. policy development;
b. administration;
c. land and resource planning;
d. budgeting; financial and personnel management;
e. silviculture, including methods of establishing and controlling the composition, growth, and quality of forest stands
f. integrated forest resource management at stand-, system-, and landscape-scales, with consideration of wood, forage, water, wildlife, fish, recreation, cultural, educational, and aesthetic benefits;
g. forest engineering, harvesting, and utilization.

- **Measurement of Forest Resources**
  Minimum of 3 semester credit hours in the following subjects:
  a. land measurement, geographic information systems, photogrammetry and remote sensing;
  b. sampling theory and methods;
  c. measurement of trees, forests, and forest products;
  d. wildlife habitat assessment;
  e. measurement of water yields and quality;
  f. assessment of the aesthetic, cultural, mineral, range, recreation, and wilderness values of forests.

B. NAU COURSES SATISFYING REMEDIAL COURSEWORK REQUIREMENT

Chapter 15, Table 1 includes a list of courses offered at NAU that satisfy the remedial coursework requirement in the distribution categories: **A. Forest Ecology and Biology (6 credits)**; **B. Management of Forest Resources, and Forest Resource Policy and Administration (6 credits); and C. Measurement of Forest Resources (3 credits)**

- Other forestry and NAU courses, not listed below, may meet remedial requirements upon approval of the thesis (M.S. students) or dissertation (Ph.D. students) committee, or major professor (M.F. students). This includes certain special offering courses (e.g. FOR 499/599).

C. REMEDIAL COURSEWORK AND DEGREE REQUIREMENTS

Courses taken to meet degree requirements may not be used to fulfill the remedial coursework requirement. Courses that constitute part of the maximum of 24 semester credit hours allowed as transfer units into the Ph.D. program cannot be used to fulfill the remedial coursework

requirement.

D. TRANSFER COURSES SATISFYING REMEDIAL COURSEWORK REQUIREMENT

Transfer courses may be used to satisfy remedial coursework requirements if they meet the spirit and intent of the above described remedial coursework distribution areas. Any transfer course must have significant forestry content and must be analogous to a course that fulfills an upper division requirement of a professional forestry program. The use of transfer courses in a remedial coursework program must still adhere to the distribution requirements.

The student's thesis (M.S. students) or dissertation (Ph.D. students) committee or major professor (M.F. students) must approve all transfer courses.

Coursework from a Society of American Foresters-accredited forestry or natural resources program clearly satisfies the spirit and intent of the remedial coursework requirement and should be placed in the appropriate distribution category in the remedial coursework program. Courses taken at universities outside the United States may be used as transfer courses to meet remedial coursework requirements as long as they meet the spirit and intent of remedial coursework requirements.

E. MAJOR PROFESSOR AND THESIS AND DISSERTATION COMMITTEE RESPONSIBILITIES

Before enrollment or in the first semester of coursework, the student and major professor will meet to discuss the remedial course plan. The student may also request to meet with the Graduate Coordinator to review the plan. Additionally, the major professor and thesis or dissertation committee are expected to thoroughly evaluate the student's academic capabilities and preparation in order to develop the student's remedial coursework requirements. **The 15 semester credit hours are a minimum requirement**, and the major professor and committee should decide if this requirement is sufficient. The major professor shall review any transfer courses to be used to satisfy remedial coursework requirements to ensure that they meet the spirit and intent of the above described competency areas. Students should provide a syllabus for any proposed transfer coursework to facilitate proper evaluation.

After approval of the remedial coursework plan by the major professor (M.F. students), thesis committee (M.S. students), or dissertation committee (Ph.D. students), the “Remedial Course Plan” form (Appendix) must be submitted to the Graduate Coordinator for review before submission to the Executive Director of the School of Forestry for approval.

F. INTERNATIONAL STUDENTS

International students are encouraged to meet the spirit and intent of the remedial requirements by completing the Remedial Coursework Form if they do not hold an undergraduate degree in forestry.

G. GRADUATE COORDINATOR RESPONSIBILITIES

The School of Forestry Graduate Coordinator will revisit the courses specified as fulfilling remedial coursework requirements on a regular basis and review new courses and special offerings to help determine where they fit in remedial coursework categories. The Graduate Coordinator will review all “Remedial Course Plan” forms. The Graduate Coordinator will forward plans that clearly meet the spirit and intent of remedial requirements to the Executive Director of the School of Forestry for approval. Remedial course plans that do not clearly meet the spirit and intent of remedial requirements will be returned to the student for revision.

CHAPTER 5 - MASTER OF SCIENCE IN FORESTRY (THESIS OPTION)

This 32-hour program prepares you for a career in forest research and management. It is appropriate for students who desire advanced training in forestry with a research focus. Master of Science in Forestry students can qualify for the WICHE WRGP program (see https://nau.edu/graduate-college/discount-tuition-rates/) which may allow funding for certain out-of-state students to earn their degree at the rate of 150% of the cost of in-state tuition.

A. THESIS COMMITTEE ESTABLISHMENT

During the first semester following admission, the student will meet with their major professor to discuss thesis committee composition. The thesis committee should be established during the first semester that a student begins coursework. Requirements of the thesis committee composition are:

- At least three members who have earned terminal degrees in forestry or a related field of study, and have expertise relevant to the thesis.
- The chair of the committee is the major professor. Thesis committees may be co-chaired by two faculty.
- At least one additional member of the thesis committee must be faculty, adjunct faculty, or research faculty in the School of Forestry.
- The third (and other additional members) of the thesis committee are typically faculty, adjunct faculty, or research faculty at NAU or at other colleges and universities, but also may include non-university scientists and specialists, such as researchers with governmental agencies or non-governmental organizations.
    a. Participation on a thesis committee by a person who is not faculty, adjunct faculty, or research faculty at NAU must be approved by the Graduate Coordinator using the "Approval of Outside-NAU Master of Science thesis committee Member" form (https://nau.edu/forestry/internal-resources/graduate-student-handbook/; Appendix), which requires attachment of the committee member's vita.
    b. Adjunct faculty may serve as members of the thesis committee, but not as the major professor.

The Executive Director of the School of Forestry must approve the major professor and thesis committee. Once a committee has been established, faculty who retire may continue to serve on the thesis committee. For NAU graduate school policies about theses, visit: https://www5.nau.edu/policies/client/Details/625?whoIsLooking=All&pertainsTo=All

B. THESIS COMMITTEE RESPONSIBILITIES

The thesis committee has the following responsibilities per the NAU Thesis and Dissertation Committee Roadmap. The committee shall:

1. Meet during the first semester of coursework to:
    a. Approve the Program of Study and Remedial Coursework Plan (if required)
    b. Determine the feasibility of the topic for the thesis/dissertation proposal/prospectus, and to permit the student to proceed only after such determination has been made;
2. Approve the student's proposal/prospectus and a copy of documentation or email approvals (per departmental requirements) should be recorded and maintained in the department. Approval signifies that the student has permission to proceed with the study as outlined in the proposal/prospectus;
    a. The committee shall determine whether the student's research is subject to the university policy regarding research on human or animal subjects and advise the student accordingly;
    b. The committee shall determine the adequacy of the literature review in the prospectus;
    c. The committee shall review and approve the methodology and any instrument or questionnaire used in data collection;
3. Meet at least once per year after the initial meeting;
4. Committee members shall offer expertise in their area of study and guidance for the student through all stages of the research, writing, and delivery of the thesis;
5. Ensure that the student is familiar with and understands all university policies concerning thesis/dissertation requirements, the handling of dangerous materials, laboratory and fieldwork safety, and maintenance of standards of quality, ethics, and professional performance/behaviors. Review thesis drafts and provide feedback in a timely manner. Depending on circumstances, there should be **no more than a four-week turnaround** review time for each of the committee members to review a thesis, or parts thereof;
6. Committee members will discuss any recommendations for revisions or problematic issues with the committee chair and the student;
7. The committee is to examine the student's work and to make a final determination of the acceptability of the thesis, and to assist in arranging any oral defense of the thesis in accordance with department and university written policies;
8. It is the policy of this university to make all theses available to the public through the library's Institutional Repository (IR) and search engines, as well through NAU's established academic publishing service (ProQuest). On rare occasions, committee members shall assist the student in determining the need for and recommending the withholding of material for publication (embargo) for a specified period of time, generally no more than one calendar year. The committee shall also assist the student in making copyright and open-access versus traditional publishing decisions;

C. PROGRAM OF STUDY

By the end of the first semester of coursework the major professor, in consultation with the thesis committee and the student, must submit an approved "Program of Study" form (https://nau.edu/graduate-college/programs-of-study/) to the Graduate College. The Program of Study outlines a planned series of coursework and academic experiences for each student. It clearly specifies required courses. The thesis committee, Graduate Coordinator, and Executive Director of the School of Forestry must approve the Program of Study, including any required revisions. Once a Program of Study has been approved, a student is expected to adhere to the Program.

The "Program of Study" Form, including any revised Programs of Study, must be copied to the Graduate Coordinator, the graduate student's file in the School of Forestry office, the major professor, all members of the student's thesis committee, and the Graduate College.

D. M.S. COURSEWORK REQUIREMENTS

The major professor and the thesis committee, in consultation with the student, will determine the courses required for each graduate student.

The Master of Science in Forestry requires **32 semester credit hours including 8 hours of thesis credits** (FOR 699). You must complete at least **18 hours of formal coursework** i.e, courses other than individualized studies, such as independent studies, directed readings, and research.

1. No remedial coursework may satisfy these requirements. The remedial course plan (https://nau.edu/forestry/internal-resources/graduate-student-handbook/) should be completed at the same time as the program of study (POS). Only the POS is uploaded to Louie; copies of the approved remedial plan are provided to the student, advisor(s) and placed in the official student file. Conditional admission status based on fulfilling remedial course requirements will not be removed until all remedial courses have been completed (or are in progress, if the final semester).

2. For the thesis program all students must take, at a minimum, the 32 credit hours listed below, as well as required remedial coursework:
    - FOR 505 Forestry Seminar Series (1)
    - FOR 690 Research Methods (3) (recommend taking first semester of study)
    - FOR 692 Proseminar (2) (recommend taking last semester of study)
    - Six hours of graduate-level (500-, 600-, 700-) courses with significant content in statistics. Examples include:
        - FOR 606 Applied Ecological Data Analysis (3)
        - STA 570 Statistical Methods I (3)
        - STA 571 Statistical Methods II (3)
        - STA 572 Multivariate Statistical Methods (3)
        - STA 574 Categorical Data Analysis (3)
        - STA 676 Experimental Design (3), CCJ 614 Research Statistics (3) OR SOC

655 Quantitative Analysis (3)
- BIO 682 Quantitative Biology (3)
- Other graduate-level courses with significant content in statistics.

Note that STA 570 is a prerequisite for all other 500-level STA courses.

- 12 hours of elective coursework, including at least 6 hours of formal coursework (i.e., courses other than individualized studies, directed readings, and research), chosen in consultation with the major professor and thesis committee.
- Eight hours of FOR 699 thesis credits (note: more than eight hours of thesis may be taken, but only eight hours may be counted toward coursework requirements)

3. All graduate students must maintain a GPA of 3.0 or higher. Only six hours of grade "C" are acceptable in the master's degree program. A grade below "C" does not earn graduate credit. A student with more than 6 units of graduate work with a grade of "C" or below cannot continue in a master's or doctoral program, regardless of GPA. Graduate students do not normally repeat courses. But, if a grade of "D" or "F" is received in a graduate course, students may repeat that course, with advisor approval. The repeated course does not replace the grade for the prior course; if a course is repeated, both grades are used in the computation of the overall GPA. Units earned for repeated courses may only be used once to fulfill graduation requirements.

4. No graduate credit is allowed for courses numbered 100-399.

5. With the approval of the thesis committee, up to two 400-level courses taken at NAU may be used on a master's degree program (requires filing of the "Override Authorization-Audit/Class Links/Out of Career" form, available from the Registrar's website: http://nau.edu/Registrar/Forms-and-Policies/).

6. The maximum graduate course load is 16 hours/semester. Graduate Research Assistants may only take a maximum of 12 hours/semester. The minimum course load for full-time graduate students is 9 hours/semester. Graduate Assistants must be full-time graduate students (i.e., must maintain a course load of 9 – 12 hours/semester).

7. Graduate students working on a thesis are expected to enroll in FOR 699 (Thesis) each fall and spring semester from the semester of first enrollment in FOR 699 until completion of the degree. If you are using research or other university facilities, and/or the professional time of faculty members, you should enroll for at least three credits but a minimum of one is required. During the term you complete and defend your thesis (even if you defend and complete during the summer session), you must enroll for at least one credit.
    a. *Note:* If you do not maintain continuous enrollment after you have begun work on your thesis and you do not have an approved leave of absence on file with

the Graduate College and wish to resume work, you must submit a new application for admission and register for additional credits of Thesis (FOR 699) in an amount equal to the number of such credits missed while not maintaining continuous enrollment. You can apply for a leave of absence using the approved form: https://nau.edu/graduate-college/forms/

8. Contingent on approval of the major professor and thesis committee, up to 25% of the credits required for the M.S. degree may be transferred to NAU from another graduate institution. Transfer courses that are used to meet degree requirements must be submitted to the Graduate College using the online "Petition for Transfer Credit" form: https://nau.edu/graduate-college/forms/. The Graduate College must approve all use of transfer courses to meet degree requirements. Transfer courses older than 6 years must be approved by the Graduate College using the "Petition for Extension of Time Limit" form for master's students, available at: https://nau.edu/graduate-college/forms/.

9. Read and follow the guidelines and procedures for NAU master's programs described by the Graduate College at: https://nau.edu/graduate-college/thesis-and-dissertation/.

E. COURSE LOADS

For graduate students, 9 credit hours during fall and spring semesters are considered to be full-time enrollment. The minimum full-time course load is 9 credit hours during fall or spring semester, and 16 hours is the maximum (12 hours for graduate assistants). Credit hours during the summer are not required, unless you are graduating at the end of the summer or completing your defense during the summer.

F. RESEARCH PROPOSAL / PROSPECTUS

All students in the master's program must prepare a detailed proposal / prospectus for their thesis research. This document demonstrates that the student has reviewed the literature and describes in detail how the research will be conducted. The proposal / prospectus should include a working title for the thesis, a statement of research questions or objectives, a literature review related to the research topic, and a brief summary of the proposed research methods or approach.

The proposal should be completed no later than the end of the second semester of regular graduate coursework. A major objective of Forestry 690 (Research Methods) is to provide the skills and guidance necessary for each student to complete a successful research proposal. Research Methods is required of all Master of Science students and fulfills the research proposal requirement.

- A copy of the research proposal developed in FOR 690 will be provided to the major professor and thesis committee upon completion for approval.

G. THESIS REQUIREMENTS

The purpose of a thesis is to give the student experience in carrying out the kind of research he or she may expect to do throughout a professional career. A thesis involves a significant investigation of the literature. It may involve a re-examination or re-evaluation of information generated by others to confirm or review their conclusions. It may also involve generating new knowledge through original research. It is intended to demonstrate ability to work independently on a problem, wide familiarity with the literature in the field of the program, command of the techniques and the principles of research, and ability to form valid generalizations from the data used.

No acceptable or unacceptable length to a thesis exists; the nature of the subject must determine the amount of writing necessary. In general, the acceptability of a thesis can be measured by asking whether the study would be suitable for publication in a refereed research journal in the field. Graduate students in the School of Forestry are expected to prepare at least one draft manuscript suitable for publication before graduation.

Graduate students must ensure that their thesis meets general university requirements by working with the Graduate College's Format Editor. Theses in manuscript format are acceptable to the Graduate College and are endorsed by the Forestry faculty.

FORMAT OF A MANUSCRIPT THESIS

Theses in manuscript format should have all the same basic components that occur in a normal thesis. The main distinction of a manuscript format thesis is that within the context of the thesis there are one to several distinct manuscript chapters. The intent of the manuscript chapter format is to facilitate the preparation of manuscripts for submission to professional journals while completing the thesis requirement.

A manuscript thesis must have:

a) an overall preface that explains the structure and organization of the thesis. Some redundancy may exist in the thesis to maintain integrity of the individual manuscripts, but this should be kept to a minimum and mentioned in the preface.
b) an introduction to the entire thesis (including a literature review if appropriate),
c) individual chapters as manuscripts. A minimum of one data-driven research chapter is required. The major professor may also require a literature review chapter. Each data-driven chapter generally includes a title, abstract, introduction, materials and methods, results, discussion, and literature cited sections.
d) a final chapter that discusses the management implications of the research.
e) a literature cited section for each chapter of the thesis.

There may be slight variations in style between manuscripts reflecting different journal requirements. The non-manuscript portion of the thesis should have consistent style and the entire thesis must adhere to NAU formatting standards (https://nau.edu/graduate-college/thesis-and-dissertation/).

Below are guidelines for completing the thesis.

1. The first draft of the thesis should be provided to the major professor at least eight weeks before graduation. If the student and major professor agree, review of individual chapters may occur during this time, rather than the complete thesis. The major professor must review the thesis and return to the student for revision; several cycles of review and revision are often required. The thesis should be submitted for format review by the Graduate College at this time but no later than 10 work days before the defense date.

2. The revised thesis should be submitted to the thesis committee at least six weeks before graduation or at least two weeks before the defense date. The committee should review the thesis within two weeks. If a committee member determines the thesis to be inadequate she or he may return it to the student with requested revisions. If a committee member feels the thesis is not defendable, the committee member should notify the major professor.

3. The final revised draft of the thesis should be submitted to the major professor at least four weeks before graduation or within one week following the thesis defense. Students are expected to carefully consider the comments of their thesis committee. The major professor has responsibility to ensure that the recommendations of the committee are considered in the revisions. The major professor has final responsibility for thesis approval. Students should be aware that this is the minimum acceptable time for each review step.

4. NAU thesis formatting and submission is electronic. The thesis document must be submitted to the Graduate College (etd@nau.edu) for a format check early in the semester the student plans to defend but no later than 10 business days before the defense. The last possible date to submit the document for a format check is fifteen (15) business days before the end of the semester. See the Checklist for Proper Document Format for all items that need to be addressed and submitted for format checking: (http://www2.nau.edu/gradcol/ThesesDiss/ChecklistProperDocumentFormat.pdf).

   The ETD coordinator will check the document for compliance with the format requirements outlined in the Checklist for Proper Document Format and will notify the student via NAU email regarding the results of the review and indicating any revisions that need to be made to the document.

5. Students must register for at least one credit of thesis (FOR699) for each fall and spring semester after the defense until final copies of the thesis are submitted to the Graduate College.

6. The final thesis should be submitted to the Graduate College at etd@nau.edu after

approval of any revisions required following the defense by the major professor and/or thesis committee members. The major professor will submit required documentation directly to the Graduate College upon thesis approval.

H. FINAL EXAMINATION

A final examination, or defense, of the thesis is required for all Master of Science candidates. The defense consists of two components: 1) presentation, and 2) oral examination.

1. **The presentation component is open to all students, staff, and the public.** In the presentation component the student orally presents an overview of the objectives, methods, results, and implications of the thesis research. Questions from the audience are permitted within the 60-minute maximum presentation period. Non-faculty must leave the examination following the presentation.

2. **The oral examination will start about 15 minutes after the presentation**. The examining committee must consist of at least the thesis committee. Faculty who are not on the thesis committee may attend the oral examination, but cannot vote on the student's performance. The major professor has the responsibility to ensure that the examination is conducted in a fair and appropriate manner. Questions will be limited to the thesis or general knowledge related to the thesis. Extended and detailed answers are expected from the student in response to questions. Oral examination questions should be designed to allow students to demonstrate their ability to integrate and apply information gained from coursework and the thesis research project.

    - Following the examination period (maximum time two hours) the student will be asked to leave the room, while the major professor leads a discussion of the examination. All faculty members may discuss the student's performance. However, only members of the student's thesis committee can vote whether to pass or fail the student. A passing vote by a 2/3 majority of the committee members is required to pass the defense. If a student fails the first defense, he or she will be given another opportunity to defend. The second defense should be scheduled to take place within six months of the first defense. Students will be notified immediately as to the outcome of the defense. The major professor is responsible for completing the "Final Oral Examination" form and collecting signatures. The form must be signed by all members of the thesis committee, the Graduate Coordinator, and the Executive Director of the School of Forestry.

    - Forms: "The Final Oral Examination (Thesis/Dissertation Defense) – Part 1 (Pass/Fail Form)" form is used to record and document the vote of the thesis committee. This form is available to faculty at the following Graduate College website: https://nau.edu/graduate-college/forms/.

    - To account for the thesis committee to meet privately before and after the oral

examination, a period of 3 hours should be reserved for the oral examination.

3. The following rules apply to the final oral examination:

    a. **The examination must be announced to the faculty (via memo or email) at least one week in advance**. The exam should also be announced to other appropriate departments. A copy of the thesis shall be available for inspection by all faculty **one week in advance** by putting one copy next to faculty mailboxes in the School of Forestry mailroom.

    b. The final examination is open to faculty but is closed to other graduate students. However, graduate students may attend the presentation part of the final examination.

I. RECOMMENDED TIMELINE FOR MASTER OF SCIENCE

By no later than ...	Required activity or status:
• The end of the first semester	• thesis committee formed and meets
	• Program of Study and Remedial Course Plan (as needed) developed and approved by major professor and thesis committee
• The end of the second semester of coursework	• Research proposal prepared and approved by major professor and thesis committee (FOR 690 taken)
• The end of the next to last semester of coursework	• Apply for graduation
• Beginning of final semester	• Schedule 3-hour defense
• Eight weeks before graduation	• Draft of thesis to major professor
• Three - six weeks before graduation	• Revised draft of thesis to thesis committee

• Four weeks before graduation		• Final revised draft of thesis to major professor
• Ten days before defense		• Thesis submitted to Graduate College for format review
• One week before graduation		• Final copies of thesis submitted to Graduate College
		• Final oral examination

J. CHECKLIST FOR M.S. STUDENTS

The NAU Graduate College has prepared a checklist for M.S. students in thesis programs to follow to complete degree requirements. We recommend you download and periodically review this form to ensure you are on track for graduation: https://nau.edu/graduate-college/forms/.

CHAPTER 6 - MASTER OF FORESTRY (NON-THESIS OPTION)

This 33-hour program prepares you for a career in forest management, in contrast to a career in research. It is appropriate for students who desire advanced training in forestry, but not a research focus. Master of Forestry students can qualify for the WICHE WRGP program (see https://nau.edu/graduate-college/discount-tuition-rates/) which may allow funding for certain out-of-state students to earn their degree at the rate of 150% of the cost of in-state tuition.

The Master of Forestry program involves a minimum of 30 semester hours of coursework plus three hours of credit for the professional paper, plus any remedial coursework required as part of admission, and is designed by the student in consultation with the student's major professor, whose interests complement those of the student. The student's Program of Study includes core courses, as specified below, plus a selection of courses tailored to the student's personal interests. The development of both oral and written communications skills is an integral and essential part of the program.

The Master of Forestry degree includes the preparation and presentation of a professional paper, rather than a research thesis, on a subject relating to forest management. The successful completion of academic coursework and preparation of the professional paper leads to a Master of Forestry degree.

The Graduate Coordinator will recommend to the Executive Director of the School of Forestry one member of the School of Forestry tenure-track faculty or a Research Professor working full time in the School of Forestry to serve as the student's major professor. During the admission process, the Graduate Coordinator attempts to match the student's expressed interests with those of a faculty member.

A. PROGRAM OF STUDY

By the end of the first semester of coursework the major professor, in consultation with the student, must submit an approved “Program of Study” form (https://nau.edu/graduate-college/programs-of-study/) to the Graduate College. The Program of Study outlines a planned series of coursework and academic experiences for each student. It clearly specifies required courses. The Graduate Coordinator of the School of Forestry must approve the Program of Study, including any required revisions; the Executive Director also approves the final Program of Study submitted before graduation. Once a Program of Study has been approved, a student is expected to adhere to the Program.

The Program of Study Form, approved by the major professor, the Graduate Coordinator, and the Executive Director of the School of Forestry, must be submitted to the student’s file in the office of School of Forestry, the major professor, and the Graduate Coordinator, and uploaded by the student to their LOUIE online account, no later than the end of the first semester of

coursework after the student has been fully admitted. For students required to complete Remedial courses, please see Chapter 4.

B. M.F. COURSEWORK REQUIREMENTS

The courses required for each graduate student are determined by the major professor in consultation with the student.

No remedial coursework may satisfy these requirements. . The remedial course plan (https://nau.edu/forestry/internal-resources/graduate-student-handbook/) should be completed at the same time as the program of study (POS). Only the POS is uploaded to Louie; copies of the approved remedial plan are provided to the student, advisor(s) and placed in the official student file. Conditional admission status based on fulfilling remedial course requirements will not be removed until all remedial courses have been completed (or are in progress, if the final semester).

Required Courses (6 hours):

FOR 505	Forestry Seminar Series (1)
FOR 692	Proseminar (2) (recommend taking last semester of study)
STA 570	Statistical Analysis I (3), or one, three-credit hour graduate-level course with significant content in statistics (e.g., CCJ 614, SOC 655). FOR 606 may be appropriate for students who have already completed a graduate-level course in statistics.

Core Courses (8-9 hours):

8-9 hours of core courses, with one course from each of the following subject areas: Ecosystem Science; Forest Management Sciences and Economics; and Forest Social Science. The list of courses satisfying these core areas can be found in Chapter 15, Table 1.

Courses offered as Special Studies in Forestry (FOR 506), Advanced Studies in Forestry (FOR 695), special topics courses, or other courses offered by the School of Forestry or other departments that are clearly related to the subject areas can be used as core courses with approval by the major professor.

Elective Courses (15-16 hours):

You must take 15-16 hours of electives, chosen in consultation with your major professor.

Professional Paper (3 hours):

FOR 689	Professional Paper (3) (typically taken in last semester of study)

TOTAL REQUIRED: 33 hours

The following rules for all master's degrees at NAU should be followed:

1. Each student is required to maintain a 3.0 grade-point average for all courses taken and must also maintain a 3.0 grade-point average for all courses required in the student's program.

2. Only six semester hours of graduate coursework with a grade of "C" are acceptable.

    a. A student with more than 6 units of graduate course work with a grade of "C" or below cannot continue in a master's program, regardless of GPA. Graduate students do not normally repeat courses. But, if a grade of "D" or "F" is received in a graduate course, students may repeat that course, with advisor approval. The repeated course does not replace the grade for the prior course; if a course is repeated, both grades are used in the computation of the overall grade-point average (GPA). Units earned for repeated courses may only be used once to fulfill graduation requirements.

3. No graduate credit is allowed for courses numbered 100-399.

4. With the approval of the student's major professor, up to two 400-level courses taken at NAU may be used on a master's degree program (requires filing of the "Override Authorization-Audit/Class Links/Out of Career" form, available from the Registrar's website: http://nau.edu/Registrar/Forms-and-Policies/#General).

5. You must complete at least 24 hours of formal coursework i.e., courses other than such individualized studies as independent studies, directed readings, and research.

6. Contingent on approval of the major professor, up to 25% of the credits required for the M.F. degree may be transferred to NAU from another graduate institution. Transfer courses used to meet degree requirements must be submitted to the Graduate College using the online "Petition for Transfer Credit" form: https://nau.edu/graduate-college/forms/. The Graduate College must approve all use of transfer courses to meet degree requirements. Transfer courses older than 6 years must be approved by the Graduate College using the "Petition for Extension of Time Limit" form for Master's students available at: https://nau.edu/graduate-college/forms/.

7. Graduate students working on a professional paper are expected to enroll in FOR 689 (Professional Paper) each semester from the semester of first enrollment in FOR 689 until completion of the degree. Most students will enroll in three credits of FOR 689 in their last semester. A maximum of 4 credits total is allowed for FOR689. Failure to complete FOR 689 in that semester requires enrollment for at least one credit in the next semester. If you do not maintain continuous enrollment after you have begun work on your professional paper and you do not have an approved leave of absence on file

with the Graduate College and wish to resume work, you must submit a new application for admission and register for additional credits of Professional Paper (FOR 689) in an amount equal to the number of such credits missed while not maintaining continuous enrollment.

8. Read and follow the guidelines and procedures for NAU master's programs described by the Graduate College at: https://nau.edu/graduate-college/thesis-and-dissertation/.

C. COURSE LOADS

For graduate students, 9 credit hours during fall and spring semesters are considered to be full-time enrollment. The minimum full-time course load is 9 credit hours during fall or spring semester, and 16 hours is the maximum (12 hours for graduate assistants).

D. THE PROFESSIONAL PAPER

Each student will prepare a professional paper (FOR 689 Professional Paper) under the guidance of the major professor. The professional paper will serve as a capstone exercise that will help students integrate knowledge and information from courses and other information to produce new insights on forest management. The professional paper will serve as the written comprehensive exam required under the "Comprehensive Examination Plan" for master's degrees at NAU.

1. REQUIREMENTS OF THE PROFESSIONAL PAPER

a. The final product must be a manuscript of length appropriate for submission to a professional journal, and judged by the major professor and the graders of the paper to represent "publishable quality" with respect to a relevant refereed journal. Actual publication, with the major professor as co-author as appropriate, is encouraged but not required. The paper should include a title page that includes the names of the author and the graders of the paper, and the year that the paper was completed.

b. The paper should have a forest management orientation. It may address a specific forest management problem, or it might have a more philosophical or theoretical orientation. Examples of professional paper topics include the following:

- an article describing the forest management philosophy and practices of Native Americans;

- a literature review relating to specific forest management policies or activities of an agency such as the USDA Forest Service;

- an analysis of the potential application of forest management principles to community forestry in the tropics;

- a paper describing the utility of technology such as an electronic spreadsheet or geographical information system for solving forest management problems;

- an analysis of potential local, regional, national, or international economic impacts associated with forest management as compared to commodity-oriented management;

- an analysis of a complex local, regional, national, or international natural resources problem that has implications for forest management;

- a compilation of background material that might form the basis for a research proposal relating to forest management;

- results of pilot studies or establishment of research methodologies for future analysis.

c. The paper should have a distinct section that demonstrates the author's competency in the following learning outcome of the Master of Forestry: "An understanding of professional ethics, particularly the ability to examine how ethical issues frame decisions concerning the management of forested land." To do this, the section should first articulate the author's professional code of ethics, including their foundations and sources (e.g., professional societies, philosophy, religion). Second, the section should interpret the paper's recommendations and conclusions in the context of the author's professional ethics.

2. IDENTIFYING THE TOPIC FOR THE PROFESSIONAL PAPER

The student and the major professor will jointly identify a topic to be used for the student's professional paper. The subject of the professional paper may be suggested by either the student or the major professor, but must be agreed upon by both. The student should consult the major professor regularly during the preparation of the professional paper.

3. COMPLETING THE PROFESSIONAL PAPER

Prior to the student's last semester, the major professor, in collaboration with the student, will recruit at least two other faculty or resource professionals to serve as graders of the professional paper.

a. At least one grader must be faculty in the School of Forestry, and at least two graders must be faculty or adjunct faculty at NAU. If desired, one grader may be a non-faculty professional working in forestry or a related discipline.
b. The graders, including the major professor, will critique and approve an outline and scope of the professional paper within the first two weeks of the student's enrollment in FOR 689, and review and approve the paper, which is due the last

day of class in the semester of student enrollment in FOR 689. If the student is co-advised, then only one additional reader is needed.

c. A 2/3 vote of approval on a pass/fail basis by the grading committee is required for the student to pass FOR 689. The major professor will complete the form "Non-Thesis Master's Degree, Report on Final Oral Examination," available from the Graduate College at https://nau.edu/graduate-college/wp-content/uploads/sites/14/Report_FinalOralExam_NonThesis.pdf and will submit a fully signed copy to the School of Forestry.

d. The student must submit an electronic copy of the professional paper to the School of Forestry by emailing it to ForestryGraduateStudies@nau.edu. On the Graduate Application Form (http://nau.edu/GradCol/Student-Resources/Graduation/), check the 'No' box for oral and written defense required.

4. PRESENTING THE PROFESSIONAL PAPER

A final presentation of the professional paper is required of all Master of Forestry students. The presentation is open to all students, staff, and the public.

a. In the presentation the student will present an overview of their professional paper (approximately 40-45 minutes) and allow 15-20 minutes for questions from the audience.
b. The professional paper should be presented no later than the last day of classes during an academic semester.
c. One copy of the professional paper should be provided to the readers and placed in the School of Forestry mailroom at least one week before the final presentation to allow review by faculty, staff, and other students.
d. There is no Oral Exam/Defense required for this degree.
e. A PDF file of the final approved copy of the MF paper will be submitted to the Graduate Coordinator of the School of Forestry. The paper will be archived on the School of Forestry website.

E. MASTER OF FORESTRY, ACCELERATED BACHELOR'S/MASTER'S OPTION

The objective of the accelerated program is to facilitate faster completion of the Master of Forestry degree by outstanding and highly motivated students in the Bachelor of Science in forestry at NAU. Accelerated programs provide the opportunity for outstanding undergraduates working on their bachelor's degree to simultaneously begin work on a master's degree, which may allow them to complete both degrees in an accelerated manner:

- 12 units may be applied toward both degrees (6 units 400-level, 6 units 500- or 600-level; all 12 units must be FOR courses or courses used in an emphasis area in the bachelor's degree in forestry).
- Students must apply to the Accelerated Bachelor's/Master's Program during the third semester of professional program coursework, by the fall application deadline,

and meet all requirements to be considered for admission.

1. Students in the Bachelor of Science, Forestry Program at NAU must meet the following requirements for acceptance into the Accelerated Bachelor's/Master's Option of the Master of Forestry:
    a) 3.25 GPA overall college and university courses
    b) 3.5 or higher GPA in the following FOR required courses: FOR 211, FOR 213, FOR 215, FOR 313, FOR 314, FOR 315, FOR 319.
    c) Enrolled in the Bachelor's of Science, Forestry Program at NAU

F. SUMMARY OF IMPORTANT DEADLINES FOR THE MASTER OF FORESTRY

By no later than ...		Required activity or status:
• The end of the first semester		• Program of Study and Remedial Course Plan (as needed) developed and approved by major professor • the general topic the student will address in the professional paper.
• The end of the second semester of coursework • Beginning of the final semester of coursework		• Apply for graduation • Graders are arranged for the professional paper, FOR 689
• Four-Six weeks before the end of the semester		• Student submits a draft of the professional paper to the major professor.
• Two weeks before the professional paper presentation		• major professor sends the revised draft of the professional paper to grading committee.
• Before the last day of classes		• Professional paper presentation.

CHAPTER 7 - DOCTOR OF PHILOSOPHY IN FORESTRY

A. DOCTOR OF PHILOSOPHY DEGREE

The Doctor of Philosophy (Ph.D.) degree is the terminal degree offered in the profession of forestry. Students with the Ph.D. degree normally pursue a career in research and/or education. Ph.D. students are expected to demonstrate skill in the generation of original ideas, command of the literature, skill at designing, analyzing, and interpreting research, skill in scientific writing including the publication of research results in major professional refereed journals, and basic skills in teaching. Ph.D. students are expected to be self-motivated and largely direct their own research program with advice and counsel from the major professor and dissertation committee. The Ph.D. is a research degree that should be evaluated based on the originality and quality of the new knowledge generated.

The School of Forestry offers four Ph.D. emphasis areas: Ecosystem Science, Forest Management Sciences and Economics, Forest Social Science, and Ecology, Evolution and Conservation Biology (EECB). The EECB emphasis is available as a secondary emphasis for interested students and partially met through the elective coursework requirement.

B. DISSERTATION COMMITTEE ESTABLISHMENT

The Graduate Coordinator will recommend to the Executive Director of the School of Forestry one member of the School of Forestry tenure-track faculty, or a Research Professor working full time in the School of Forestry, to serve as the student's major professor.

1. The major professor, in conjunction with the student, will recommend members of the dissertation committee to the Graduate Coordinator using the form available at http://www2.nau.edu/gradcol/ThesesDiss/Dissertation_Committee_Rec.docx.

2. The dissertation committee should be formed by the end of the student's second semester in the doctoral program.

3. Remedial course requirements should be documented by the "Remedial Course Plan" form (available in the appendix of this document).

4. Dissertation committees include at least four members who have earned doctorate degrees and have expertise relevant to the dissertation. In rare circumstances and with approval from the Graduate College, a committee member with a master's degree and relevant expertise unique to the project may be considered.

5. In addition to the major professor, at least one member of the dissertation committee must be faculty, adjunct faculty, or research faculty in the School of Forestry.

6. Dissertation committees must include a member who is outside the School of Forestry. This outside-department member of the committee may be faculty, adjunct faculty, or research faculty at NAU or at other colleges and universities, but also may include non-university scientists and specialists, such as researchers with governmental agencies or non-governmental organizations.

7. Additional members of the dissertation committee typically are faculty, adjunct faculty, or research faculty at NAU or at other colleges and universities, but also may include non-university scientists and specialists, such as researchers with governmental agencies or non-governmental organizations.

8. Participation on a dissertation committee by a person who is not faculty, adjunct faculty, or research faculty at NAU must be approved by the Graduate College using the "Recommendation of Dissertation Committee" form available at http://nau.edu/GradCol/Student-Resources/Theses-and-Dissertations/, which requires attachment of the committee member's vita.

9. Adjunct faculty may serve as members of the dissertation committee, but not as the major professor.

10. The student's major professor is responsible for submitting to the Graduate College the "Recommendation of Dissertation Committee" form available at http://nau.edu/GradCol/Student-Resources/Theses-and-Dissertations/.

11. Once a dissertation committee has been established, faculty who retire may continue to serve on the dissertation committee. The dissertation committee shall be established within the first semester that a student begins coursework.

12. The dissertation committee's assessment of the student's progress towards meeting degree requirements will be summarized on the "Ph.D. Student Progress Evaluation" form (available in the appendix of this document or at http://nau.edu/GradCol/Student-Resources/Theses-and-Dissertations/), which shall be completed each year. Copies of the form shall be given to the student and placed in the student's departmental file.

C. Ph.D. COURSEWORK – GENERAL RULES

The major professor and the dissertation committee in consultation with the student shall determine the required courses.

The following rules should be considered:

1. All graduate students must maintain a GPA of 3.0 or higher. Only six hours of grade "C" are acceptable in the Ph.D. degree program. The student must receive a "B" or better in the fifteen credit hours selected in the emphasis area. A student with more

than 6 units of graduate course work with a grade of "C" or below cannot continue in a Ph.D. program, regardless of GPA. Graduate students do not normally repeat courses. But, if a grade of "D" or "F" is received in a graduate course, students may repeat that course, with advisor approval. The repeated course does not replace the grade for the prior course; if a course is repeated, both grades are used in the computation of the overall grade-point average (GPA). Units earned for repeated courses may only be used once to fulfill graduation requirements.

2. No graduate credit is allowed for courses numbered 100-399.

3. Up to nine hours of 400- level courses from NAU may be used on a Ph.D. degree program with the approval of the dissertation committee (requires filing of the "Override Authorization-Audit/Class Links/Out of Career" form, available from the Registrar's website: http://nau.edu/Registrar/Forms-and-Policies/).

4. The maximum graduate course load is 16 hours/semester. Graduate research assistants may take only 12 hours/semester. The minimum course load for full-time graduate students is nine hours/semester. Graduate assistants must be full-time graduate students (9-12 hours/semester) except as noted under the credit load section.

5. Graduate students working on a dissertation are expected to enroll in FOR 799 (Dissertation) each semester from the semester of first enrollment in FOR 799 until completion of the degree.

    a) You must register in FOR 799 for a minimum of one credit each fall and spring semester. If you are using research or other university facilities, and/or the professional time of faculty members, you should enroll for at least three credits.

    b) During the term you complete and defend your dissertation, you must enroll for at least one credit.
    c) If you do not maintain continuous enrollment after you have begun work on your dissertation and you do not have an approved leave of absence on file with the Graduate College and wish to resume work, you must submit a new application for admission and register for additional credits of Dissertation (FOR 799) in an amount equal to the number of such credits missed while not maintaining continuous enrollment.

6. Contingent on approval of the major professor and dissertation committee, any number of the credits required for the Ph.D. degree may be transferred to NAU from another institution.

    a) A maximum of 24 credit hours of graduate-level coursework completed during a master's degree can be used to meet degree requirements.

b) Students must take at least two of the five emphasis area courses at NAU (see below), and obtain approval from the dissertation committee for any courses taken elsewhere.

c) Transfer courses used to meet degree requirements must be submitted to the Graduate College using the online "Petition for Transfer Credit" form: https://nau.edu/graduate-college/forms/. The Graduate College must approve all use of transfer courses to meet degree requirements.

d) Transfer courses older than 6 years must be approved by the Graduate College using the "Petition for Extension of Time Limit" form for doctoral students available at: http://nau.edu/GradCol/Policies-and-Forms/Forms/.

7. A graduate student may not repeat a course and have the second grade substituted for the first grade. A graduate student may repeat a course, but both grades are used in computing the grade-point average.

8. Read and follow the guidelines and procedures for NAU doctoral programs described by the Graduate College at: http://nau.edu/GradCol/Student-Resources/.

   a) **The 'Checklist for Doctoral Students Dissertation Programs' should be reviewed and utilized on a regular basis.**

D. Ph.D. COURSEWORK – REQUIREMENTS

A total of 63 credits are required for the Ph.D. degree as outlined below:

1. A minimum of 15 dissertation credit hours is required.

2. A minimum of 48 credit hours of coursework (beyond the bachelor's degree) that includes:

   a) A minimum of 39 credit hours of 500-600 level courses;

   b) A maximum of nine credit hours of 400-level courses, subject to committee approval;

   c) A maximum of 24 credit hours of coursework completed during a master's degree, which may be credited to the 48 credit hour requirement.

   d) No remedial coursework or dissertation hours (FOR 799) may satisfy the 48 credit hour requirement. . The remedial course plan (https://nau.edu/forestry/internal-resources/graduate-student-handbook/)

should be completed at the same time as the program of study (POS). Only the POS is uploaded to Louie; copies of the approved remedial plan are provided to the student, advisor(s) and placed in the official student file. Conditional admission status based on fulfilling remedial course requirements will not be removed until all remedial courses have been completed (or are in progress, if the final semester).

3. All doctoral students must take the following 14 hours:

    a) FOR 505 Forestry Seminar Series (1 hour): Students must take FOR 505 at least at once during their degree program. The course may be taken up to five times during the degree program.

    b) FOR 690 Research Methods (3 hours), or another graduate-level course with three-credit-hours of content in defining, organizing, conducting, and evaluating scientific research, the philosophy of science, and the preparation and review of research proposals.

    c) FOR 692 Proseminar I (2 hours)
        i. Doctoral students (not M.S. or M.F. students) may earn credit for FOR 692 based on demonstration of proficiency in preparing and presenting scientific talks and posters. This way of earning credit for Proseminar requires course registration in FOR 692.
            1. Proficiency will be shown within the first year of enrollment by presentation of a departmental seminar based on previous or current research, and a public presentation of a poster, based on previous research, in the Forestry Building. The seminar and poster will be evaluated by the student's major professor and FOR 692 instructors to assess whether the presentations meet requirements for passing FOR 692. If the requirements are not met, the student must re-enroll in FOR 692 and complete all course requirements.
        ii. Graduate-level courses transferred from other universities or taken at NAU with two credit hours of content in the preparation and presentation of scientific talks and posters may be used to meet the requirement for FOR 692, contingent on approval by the dissertation committee and Graduate Coordinator.

    d) FOR 693 Teaching Practicum (2 hours)

    e) Six hours of graduate-level (500-, 600-, 700-) courses with significant content in statistics. Examples include:
        - FOR 606 Applied Ecological Data Analysis (3)

- STA 570 Statistical Methods I (3)
- STA 571 Statistical Methods II (3)
- STA 572 Multivariate Statistical Methods (3)
- STA 574 Categorical Data Analysis (3)
- STA 676 Experimental Design (3)
- CCJ 614 Research Statistics (3) OR SOC 655 Quantitative Analysis (3)
- BIO 682 Quantitative Biology (3)
- Other graduate-level courses with significant content in statistics.

Note that STA 570 is a prerequisite for all other 500-level STA courses.

4. You must also take 15 hours in your emphasis. Students must take at least two of these courses at NAU and obtain approval from the dissertation committee for any courses taken elsewhere.

    a) Courses offered as Special Studies in Forestry (FOR 506, 599), Advanced Studies in Forestry (FOR 695), or special topics courses offered by other departments can be used to fulfill emphasis requirements, with approval by the dissertation committee. When faculty offer a FOR 506, 599, or 695 course, they should work with the Graduate Coordinator to determine the appropriate emphasis area the course satisfies.

5. You must also take 19 hours of electives.

    a) The elective coursework requirement can be partially met (13 of the required 19 hours) by completing the Ecology, Evolution, and Conservation Biology (EECB) Emphasis, which requires completion of 3 credit hours of BIO 577/FOR 577 (Concepts in Ecology), 1 credit hour of a seminar course (FOR 505 or BIO 698), and 9 credit hours of graduate-level courses selected from each of the following groups: quantitative, physiological/population/community, and ecosystem/global.
        i. Courses available for these groups are listed in Chapter 15, Table 1, and the NAU catalog description for the degree.

E. PROGRAM OF STUDY

By the end of the first semester of coursework the major professor, in consultation with the dissertation committee and the student, must submit an approved Program of Study Form (https://nau.edu/graduate-college/programs-of-study/). The dissertation committee, Graduate Coordinator, and Executive Director of the School of Forestry must approve the Program of Study, including any required revisions. Once a Program of Study has been approved, a student is expected to adhere to the Program.

The Program of Study Form, including any revised Programs of Study, must be copied to the Graduate Coordinator, the graduate student's file in the School of Forestry office, the major

professor, all members of the student's dissertation committee, and the Graduate College.

F. COURSE LOADS

Nine credit hours during each of the fall and spring semesters are considered to be the minimum course load for full-time enrollment for graduate students. Sixteen hours per semester is the maximum (12 hours for graduate assistants).

After completion of all required course work except dissertation, a resident doctoral student on half-time assistantship may petition to register for six credit hours a semester. Such a petition should be approved by the Graduate College and be endorsed by the student's major professor and the Executive Director of the School of Forestry.

G. SEMINAR REQUIREMENTS

1. All Ph.D. students must attend the School of Forestry seminar series, unless course or research schedules interfere.
2. In addition, all Ph.D. students are required to present two seminars: 1) presentation of final research results in a dissertation defense seminar; and 2) presentation of a talk or poster at a local, state, regional, or national meeting (e.g., Society of American Foresters, Ecological Society of America, Wildlife Society, American Water Resources Association, or other professional organizations).

    a) The second seminar must be presented outside the School seminar series and is subject to approval by the student's major professor.

H. RESEARCH COMPETENCY REQUIREMENT

NAU policy for Ph.D. programs includes a "research competency requirement" that must be satisfied before a student can be admitted to candidacy. In the School of Forestry, FOR690 (Research Methods) plus two graduate-level courses (six hours) with significant content in statistics, meet this requirement.

I. RESEARCH REQUIREMENTS

The Ph.D. degree requires a demonstration of considerable independence, research skill, and experience in a discipline within forestry.

1. Development of techniques, design of experiments, collection and analysis of data, reporting results in written and oral forms, and preparation of research proposals are skills that should be mastered in this degree program.

2. The choice of a problem and research area is made in consultation with the dissertation committee.

3. Dissertation research meets School of Forestry standards when it poses a set of objectives which: 1) are based in the theoretical context of the subject, 2) proceed

with a sound design that gives due attention to statistical adequacy, and 3) concludes with findings and inferences that once again are set forth in an appropriate theoretical context.

4. The dissertation must demonstrate that the student has mastered their field of specialization, has carried out independent scholarly work, and has contributed significant new knowledge.

5. The student must prepare a research prospectus that outlines the general research area and identifies the research questions to be answered in their research. The proposal / prospectus should include a working title for the thesis, a statement of research questions or objectives, a literature review related to the research topic, and a brief summary of the proposed research methods or approach.
   a) The research prospectus is generally 5-10 pages in length and must be approved by the dissertation committee. A copy is placed in the School file, and a copy is included as part of the "Dissertation Committee Recommendation" form (http://nau.edu/GradCol/Student-Resources/Theses-and-Dissertations/).

J. COMPREHENSIVE EXAMINATIONS

The goal of the comprehensive examinations is to ensure that every Ph.D. student has a rigorously-demonstrated competence in a breadth and depth of subjects within the larger field of forestry. In addition, students must demonstrate both written and oral communication skills in English at a level that will allow them to effectively communicate their ideas and knowledge to a wide range of audiences.

In general, comprehensive examinations take place after the student has met all coursework requirements, as directed by the student's Program of Study. Comprehensive examinations must occur no later than one semester before graduation; ideally, students complete them in the third year.

COMPREHENSIVE WRITTEN EXAMINATION

Each student must successfully complete a written comprehensive examination. This examination is separate from the student's coursework requirements. **With the approval of the dissertation committee, the student may choose among 3 options for the format of the written examination.**

Option 1: Timed, written response to questions: The examination will consist of a line of questioning prepared by each member of the student's dissertation committee, subject to the review and approval of the student's major professor. A line of questioning may include one or more questions. A student will have a maximum of eight hours to prepare a response to the line of questioning provided by each member of the dissertation committee (i.e., 8 hours for each committee member's line of questioning). The exact format for preparing responses for a line of questioning is at the discretion of the faculty member preparing the line of questioning, with the approval of the major professor.

General schedule and responsibilities:

• The choice of the written exam format is made jointly by the student and the committee. At any time after the dissertation committee is formed, the student may propose their preferred written exam option to the committee, solicit feedback, and obtain committee approval of the choice.

• Student works with major professor and Dissertation Committee to determine a week to complete the written comprehensive examination.

• Student and major professor determine which weekdays the written questions will be disseminated, start and end time each day, daily order of dissertation committee questions and whether a lunch break will be included.

    i. Example schedule: Day 1: 8:00am – 4:30pm (30-minute lunch break included); committee member 1 questions Day 2: same, but committee member 2 questions, etc.

• Major professor is responsible for disseminating and collecting questions at the beginning and end of each day and passing each question along to the appropriate committee member for grading.

The major professor must read and evaluate all responses. Only the committee member responsible for a particular line of questioning is required to read and evaluate the response to that line, although all committee members are encouraged to read all responses. Any member of the Dissertation Committee may request to review the questions and responses of the student. The author of each line of questioning, along with the major professor, will determine the adequacy of the response to each question, both for its subject matter content and its organization and overall quality as a written document. In the event of a disagreement between the committee members, the vote of the entire committee will determine the adequacy of the response. The student responses to written questions and faculty evaluations of those responses shall become an official part of the student's file. A student may either pass or fail the examination. A student passes the examination by preparing adequate responses to 3/4 of the lines of questioning. Upon passing the written examination the student becomes immediately eligible for the oral comprehensive examination. Failure results when the committee feels that the student has not prepared adequate responses to a majority of the lines of questioning. In this case, the student can retake the failed portions of the examination. New lines of questioning may be substituted for those in the original examination. Students are not required to retake those portions of the examination where responses were judged adequate.

Option 2: Publication-quality literature review paper: The examination will consist of the preparation of a publication-quality literature review paper. Students would select a topic within their field of study, or another topic within the field of forestry to develop a comprehensive review paper that synthesizes the state of knowledge. The literature review will be judged by the committee as to whether it is of sufficient quality to be publishable, using their professional judgement. The best reviews will be those that develop novel synthetic insights or new directions for the field. The review should be distinct from other published reviews.

General schedule and responsibilities:

• The choice of the written exam format is made jointly by the student and the committee. At any time after the dissertation committee is formed, the student may propose their preferred written exam option to the committee, solicit feedback, and obtain committee approval of the choice.

• Student may begin development and writing at any point in their program after the selection of the literature review option. The major professor will, and committee members may, provide feedback on drafts, but the student remains the sole author at least until the exam is passed.

• Student and major professor, in consultation with the committee, determine a date for the review to be disseminated to committee members for assessment.

• Upon receipt, major professor and other committee members have 14 days to read and assess the review, determining if it is of publication quality in their professional opinion (this equals a "pass" vote), and if not, providing constructive critique to the student that would elevate the review to that standard.

• If appropriate, a version of this review may later be included as part of the dissertation (e.g., as the introductory chapter), but cannot replace a chapter derived from the dissertation research. The dissertation must be satisfactory with or without this review.

A student passes the examination when at least 3/4 of the committee members vote "pass", indicating that the review is of publication quality. Upon passing the written examination the student becomes immediately eligible for the oral comprehensive examination. Failure results when two or more committee members feel that the student has not prepared a publication quality review. In this case, the student can resubmit one revision of the literature review to those committee members, taking into account their constructive criticism, on a mutually agreed date after which those committee members would have 14 days to reassess and communicate their decision to the major professor.

Option 3: Original grant proposal: The examination will consist of the preparation of an original research proposal on a topic within the student's field of study, or another topic within the field of forestry. The proposal must identify significant knowledge gaps and propose an approach to fill the knowledge gap with original research. The grant proposal will be judged by the committee as to whether it is of sufficient quality to be competitive for funding, using their professional judgement. The proposal should reflect a **new idea attributable to the student**, rather than the student's advisor. Students would be encouraged to develop proposals oriented toward dissertation improvement - going beyond the student's original dissertation plan - or potential post-doctoral research.

General schedule and responsibilities:

• The choice of the written exam format is made jointly by the student and the committee. At any time after the dissertation committee is formed, the student may propose their preferred written exam option to the committee, solicit feedback, and obtain committee approval of the choice.

• Student may begin development and writing at any point in their program after the selection of the proposal option. Student and major professor choose an appropriate format for the proposal, based on one used by a funding agency. The major professor will, and committee members may, provide feedback on drafts, but the student remains the sole author at least until the exam is passed.

• Student and major professor, in consultation with the committee, determine a date for the proposal to be disseminated to committee members for assessment.

• Upon receipt, major professor and other committee members have 14 days to read and assess the proposal, determining if it is of sufficient quality to be competitive in their professional opinion (this

equals a “pass” vote), and if not, providing constructive critique to the student that would elevate the proposal to that standard.

A student passes the examination when at least 3/4 of the committee members vote “pass”, indicating that the proposal is of sufficient quality to be competitive for funding. Upon passing the written examination the student becomes immediately eligible for the oral comprehensive examination. Failure results when two or more committee members feel that the student has not prepared a competitive proposal. In this case, the student can resubmit one revision of the proposal to those committee members, taking into account their constructive criticism, on a mutually agreed date after which those committee members would have 14 days to reassess and communicate their decision to the major professor.

Regardless of the option, a student has only one opportunity to retake/resubmit any or all portions of the written examination. If the student fails the second written examination, the student will be immediately dropped from the Ph.D. program. The student may reapply for admission after one year (two semesters). Readmission will be subject to the same requirements as specified for those students applying to the program at the time the application is made. The major professor must inform the student of the outcome of the written examination within 14 days of the time the last examination responses were received from the student. Results of the written examination must be reported to the Graduate College on the "Report of Results of 39 Written Comprehensive Examination" form (Appendix, or http://nau.edu/CEFNS/Forestry/Student-Resources/Graduate-Handbook/).

2. COMPREHENSIVE ORAL EXAMINATION The comprehensive oral examination can only be scheduled after the successful completion of the written examination. A minimum of 2 weeks should be planned between the written and oral comprehensive examinations. All dissertation committee members must attend the oral examination. The examination should focus on a mixture of subjects within the student’s subfield(s), and other topics within or related to the broader field of forestry and agreed upon by the committee. The examination may include a presentation by the student on the student’s research plan and preliminary results. Generally, the oral examination should continue for two hours. At the end of the discussions, the student will be asked to leave the room so that the members of the dissertation committee can discuss the student's performance. The major professor must inform the student as to the committee's decision within one hour of the examination's completion. Students either pass or fail the oral examination. A vote of 3/4 of the dissertation committee is required to pass the student. If passed, this qualifies the student for candidacy provided all other candidacy requirements have been successfully completed. The major professor must provide to a student failing the oral examination the reasons for the adverse decision.

• A student failing the oral examination must retake the examination within 60 days.

• A student failing the oral examination a second time will be immediately dropped from the Ph.D. program.

• The student may reapply for admission after one year (two semesters).

• Readmission will be subject to the same requirements as specified for those students applying to the program at the time the application is made. The results of the oral examination must be reported to

the Graduate College on the "Report of Results of Oral Comprehensive Examination" form (Appendix, or http://nau.edu/CEFNS/Forestry/Student-Resources/Graduate-Handbook/)

K. ADMISSION TO CANDIDACY

A student must apply for candidacy on the form "Application for Candidacy for the Doctoral Degree" (http://nau.edu/GradCol/Student-Resources/Theses-and-Dissertations/). The application is approved by the major professor, the Executive Director of the School of Forestry, and the Dean of the Graduate College.

Admission to candidacy should be obtained during the semester before graduation and must be granted at least 90 days before the Dissertation Defense Examination.

Application for Candidacy of the Doctoral Degree Checklist

1. Submit the Recommendation of Dissertation Committee paperwork with a 2-3 paragraph summary of your dissertation. This form can be found on the Graduate College webpage at http://nau.edu/GradCol/Student-Resources/Theses-and-Dissertations/.

2. Submit the Report on Results of Written Comprehensive Examination and Report on Results of Oral Comprehensive Examination after you have completed your comprehensive exams. These forms can be found on the School of Forestry webpage at http://nau.edu/CEFNS/Forestry/Student-Resources/Graduate-Handbook/.

3. Submit your dissertation prospectus. Your prospectus consists of the following two items:
    a) A 5-10 page research prospectus which has been approved by your dissertation committee.
    b) A copy of your prospectus title page that has been signed by your committee.

4. Complete and submit your candidacy application. This application is located at http://nau.edu/GradCol/Student-Resources/Theses-and-Dissertations. Make sure you can answer 'yes' to the following questions before submitting your candidacy paperwork:
    a) Have you completed all your coursework except for dissertation credits?
    b) Have you met the research competency requirement (completed FOR 690 and two courses (six hours) with a significant content in statistics)?
    c) Have you met the residency requirements (residency is defined as carrying a minimum load of nine credit hours of committee-approved courses during a semester or five approved hours during a summer session)?
    d) Is your Program of Study current? If your coursework has changed, you will also need to submit an updated Program of Study with your candidacy application.

All paperwork should be turned in to the School of Forestry once you have obtained the necessary signatures. The School of Forestry Office will then distribute copies of your paperwork and ensure that a copy goes in our files and the Graduate College's files.

L. DISSERTATION REQUIREMENTS

The School of Forestry has adopted Manuscript Dissertations: a series of manuscripts either submitted, or prepared for submission, to professional refereed journals, with additional introductory and concluding chapters in the Graduate College-approved format.
Detailed format requirements are specified by the Graduate College at the following webpage: http://nau.edu/GradCol/Student-Resources/Theses-and-Dissertations/. The student is expected to conform to the style of presentation currently accepted by the Graduate College in preparing all drafts of a dissertation.

a.

Manuscript Dissertations

Dissertations in manuscript format include several distinct manuscript chapters. The intent of the manuscript chapter format is to facilitate the preparation of manuscripts for submission to professional journals while completing the dissertation requirement. There may be slight variations in style between manuscripts reflecting different journal requirements. The non-manuscript portion of the dissertation should have consistent style. Students are advised to review the format guidelines (see link above) well in advance of preparing their dissertation.

1. Requirements of a manuscript dissertation:

    a) An introduction to the entire dissertation (including a literature review if appropriate), and then is divided into chapters or manuscripts.
    b) Each chapter generally has a title, abstract, introduction, materials and methods, results, discussion, and literature cited section.
    c) The dissertation should have an overall preface that explains the structure and organization of the dissertation.
    d) Following the individual manuscript chapter(s) there is an overall summary of the entire dissertation project, including management implications.
    e) Some redundancy may exist in the dissertation to maintain integrity of the individual manuscripts, but this should be kept to a minimum.
    f) A dissertation will generally include at least 3 manuscript chapters, for a total of 5 chapters (introduction, 3 data-driven manuscript chapters, management implications). In special cases, with the approval of the dissertation chair and committee, fewer chapters will be considered acceptable (e.g., the student is preparing a monograph, rather than multiple journal articles).

Guidelines for completing the dissertation:

1. The first draft of the dissertation must be reviewed by the major professor, revised by the student, and approved again by the major professor before distribution to the dissertation committee. This initial review should be made well in advance of the dissertation defense examination and often requires several cycles (minimum of eight weeks). At this time students should submit their dissertation to the Graduate College for format review. Committee members must be given the opportunity to review the manuscripts prior to submissionfor publication when this occurs prior to the defense date.

2. The revised dissertation should be submitted to the dissertation committee at least four weeks before dissertation defense examination. Committee members must provide feedback on the dissertation within two weeks if their changes are to be incorporated into the final draft of the dissertation. The major professor has responsibility to ensure recommendations of the committee are incorporated into the revised dissertation.

3. The dissertation in final draft form, including all figures, tables, and references, must be provided to the Graduate College at least two weeks before the date of the dissertation defense exam.

4. Students should be aware that this is the minimum acceptable time for each review step. The Graduate College estimates the average time required to complete the dissertation is three months following approval of the format by the Graduate College. Consequently, students are advised to arrange their first format review with the Graduate College Format Editor in the first two weeks of the semester they plan to complete the thesis.

5. NAU dissertation formatting and submission is electronic. The dissertation document must be submitted to the Graduate College for a format check early in the semester the student plans to defend but no later than ten business days before the defense. See the Checklist for Proper Document Format for all items that need to be addressed before submission. Also helpful might be the Thesis Title Page Model or the Dissertation Title Page Model. Visit http://nau.edu/GradCol/Student-Resources/Theses-and-Dissertations/ for more information.

6. Submit an electronic copy of the following items to the Graduate College ETD coordinator (etd@nau.edu) for format review:

   a. Title Page
   b. Abstract
   c. Dissertation (completed document)

   The ETD coordinator will check the document for compliance with the format

requirements outlined in the Checklist for Proper Document Format and will notify the student via NAU email regarding the results of the review and indicating any revisions that need to be made to the document.

7. Students must register for at least one credit of dissertation (FOR799) for each semester after the defense until final copies of the dissertation are submitted to the Graduate College, including summer semester.

M. DISSERTATION DEFENSE

A defense of the dissertation is required for all Ph.D. candidates.

Defense requirements and guidelines:

1. The dissertation defense shall be held within four years of the oral comprehensive exam. If this time is longer than four years, the oral exam must be repeated.

2. The dissertation defense must occur no sooner than 90 days following admission to candidacy.

3. The defense should be scheduled at least four weeks before the expected date of graduation.

4. The student must complete the "Dissertation Defense Scheduling" form on the Graduate School webpage (http://nau.edu/GradCol/Student-Resources/Theses-and-Dissertations/) and send it to the Graduate College to schedule the defense, *at least 10 business days before the defense.*

5. The defense will be scheduled immediately following the dissertation defense seminar. The dissertation defense seminar is open to the public.

6. The length of the dissertation defense seminar will be limited to 60 minutes, including questions from the audience.

7. The dissertation defense will convene within 20 minutes following the seminar.

8. The defense is restricted to faculty and, at the minimum, must include the entire dissertation committee and an observer from outside the School of Forestry, appointed by the Graduate College. The observer reports to the Graduate College on the conduct of the exam and may ask questions, but does not vote. Only dissertation committee members can vote on the student's performance in the defense.

9. The maximum time for the dissertation defense (following the seminar) is two hours.

10. At least four weeks of notice of the defense should be provided to all dissertation

committee members.

11. All committee members also should be provided a copy of the dissertation for review at least four weeks before the defense.

12. The dissertation must be in final form before the defense. It is the major professor's responsibility to determine when the dissertation is ready to be defended. However, the committee can delay the defense if the dissertation is judged to be inadequate.

13. The major professor has the responsibility to ensure that the defense is conducted in a fair and appropriate manner. Questions will be asked by each member of the dissertation committee and by other faculty in attendance upon approval of the major professor. Questions will be limited to the dissertation or knowledge related to the dissertation. Defense questions should be designed to allow the student to demonstrate ability in interpreting the results of the dissertation research and in discussing the results in relation to current scientific understanding.

14. Following the defense, the student will be asked to leave the room, while the major professor leads a discussion of the examination. A passing vote by a 3/4 majority of the committee members is required to pass the defense.
    a) If a student fails their first defense, they will be given another opportunity to defend. The second defense must be scheduled to take place within six months of the first defense.

15. Students will be notified immediately as to the outcome of the defense.

16. **Forms:** The University Graduate Committee representative provides the “Final Oral Examination (Thesis/Dissertation Defense) – Part 1 (Pass/Fail)” form on which the vote is recorded and which the committee members sign.

N. STUDENT TEACHING REQUIREMENT

All Ph.D. students benefit by gaining teaching experience. Teaching skills are important for Ph.D. students and provide valuable experience needed in the highly competitive job market. For this reason, the School of Forestry requires all Ph.D. students, regardless of the type of financial support, to have some teaching experience. However, the teaching expectation in the School of Forestry may vary depending on financial support, the year of residence, and competency in teaching.

All Ph.D. students are required to participate in the teaching of an established course in order to gain teaching experience. Such participation will include preparing a minimum of four lectures, delivering them in the presence of a faculty instructor, and developing test questions based on the material presented in class. The dissertation committee must approve the proposed teaching experience. All teaching by Ph.D. students must be evaluated by the student's major professor or course instructor using the “Ph.D. Student Teaching Evaluation”

form (Appendix, or http://nau.edu/CEFNS/Forestry/Student-Resources/Graduate-Handbook/).

1. Students who successfully complete FOR 693 (Teaching Practicum) may use this course to fulfill their student teaching requirement, subject to approval by their major professor and dissertation committee.

2. Teaching in a class by a student does not replace the requirement to take FOR 693 (Teaching Practicum), which is a required course for the Ph.D. degree in the School of Forestry.

O. RESIDENCY REQUIREMENTS

The student must spend two consecutive semesters of full-time study in residence at NAU after formal admission to the Ph.D. program. Residency is defined as carrying a minimum load of nine credit hours of committee-approved courses during a semester or five approved hours during a summer session.

P. SUMMARY OF IMPORTANT DEADLINES FOR THE Ph.D.

No later than…..	**Complete task…..**
• End of 2nd semester	• Form dissertation committee and submit form to Grad College for approval
• End of 2nd semester	• Write prospectus and complete Program of Study; complete Remedial Course Plan if required
• Upon completion of coursework	• Comprehensive exams
• Semester before graduation	• Apply for candidacy
• Semester before graduation	• Apply for graduation
• Ten days before defense	• Submit defense scheduling form; submit dissertation for format check
• Last day of term	• Submit approved, final dissertation to ProQuest

CHAPTER 8 - APPLICATION FOR GRADUATION

All graduate students in the M.F., M.S., and Ph.D. programs must make a formal application for graduation. A student should apply for graduation in the semester before the semester in which graduation is expected. Forms and information on deadlines are available in the Registrar's Office and the Graduate College (http://nau.edu/GradCol/Student-Resources//Graduation/). The application process includes payment of a graduation fee. The Program of Study must be current and the final, updated form should be submitted before applying for graduation.

In signing the application, the major professor asserts that the graduate student is making sufficient progress to be able to complete and defend the professional paper, thesis, or dissertation before the end of the semester.

CHAPTER 9 - FINANCIAL ASSISTANCE

There are four broad categories of financial support available to students in the School of Forestry. The first and most common is a research assistantship awarded by the School of Forestry based on academic merit and ability to conduct research in collaboration with a faculty member. The second, a teaching assistantship, is occasionally available depending on funding and teaching needs of the School. Teaching assistantships are awarded by the Executive Director of the School of Forestry. Both Research and Teaching Assistantships include a waiver of out-of-state tuition, and a waiver of a portion of in-state tuition, if the number of work hours exceeds 10 per week. The third category of support is a fellowship provided by governmental agencies or other sources. The fourth category is based on demonstrated financial need. Financial assistance based on financial need is administered by the Office of Student Financial Aid, (http://nau.edu/finaid/; P.O. Box 4108, Flagstaff, AZ 86011-4108; 928-523-4951), with programs described in a brochure titled Financial Aid, available from that office. For all kinds of support, formal offers of assistance are made only after the student is admitted into the graduate program.

Research assistantships for students in the School of Forestry are available from two sources: 1) a variable number of assistantships are supported by funds provided to the School from the Bureau of Forestry Research, and 2) a variable number of assistantships may be available through externally supported research grants. In both cases, assistantships are awarded to individual faculty members who are responsible for selecting students. Criteria for selecting a student for an assistantship may vary among faculty members, but must include a high likelihood of excellent academic performance and ability to conduct independent research of high quality. Inquiries about the availability of assistantships should be made to the Graduate Coordinator and to faculty doing research in the area in which the student is interested.

All half-time assistantships include a commitment of 20 work hours per week, and a course load of 9-12 credit hours per semester (note exceptions under "Credit Load" section). All graduate assistants are required to pay the portions of in-state tuition and other registration fees that are not waived as part of the assistantship. Students may receive scholarships to cover tuition in addition to the assistantship stipend. In addition, assistantships may occasionally be awarded at less than the half-time rate depending on the needs of a research project and the availability of funds (e.g., Peace Corps Master's International assistantships, see Chapter 6 – Master of Forestry). Graduate students who receive half-time assistantships are not permitted to have employment outside the School of Forestry.

State-supported M.S. Research Assistantships are typically limited to two years. There is no specific limit on the duration of externally funded M.S. Research Assistantships. State-supported Ph.D. assistantships are typically limited to four years. However, only students who make good progress in the first year of their program will be considered for continued support. There is no limit on the total number of years of support for Ph.D. assistantships funded by external grants. The duration of support for assistantships funded by external grants will

depend on the student's performance and the availability of funds. In addition, assistantship support may be withdrawn at any other time that a student's overall performance is judged inadequate by the major professor, following failure to improve performance after a performance evaluation.

CHAPTER 10 - RESEARCH ASSISTANT EXPECTATIONS

Graduate research assistants are expected to demonstrate qualities of professionalism and academic leadership beyond those normally expected of other graduate students. A graduate assistant is expected to remain in good academic standing and make satisfactory progress toward a graduate degree.

This includes:

1. A minimum cumulative GPA of 3.00.
2. No more than six hours of grade “C”.
3. A grade of “B” or better in the fifteen credit hours of emphasis area courses.
4. Completion of at least nine hours of credit each academic semester.

In addition, all Graduate Assistants must attend in their first semester of employment: a) the University Graduate Assistant Orientation. This orientation is designed to familiarize Graduate Assistants with the goals of the University and the Assistant's role in achieving these goals. b) NAU’s Preventing Workplace Harassment training. This is an online training course available at http://training.newmedialearning.com/psh/narizonau/index.htm.

In addition to the above university-wide expectations for graduate assistants, the School of Forestry has established the following conditions of support for Graduate Research Assistants:

1. The major professor has control over the Graduate Research Assistant's work schedule. Requests for assistance from a graduate student should always be routed through the major professor.

2. Graduate Research Assistants are expected to work an average of 20 hours/week (half-time appointment) with the primary objective of conducting their thesis or dissertation research. The work schedule may vary but may include more hours during the summer, often up to 40 hours/week. If the GRA works 20 hrs weekly during the academic year, and is not paid extra during the summer, the expectation for work is 20 hrs weekly on average across the calendar year. Faculty may pay GRAs over the summer, in which case the number of weekly summer hours will be negotiated between the faculty and student. GRAs are not expected to work holidays and a reasonable amount of time off during the calendar year should be negotiated with the major professor(s).

3. Students who receive research assistantships provided to faculty members through external grants are typically employed to perform research or other work specified in the grant. This may involve assisting the faculty member with data collection, data analysis, and writing reports so that the faculty member can meet their obligations to the granting agency. In many cases, the work done by the student may be an important component of their thesis or dissertation research. However, the student's use of such

data for his or her research must be approved by the faculty member responsible for the research. Further, such use of data does not relieve the student of the obligation to provide data, reports, or other products to the faculty member responsible for the research. Faculty members and their students supported by externally-funded assistantships should agree to the student's responsibility to the project and the use of project data before initiation of any work by the student.

4. Graduate Research Assistants working at the half-time level (20 hours per week) are not permitted to have employment outside the School.

5. Graduate Research Assistants are expected to be self-motivated and work with minimal supervision from the major professor.

6. At the discretion of the major professor, Graduate Research Assistants may be required to help on other graduate student and faculty projects.

7. Graduate Research Assistants may occasionally be asked to assist on field trips or in laboratory exercises and present appropriate lectures in their field of study as requested by the major professor.

8. Graduate Research Assistants may occasionally be asked to assist in recruitment efforts such as Career Days with approval of the major professor.

9. Graduate Research Assistants are expected to become the local expert in their field. They should know as much or more about their field than the major professor or any other faculty.

10. Graduate Research Assistants are expected to be members of and participate in professional organizations.

11. Graduate Research Assistants are expected to publish the results of their thesis or dissertation research. A draft manuscript may be required before completion of the degree, depending on the major professor's requirements. Within the conventional ethical standards for determination of senior authorship, the major professor shall have the right to assume senior authorship and submit for publication any manuscript not completed by the student within one year of graduation.

12. After completion of all required course work except dissertation, a resident doctoral graduate student on half-time assistantship may petition to register for six credit hours a semester. Such a petition should be approved by the Graduate College and be endorsed by the student’s major professor and the Executive Director of the School of Forestry.

The student's major professor will determine whether the student has satisfied the above

conditions.

Written evaluation by the major professor of the performance of each Graduate Assistant is required for each fall and spring semester using the Graduate Assistant Evaluation Form (Appendix, or http://nau.edu/CEFNS/Forestry/Student-Resources/Graduate-Handbook/)

CHAPTER 11 - STUDENT'S ROLE IN THE SCHOOL

A graduate student occupies a special place in the School and the University. Graduate students are in many ways closer to the faculty than to undergraduate students. Thus, high expectations exist for responsibility, honesty, and professional behavior at all times. These qualities are developed and observed through interactions with faculty, other graduate students, and visiting scientists, dissertation research, participation in seminars, attendance at departmental seminars, and attendance and presentation of papers at scientific meetings. Evaluation concerning a student's professional competence and ability to interact with people is based on the student's participation in these diverse activities.

Students carry significant responsibilities in School teaching and research. Many are employees of the School, University, and State, and are representatives of the School on and off campus. Therefore, graduate students are expected to exhibit high professional standards, to be knowledgeable about School affairs, faculty and student activities, and in general conduct themselves in a professional manner.

Graduate students are encouraged to join and participate in the activities of appropriate professional societies. The benefits of membership, including journals and newsletters, are generally available to students at reduced rates.

There are many informal opportunities to learn from fellow students with experience from other parts of the United States and the World. One can learn a great deal by helping others, sharing work efforts, and studying together. Cooperation and social interaction with fellow students are strongly encouraged.

Nearly all our activities entail the use of facilities, equipment, and operational budgets provided through State and Federal Governmental funds. Our use of State vehicles, which are clearly marked "For Official Use Only," is an especially sensitive and obvious area of concern. Anyone using State or University property for reasons other than those intended is liable for legal prosecution and/or dismissal. Telephones, copy machines, postage, vehicles, etc. may not be used for personal reasons. If there is doubt about the difference between official and private actions, check with your major professor.

Common courtesy requires that students ask permission before using facilities or equipment not already assigned to their project. Although some equipment is kept in common storage areas, it may well be considered the "property" of a specific research project, laboratory, or teaching area. Requests for equipment should be directed to the School of Forestry equipment manager. If that individual is not available, talk to a faculty member whose interests might involve those materials. All equipment should be signed out and returned in clean working order. Report any problems to the equipment manager so that they can be corrected.

Office space will be provided to all graduate students if possible. If space is limited, priority is

given to graduate students who are employed by the School of Forestry (e.g., research or teaching assistantships, other sources of financial support that clearly benefit the School) based on seniority. When all funded students are allocated office space then non-funded students may be assigned space on a seniority system. Full-time research associates, technicians, or post-doctoral researchers may be placed in the graduate student areas if space is not available elsewhere.

It is the responsibility of the major professor to notify the Executive Director of the School of Forestry of the impending arrival of new students or the departure or return of old ones. Time of such notification is used to establish precedence within each priority level. Once assigned a desk, the student is expected to utilize it to the fullest. Space is a scarce resource. Infrequently used desks will be assigned to another student.

Appropriate keys are issued to students by the Executive Director of the School of Forestry upon written request by the major professor. Security demands that you safeguard keys issued to you and not lend them to others. It is illegal to duplicate university keys. Also, students should be very conscious about locking doors when they enter the building or laboratories outside of general business hours.

CHAPTER 12 - ACADEMIC CONDUCT OF GRADUATE STUDENTS

Graduate research should entail the generation of original, truthful information. Academic misconduct includes any of the following deceptive practices:

- Falsification of data: the intentional and unauthorized altering or inventing of any information or citation, including the purposeful omission of conflicting data with the intent to falsify.
- Plagiarism: knowingly representing the works or ideas of another as one's own.
- Misappropriation of the ideas or data of others.
- Misrepresentation of academic credentials.

Allegations of academic misconduct should be brought immediately to the attention of the major professor and the Executive Director of the School of Forestry. The major professor and Executive Director of the School of Forestry shall immediately conduct a preliminary investigation to ascertain the legitimacy of the alleged misconduct. Allegations of misconduct that are substantiated at this level shall be reported to the Graduate College for appropriate University-level action.

CHAPTER 13 - GRIEVANCE AND APPEAL PROCEDURES

Students with significant complaints about any aspect of their education in the School of Forestry first should attempt to resolve the issue informally. Examples of informal resolution are addressing such complaints first directly to the person causing the grievance, second to the student's major professor, and third to the Graduate Coordinator, and next to the Executive Director of the School in order to reach a settlement within two weeks if possible. When none of the above attempts are successful, the student should follow the formal grievance procedures established by the University and described in the University Student Handbook (http://nau.edu/student-life/Student-Handbook/) and Graduate College policies (for example, http://nau.edu/GradCol/Student-Resources/Succeeding/Policies/).

Grade appeals will be treated as described in the University Student Handbook (http://nau.edu/student-life/Student-Handbook/).

CHAPTER 14 – GRADUATE PROGRAM ASSESSMENT

Regular assessment of student desired learning outcomes in SOF graduate programs is desirable for evaluation of curriculum effectiveness and improvement. The SOF faculty, led by the Graduate Coordinator, will evaluate student desired learning outcomes using rubrics and record data on standard forms using procedures described for each degree in the curriculum maps at the end of this section.

Hard copies of the evaluation forms are available to faculty in the School of Forestry faculty lounge, and electronic copies are available from the section "Graduate Program Assessment Forms" at: https://nau.edu/CEFNS/Forestry/Faculty-and-Staff/Procedures-Policies-Reports/. The forms also are available on the School's server (\\naushares\forestry\office\graduatecoordinator) in the folder "Assessment Plans Graduate Program." Completed forms will be given to the School of Forestry CGP immediately upon completion. Each summer, the CGP will enter raw data from the last academic year's fall and spring semesters into a spreadsheet, and then compete summary statistics (mean, median, SE, range) of student performance for each desired learning outcome. The CGP will present findings from the analysis to the faculty for reflection and discussion at the School's fall annual retreat (typically late August). The CGP will prepare a brief written report that captures the faculty discussion. The raw data, data summary, and report for each year will be stored by the CGP on the School's server (\\naushares\forestry\office\graduatecoordinator) in the folder "Graduate Program Assessment Data and Reports." In the fall semester of each year, the School's Curriculum Committee will reflect further on the assessment results and develop improvements to the assessment process and curriculum as needed. By spring break of the following year, the CGP will submit to the OCLDAA an annual assessment report consisting of:

1. Curriculum and assessment plan (this document, revised as needed in the future);
2. Table of efforts achieved in current academic year;
3. Table outlining efforts that will be pursued, by whom and when, for the upcoming academic year.

Master of Forestry
Desired Learning Outcomes and Assessment Plan/Map
March 5, 2018

Desired Learning Outcome	Where	When	How	By Whom
1. Fundamental knowledge of forest ecosystem, forest management & economics, & forest social sciences	• FOR 689 (Professional Paper): professional paper	• Last semester	• Assessment, professional paper with rubric	• Each member, professional paper reading committee
2. Understanding of professional ethics, & how ethical issues frame decisions concerning the management of forested land	• FOR 689 (Professional Paper): professional paper	• Last semester	• Assessment, professional paper with rubric	• Each member, professional paper reading committee
3. Effective written communication about forestry & forest management	• FOR 689 (Professional Paper): professional paper	• Last semester	• Assessment, professional paper with rubric	• Each member, professional paper reading committee
4. Effective communication about forestry and forest management in oral and poster presentations	• FOR 692 (Proseminar) required course • FOR 689 (Professional Paper): Professional paper presentation	• Last or next to last semester • Last semester	• Assessment, oral presentation & poster with rubric • Assessment, professional paper presentation with rubric	• Course instructor • Each member, professional paper reading committee
5. Ability to evaluate trends and effects in data	• FOR 689 (Professional Paper): professional paper	• Last semester	• Assessment, Professional paper with rubric	• Each member, professional paper reading committee
6. Ability to produce new insights, tools, or approaches about forestry and forest management	• FOR 689 (Professional Paper): Professional paper	• Last semester	• Assessment, professional paper with rubric	• Each member, professional paper reading committee

Master of Science in Forestry
Desired Learning Outcomes and Assessment Plan/Map
March 5, 2018

Desired Learning Outcome	Where	When	How	By Whom
1. Fundamental knowledge about forest ecosystems and human management of forests	• FOR 699 (Thesis): thesis & defense	• Last semester	• Assessment, thesis & defense with rubric	• Each member, thesis committee
2. Understanding and use of research methods, modes of inquiry, and quantitative methods appropriate in forestry	• FOR 690 (Research methods) • FOR 699 (Thesis): thesis & defense	• First semester • Last semester	• Assessment, research proposal with rubric • Assessment, thesis & defense with rubric	• Course instructor • Each member, thesis committee
3. Understanding of research ethics	• FOR 690 (Research methods) • FOR 699 (Thesis): thesis & defense	• First semester • Last semester	• Assessment, course assignment and research proposal with rubric • Assessment, thesis & defense with rubric	• Course instructor • Each member, thesis committee
4. Expertise in planning a forestry research project	• FOR 690 (Research methods) • FOR 699 (Thesis): thesis & defense	• First semester • Last semester	• Assessment, research proposal with rubric • Assessment, thesis & defense with rubric	• Course instructor • Each member, thesis committee
5. Expertise in executing a forestry research project	• FOR 699 (Thesis): thesis & defense	• Last semester	• Assessment, thesis & defense with rubric	• Each member, thesis committee
6. Effective written communication about forestry research	• FOR 690 (Research methods) • FOR 699 (Thesis): thesis & defense	• First semester • Last semester	• Assessment, research proposal with rubric • Assessment, thesis & defense with rubric	• Course instructor • Each member, thesis committee
7. Effective communication about forestry research in oral and poster presentations	• FOR 692 (Proseminar) • FOR 699 (Thesis): oral presentation & defense	• Last or next to last semester • Last semester	• Assessment, oral presentations & posters with rubric • Assessment, final thesis oral presentation & defense with rubric	• Course instructor • Each member, thesis committee

PhD in Forestry
Desired Learning Outcomes and Assessment Plan/Map
March 5, 2018

Desired Learning Outcome	Where	When	How	By Whom
1. Fundamental knowledge about forest ecosystems and human management of forests	• Comprehensive exam • FOR 799 (Dissertation): Dissertation & defense	• 2th to 4th year • Last semester	• Assessment, written & oral exam with rubric • Assessment, dissertation & defense with rubric	• Each member, dissertation committee • Each member, dissertation committee
2. Expert knowledge about a specific research topic in forest science (dissertation topic)	• Comprehensive exam • FOR 799 (Dissertation): Dissertation & defense	• 2th to 4th year • Last semester	• Assessment, written & oral exam with rubric • Assessment, dissertation & defense with rubric	• Each member, dissertation committee • Each member, dissertation committee
3. Understanding of research ethics	• FOR 690 (Research methods) • Comprehensive exam • FOR 799 (Dissertation): Dissertation & defense	• First semester • 2th to 4th year • Last semester	• Assessment, course assignment & research proposal with rubric • Assessment, written & oral exam with rubric • Assessment, dissertation & defense with rubric	• Course instructor • Each member, dissertation committee • Each member, dissertation committee
4. Expertise in planning a forestry research project	• FOR 690 (Research methods) • FOR 799 (Dissertation): Dissertation & defense	• First semester • Last semester	• Assessment, research proposal with rubric • Assessment, dissertation & defense with rubric	• Course instructor • Each member, dissertation committee
5. Expertise in executing a forestry research project	• FOR 799 (Dissertation): Dissertation & defense	• Last semester	• Assessment, dissertation & defense with rubric	• Each member, dissertation committee
6. Research significantly advances scientific understanding of forests	• FOR 799 (Dissertation): Dissertation & defense	• Last semester	• Assessment, dissertation & defense with rubric	• Each member, dissertation committee

7. Expertise with research methods used in forest science	• FOR 690 (Research methods) • Comprehensive exam • FOR 799 (Dissertation): Dissertation & defense	• First semester • 2th to 4th year • Last semester	• Assessment, research proposal with rubric • Assessment, written & oral exam with rubric • Assessment, dissertation & defense with rubric	• Course instructor • Each member, dissertation committee • Each member, dissertation committee
8. Effective written communication about forest science	• FOR 690 (Research methods) • Comprehensive exam • FOR 799 (Dissertation): Dissertation	• First semester • 2th to 4th year • Last semester	• Assessment, research proposal with rubric • Assessment, written exam with rubric • Assessment, dissertation with rubric	• Course instructor • Each member, dissertation committee • Each member, dissertation committee
9. Effective communication about forest science in oral and poster presentations	• FOR 692 (Proseminar) • FOR 799 (Dissertation): Dissertation presentation	• 3rd year • Last semester	• Assessment, oral presentations & posters with rubric • Assessment, dissertation presentation with rubric	• Course instructor • Each member, dissertation committee
10. Ability to plan and teach a college-level course using innovative teaching/learning approaches	• FOR 693 (Teaching Practicum)	• 2th to 4th year	• Assessment, teaching plan & performance with rubric	• Course instructor

CHAPTER 15: COURSE LIST AND DEGREE REQUIREMENTS

The School of Forestry offers many courses that meet degree requirements. The following table represents the most current list of course offerings and where courses may be counted toward graduate degrees. Students should use this list as a reference guide only for completing the draft program of study.

Table 1. List of coursework satisfying degree requirements, by department, course number, and category. REQ = required for degree.

				Remedial Category			M.S. Program	Ph.D. Program				EECB Emphasis	M.F. Program			
Dept	Course #	Course Name (note some courses are cross-listed as both undergrad and grad courses (e.g. 454/554))	Credits	A	B	C	MS REQ	PhD REQ	Ecosystem Science	Forest Mgmt Sciences and Economics Emphasis	Forest Social Science Emphasis	(M.S. / Ph.D)	MF REQ	Ecosystem Science	Forest Mgmt Sciences and Economics	Forest Social Science
FOR	211	Forest Mapping and Measurement	3			x										
FOR	212	Trees and Forests of North America	2	x												
FOR	213	Ecology and Management of Forest Soils	3	x												
FOR	220	Introduction to Forest and Range Plants	2	x												
FOR	225	GIS Tools in Forestry	2			x										
FOR	230	Multicultural Perspectives Env. Management	3		x											
FOR	240	Saving Life on Earth	3	x	x											
FOR	251	Introduction to Wildland Fire	3	x	x											
FOR	255	International Wildlife Issues	3	x	x											
FOR	483	Forestry in the Wildland-Urban Interface	3		x											
FOR	313/314	Forest Ecology I and II	7	x												
FOR	315	Silviculture I (does not cover all of silviculture)	3		x											
FOR	319	Forest Operations	3		x											
FOR	323/325	Forest Management	11		x											
FOR	340	Environmental Hydrology	3	x												
FOR	351	Fire Monitoring and Modeling for Professionals	3		x											
FOR	360	Natural Resources Policy	3		x											
FOR	381	Forest Ecosystem	3		x											

		Management														
FOR	382	Ecological Restoration Applications	3	x	x											
FOR	415	International Forestry	3		x											
FOR	442	Principles of Wood Science and Technology	3		x											
FOR	445	Wilderness Management	3		x											
FOR	447	Forestry and Community	3	x												
FOR	449	Fire Monitoring and Modeling			x	x										
FOR	451	Fire Ecology and Management	3	x	x											
FOR	452	Forest Pathology	3	x												
FOR	453	Forest Insects	3	x												
FOR	454	Forest Health	3	x												
FOR	465	Watershed Restoration	3		x											
FOR	468	Conservation Genetics	3	x												
FOR	493	Natural Resource Economics	3		x											
FOR	504	Machine Learning in Ecology & Resource Management	3	x	x				x			x				
FOR	505	Forestry Seminar Series	1				x	x				x	x	x		
FOR	510	Multiple Resources Silviculture	3		x					x		x			x	
FOR	515	International Forestry	3		x				x		x	x		x		x
FOR	520	Applied Forest Stand Dynamics	3	x	x				x			x		x		
FOR	521	Forest Soils	3	x					x			x		x		
FOR	525	GIS and Spatial Techniques in Forestry	4			x				x		x			x	
FOR	542	Principles of Wood Science and Technology	3	x	x											
FOR	544	Landscape Ecology	3	x					x			x		x		
FOR	545	Rangeland Ecology and Management	3	x					x	x		x		x	x	
FOR	550	Forest Tree Ecophysiology	3	x					x			x		x		
FOR	551	Fire Ecology and Management	3		x				x	x		x		x	x	
FOR	552	Forest Tree Diseases	3	x					x			x		x		
FOR	553	Forest Entomology	3	x					x			x		x		
FOR	554	Integrated Forest Health	3	x					x			x		x		
FOR	560	Wetland Ecology and Management	3	x					x			x		x		
FOR	563	Watershed Hydrology	3	x								x		x		
FOR	565	Watershed Restoration								x		x		x	x	
FOR	568	Conservation Genetics	3	x								x				

FOR	**569**	**Forest Genetics**	**3**	**x**								**x**				
FOR	**573**	**Human Dimensions of Natural Resource Management**	**3**		**x**					**x**	**x**	**x**			**x**	**x**
FOR	**577**	**Concepts in Ecology**	**3**									**x**				
FOR	**582**	**Ecological Restoration Applications**	**3**		**x**				**x**			**x**		**x**		
FOR	**590**	**Economic and Social Issues in Forest Recreation Development**	**3**							**x**	**x**				**x**	
FOR	**593**	**Natural Resources Economics**	**3**							**x**		**x**			**x**	
FOR	**604**	**Wildlife Habitat Relationships**	**3**	**x**	**x**				**x**	**x**		**x**		**x**		
FOR	**633**	**Ecological Economics**	**3**		**x**					**x**					**x**	
FOR	**689**	**Professional Paper**	**3**										**x**			
FOR	**690**	**Research Methods**	**3**				**x**	**x**								
FOR	**692**	**ProSeminar**	**2**				**x**	**x**					**x**			
FOR	**693**	**Teaching Practicum**	**2**					**x**								
GSP	**320**	**Introduction to Remote Sensing**	**4**			**x**										
GSP	**423**	**Advanced Remote Sensing Techniques II**	**4**			**x**										
GSP	**433**	**Spatial Analysis and GIS Applications**	**4**			**x**										
MAT	**542**	**Wildlife Population Modeling**	**3**									**x**		**x**		
MAT	**543**	**Wildlife Population Modeling Lab**	**2**									**x**		**x**		
POS/ ENV	**555**	**Science, Politics, and the Environment**	**3**								**x**	**x**				**x**
POS/ ENV	**658**	**Topics in Environmental Politics**	**3**								**x**					**x**
POS/ ENV	**659**	**Environmental Policy**	**3**								**x**					**x**

APPENDIX A: SCHOOL OF FORESTRY GRADUATE STUDENT FORMS

(Available at https://nau.edu/forestry/internal-resources/graduate-student-handbook/)

Form 1	Recommendation for Graduate Study
Form 2	Ph.D. Student Progress Evaluation Report
Form 3	Ph.D. Student Teaching Evaluation
Form 4	Report on Results of Written Comprehensive Examination
Form 5	Report on Results of Oral Comprehensive Examination
Form 6	Graduate Assistant Evaluation
Form 7	Approval of Outside-NAU Master of Science Thesis Committee Member
Form 8	Remedial Course Plan
Form 9	Approval of Program of Study, Remedial Coursework, and Research Prospectus

Graduate College forms are available at http://nau.edu/GradCol/Student-Resources/, and at http://nau.edu/GradCol/Student-Resources/Theses-and-Dissertations/.

Form 1 Recommendation for Graduate Study

School of Forestry
Northern Arizona University
NAU Box 15018 Flagstaff, Arizona, U.S.A. 86011-5018

Last Name _____ **First Name** _____ **Middle Name** _____

Please keep your current address on file with NAU: Log in to LOUIE at http://www.nau.edu/louie

Please read the following carefully before issuing or completing this form:

TO THE CANDIDATE: Please check one of the following options before you send or give this form to the person recommending you. This form will not be accepted if you fail to designate the option of your choice or fail to sign below.

PLEASE CHECK ONLY ONE OPTION

☐ NON-CONFIDENTIAL RECOMMENDATION. The above-named person elects to keep this recommendation non- confidential recommendation may be shown to the candidate at his or her request.

☐ CONFIDENTIAL RECOMMENDATION. I elect to keep this recommendation confidential and I waive all my rights of access to this recommendation, whether visual, oral or written, as provided in the Family Educational Rights and Privacy Act of 1974 and its amendments. I understand that this recommendation will not be available for my inspection now or in the future.

_____ Date: _____
Candidate's Signature and Date (Must be signed to be valid)

TO THE RECOMMENDER:

The person whose name appears on this form wishes to ask you for a recommendation regarding his or her qualifications for graduate study in forestry. Your honest and careful statement and evaluation will be appreciated. Please rate this applicant in comparison with other students of the same age and position.

Please check appropriate box for each category	No Basis for Judge-ment	Lower Half	Upper Half but not Upper 25%	Upper 25% but not Upper 2%	Upper 2%
Native Intellectual Ability	☐	☐	☐	☐	☐
Breadth of General Knowledge	☐	☐	☐	☐	☐
Initiative and Resourcefulness	☐	☐	☐	☐	☐
Interest in Their Field	☐	☐	☐	☐	☐
Oral Expression Ability	☐	☐	☐	☐	☐
Written Expression Ability	☐	☐	☐	☐	☐
Ability to Work with Others	☐	☐	☐	☐	☐
Emotional Maturity	☐	☐	☐	☐	☐
Promise as a Teacher	☐	☐	☐	☐	☐
Promise as a Researcher	☐	☐	☐	☐	☐
Independence	☐	☐	☐	☐	☐

In what capacity do you know this person _____ and for how long? _____

Please attach a letter, or use the space below for additional comments.

_____ (Type or print your name) _____ (Title or position) _____ (Signature)

Date _____ Your Employer _____

Mail Completed form to: Coordinator of Graduate Programs
School of Forestry
P.O. Box 15018
Northern Arizona University
Flagstaff, Arizona 86011

Form modified: May 3, 2005

Form 2 Ph.D. Student Progress Evaluation Report

(To be submitted on an annual basis)

School of Forestry
Northern Arizona University
NAU Box 15018 Flagstaff, Arizona, U.S.A. 86011-5018

Last Name _____ **First Name** _____ **Middle Name** _____

NAU ID _____

I. COURSEWORK

☐ **Yes** ☐ **No** **A. Have courses in Program of Study been completed as scheduled?**
If not, explain reasons for non-completion, and detail the steps anticipated to complete the courses.

_____
_____
_____

☐ **Yes** ☐ **No** **B. Is performance in coursework satisfactory?**
If not, explain steps anticipated to correct unsatisfactory performance.

_____
_____
_____

C. If completion or satisfactory performance issues were noted at the last evaluation, discuss the progress on the plan(s) to address these issues.

_____
_____
_____

D. Comments

_____
_____
_____

☐ **Satisfactory** ☐ **Unsatisfactory** **E. Overall Coursework Progress Evaluation**

II. RESEARCH AND DISSERTATION PREPARATION

☐ **Yes** ☐ **No** **A. Has performance and progress on the dissertation research been satisfactory?**
If not, detail the steps anticipated to achieve satisfactory progress.

_____
_____
_____

B. If completion or satisfactory performance issues were noted at the last evaluation, discuss the progress on the plan(s) to address these issues.

_____
_____

II. RESEARCH AND DISSERTATION PREPARATION (Cont'd)

C. Comments

_____

_____

_____

☐ **Satisfactory** ☐ **Unsatisfactory** **D. Overall Research and Dissertation Preparation Evaluation**

III. OVERALL EVALUATION

☐ **Satisfactory** ☐ **Unsatisfactory** **A. How would you rate the candidate overall?**

Signatures

Program Committee	Name	Signature	Date
Major Professor:			
Committee Members:			
Graduate Coordinator:			
Exec Director - School of Forestry:			

Distribution: Major Professor
School File
Student

Form modified: May 3, 2005

Form 3 Ph.D. Student Teaching Evaluation

School of Forestry
Northern Arizona University
NAU Box 15018 Flagstaff, Arizona, U.S.A. 86011-5018

Last Name	First Name	Middle Name
NAU ID	Evaluation Date	

Teaching is a crucial part of doctoral student education. The evaluation of teaching should be based on at least two classroom observations, preferably at widely separated intervals. Constructive criticisms should be given to the student during a personal meeting within a few days of each observation. In addition, each student should be evaluated by the classroom students using the Instructor Teaching Evaluations used by Forestry Faculty.

I. AREA EVALUATIONS

A. Knowledge of Subject Matter (organization, appropriate level, response to questions)

B. Demeanor, Appearance, Control of Class, Relationship with Students.

C. Examinations and Quizzes (appropriate level, coverage of material, ease of understanding)

B. Participation in Meetings, Preparation Sessions, and Completion of Out-of-Class Assignments.

II. OVERALL TEACHING EVALUATION

☐ **Satisfactory** ☐ **Unsatisfactory**

Comments

Signatures

Program Committee	Name	Signature	Date
Major Professor:			
Evaluators:			
Student:			

Distribution: Major Professor
School File
Student

Form modified: May 3, 2005

Form 4 Report On Results of Written Comprehensive Examination

School of Forestry
Northern Arizona University
NAU Box 15018 Flagstaff, Arizona, U.S.A. 86011-5018

Last Name	First Name	Middle Name
NAU ID	**Examination Date**	

This evaluation is completed following the completion of coursework requirements as detailed in the School of Forestry Graduate Student Policies and Procedures Handbook.

Signatures

Committee Member Name	Signature	PASS	FAIL [1]
		☐	☐
		☐	☐
		☐	☐
		☐	☐
		☐	☐
		☐	☐

[1] Committee members failing a student must attach a written explanation of reasons for failing grade.

Vote of Committee: **Passed** _____ **votes**
Failed _____ **votes**
3/4 majority of the committee members required to pass.

Additional Requirements (if any) and Justifications

Executive Director – School of Forestry	Date

Distribution: Major Professor
Thesis Committee Members
School File
Graduate College
Student

Form modified: May 3, 2005

Form 5 Report On Results of Oral Comprehensive Examination

School of Forestry
Northern Arizona University
NAU Box 15018 Flagstaff, Arizona, U.S.A. 86011-5018

Last Name	First Name	Middle Name

NAU ID	Examination Date

This evaluation is completed following the completion of coursework requirements as detailed in the School of Forestry Graduate Student Policies and Procedures Handbook.

Signatures

Committee Member Name	Signature	PASS	FAIL [1]
		☐	☐
		☐	☐
		☐	☐
		☐	☐
		☐	☐
		☐	☐

[1] Committee members failing a student must attach a written explanation of reasons for failing grade.

Vote of Committee: **Passed** _____ **votes**
Failed _____ **votes**
3/4 majority of the committee members required to pass.

Additional Requirements (if any) and Justifications

Executive Director – School of Forestry	Date

Distribution: Major Professor
Thesis Committee Members
School File
Graduate College
Student

Form modified: March 1, 2008

Form 6 Graduate Assistant Evaluation

School of Forestry
Northern Arizona University
NAU Box 15018 Flagstaff, Arizona, U.S.A. 86011-5018

Last Name	**First Name**	**Middle Name**
Evaluation Date	**Evaluation semester:**	

All Graduate Assistants employed by the School of Forestry should be evaluated by their major professor or supervisor each semester with this form.

I. AREA EVALUATIONS

A. Academic performance:

B. Research performance (if appropriate):

C. Teaching performance (if appropriate):

D. Professionalism (e.g., demeanor, responsibility, punctuality, civility, participation in professional organizations):

II. OVERALL EVALUATION

☐ **Satisfactory** ☐ **Unsatisfactory**

SIGNATURES

	Name	Signature	Date
Major Professor:			
Major Professor:			
Student:			

I understand that my signature indicates that I have seen and discussed this evaluation with my Major Professor or Supervisor and received a copy. Students may attach written comments about the evaluation.

Distribution: Major Professor
School File
Student

Form modified: February 25, 2010

Form 7 Approval of Outside-NAU Master of Science Thesis Committee Member

School of Forestry
Northern Arizona University
NAU Box 15018 Flagstaff, Arizona, U.S.A. 86011-5018

If a member of the Master of Science committee is not a member of the NAU Faculty (regular or adjunct), attach to this form the individual's vita or resume and provide the information requested below. Submit the completed form to School of Forestry Graduate Coordinator and then Department Chair/Director for approval. The approved and signed form should be placed in the student's departmental file.

Student name: _____

Faculty advisor: _____

Thesis Title or topic: _____

Outside-NAU committee member's name: _____

Expertise related to student's thesis:

_____

Form modified: April 18, 2014

Form 8 Remedial Course Plan

School of Forestry
Northern Arizona University
NAU Box 15018 Flagstaff, Arizona, U.S.A. 86011-5018

A. Forest Ecology and Biology; Minimum of 6 semester credit hours in the following subjects: Topics include taxonomy, distribution, and ecological characteristics of trees and other important plants; physiology of trees, including metabolism and growth; basic and applied genetics; ecological concepts and principles, including structure and function of ecosystems; soil formation, classification, composition, and properties; silviculture, including methods of establishing and controlling the composition, growth, and quality of forest stands, including fire ecology and use of fire; water in forest ecosystems, including plant-water relationships, watershed condition and forest water quality; entomology and pathology, including the study of representative forest organisms and the application of integrated pest management; and wildlife and fish biology and ecology.

Course No./Title	Credit hours*	Grade	Term/ Year	University/program

*Specify quarter or semester

B. Management of Forest Resources, and Forest Resource Policy and Administration; Minimum of 6 semester credit hours in the following subjects: This area of study integrates all aspects of forestry education. It provides the student with an understanding of the social, cultural, political, legal, economic, institutional, and historical influences on forestry. Topics should include policy development; administration; land and resource planning; budgeting; financial and personnel management; integrated forest resource management at stand-, system-, and landscape-scales, with consideration of wood, forage, water, wildlife, fish, recreation, cultural, educational and aesthetic benefits; forest engineering, harvesting, and utilization.

Course No./Title	Credit hours*	Grade	Term/ Year	University/program

*Specify quarter or semester

C. Measurement of Forest Resources; Minimum of 3 semester credit hours in the following subjects: Topics include land measurement, geographic information systems, photogrammetry and remote sensing; sampling theory and methods; measurement of trees, forests, and forest products; wildlife habitat assessment; measurement of water yields and quality; assessment of air quality and of the aesthetic, cultural, mineral, range, recreation, and wilderness values of forests.

Course No./Title	Credit hours*	Grade	Term/ Year	University/program

*Specify quarter or semester

Signatures

Student:_____ Date: _____

Advisor:_____ Date: _____

Graduate Coordinator:_____ Date: _____

School
Executive Director: _____ Date: _____

Form modified: May 14, 2015

FORM 9: Approval of Program of Study, Remedial Coursework, and Research Prospectus (to be completed in the first year)

The Program of Study, Remedial Coursework Plan, and Research Prospectus (M.S. and Ph.D. only) have been reviewed and approved as indicated by the signatures below. Approval by the Major Professor indicates that the entire committee has reviewed, discussed and approved the required documents listed above. Readers for M.F. papers are not required to review and approve the M.F. documents.

Student name: _____ Date _____

Major Professor: _____ Date _____

Signature:

Co-Advisor (if applicable): _____ Date _____

Signature:

Graduate Coordinator: _____ Date- _____

Signature:

APPENDIX B: REVISION HISTORY

November, 1993
Revised May, 1994
Revised January, 1995
Revised April, 1996
Revised May, 1998
Revised August, 2000
Revised January, 2001
Revised July, 2001
Revised July, 2002
Revised March, 2003
Revised May 11, 2004
Revised April 28, 2005
Revised November 21, 2005
Revised March 1, 2008
Revised December 19, 2008
Revised May 21, 2009
Revised March 9, 2010
Revised February 4, 2011
Revised February 7, 2012
Revised August 14, 2012
Revised April 18, 2014
Revised October 13, 2014
Revised May 14, 2015
Revised June 16, 2016
Revised June 1, 2017
Revised June 7, 2018
Revised May 22, 2019
Revised May 5, 2021