DEPARTMENT OF MATHEMATICS AND STATISTICS

HANDBOOK FOR GRADUATE STUDENTS

2015 - 2016
CONTENTS

General Information for Graduate Students ................................................................. 1

I. Admission Requirements ..................................................................................... 3
II. Transfer Credit ..................................................................................................... 4
III. Financial Aid ....................................................................................................... 4
IV. Advisors ............................................................................................................. 5
V. Course Substitution ............................................................................................ 5
VI. Retention ............................................................................................................ 6
VII. Comprehensive Oral Examination .................................................................. 6
VIII. Thesis Option .................................................................................................. 7
IX. Graduate Student Grievance Procedure ............................................................ 8
X. List of Permanent Faculty .................................................................................. 9
XI. Schedule of Graduate Courses ......................................................................... 10

Department Graduate Teaching Assistant Policies

I. Introduction ........................................................................................................... 11
II. General Information ............................................................................................ 11
III. Typical Duties of a GTA ................................................................................... 11
IV. Support for GTAs .............................................................................................. 12
V. Requirements of GTAs ....................................................................................... 13
VI. Suggestions for Teaching .................................................................................. 16

Appendix 1: GTA Feedback Form .......................................................................... 19
Appendix 2: GTA Observation Form ....................................................................... 20
Appendix 3: GTA Gradebook Check-In Form ......................................................... 21
Appendix 4: GTA Grade Approval Form .................................................................. 22
Appendix 5: Continuing Graduate Student Evaluation .......................................... 23
Appendix 6: Professional Growth Plan (PGP) Form ................................................ 24

Graduate College Graduate Teaching Assistant Policies Link:
http://nau.edu/gradcol/policies-and-forms/policies/
GENERAL INFORMATION
FOR GRADUATE STUDENTS IN MATHEMATICS AND STATISTICS

REGISTRATION
Can be performed at Louie@nau.edu > Self Service > Student Center.

ADVISORS
Each graduate student will be assigned an advisor from the Department of Mathematics and Statistics and should confer with their advisor at least once a semester.

COLLOQUIUM
The department has a weekly colloquium every Tuesday at 4:00 pm. These are talks covering a broad range of mathematics, statistics, or mathematics education topics usually given by department faculty and occasionally by visitors. Regular attendance at the colloquium talks is expected of all Flagstaff campus graduate students. Please mark this time on your schedule so you can be sure to attend. The schedule of talks is available on the department web site.

SEMINARS
In addition to the colloquium, the department usually runs a few seminars each semester. These weekly seminars go into more depth in a particular area of mathematics or statistics. In the past we have had seminars in Combinatorics, in Applied Mathematics, and in Statistics. You will receive more information on these once the topics, days, and times have been arranged.

COMPUTER RESOURCES

Department: The department operates a computer lab in room 222 of the Adel Mathematics Building. The lab is equipped with (36) Dell computers and a laser printer.

Room 222 is equipped with a computer projection system and can be scheduled for class-time use by instructors of department courses. During the Fall and Spring semesters, room 222 has open hours throughout the day. Mathematics and statistics software on the computers is currently being updated. Graduate teaching assistant offices are also equipped with PCs.

University: There are numerous student computer labs across campus with both Macintosh and PC computers. Upon admission, students receive a university e-mail account. Students are expected to regularly check this account for official department and university announcements. For more information about university computing, visit the Information Technology Services (ITS) website www5.nau.edu/its/ or call the ITS Solution Center at (928) 523-1511.
DEPARTMENT OF MATHEMATICS AND STATISTICS
GRADUATE PROGRAM POLICIES

I. ADMISSION REQUIREMENTS

In addition to completing the application form online at: http://nau.edu/GradCol/Admissions/Application/ and submitting transcripts of record to the Northern Arizona University Graduate College, applicants also need to submit to the Department of Mathematics and Statistics the following: (1) three letters of recommendation from persons able to assess their likelihood of success in a graduate program in mathematics, mathematics education, or statistics, (2) a brief description (course title, texts used, grade) of all mathematics and statistics courses taken at the level of calculus and above, (3) a letter of intent, and (4) curriculum vita (optional).

For regular admission to graduate programs in the Department of Mathematics and Statistics, applicants should have completed a bachelor’s degree and the following requirements of the specific graduate degree program:

• For the M.S. program in Mathematics, a candidate must have completed at least 27 semester hours of undergraduate mathematics coursework at the level of calculus and above with a grade of C or better, and have at least a 3.0 grade point average in these courses. The 27 hours must include coursework in linear algebra, real analysis (advanced calculus), and abstract algebra.

• For the M.S. program in Statistics, a candidate must have completed at least 23 semester hours of undergraduate mathematics and statistics coursework at the level of calculus and above with a grade of C or better, and have at least a 3.0 grade point average in these courses. The 23 hours must include coursework in multivariable calculus, linear algebra, real analysis (advanced calculus), and mathematical statistics.

• For the M.S. program in Mathematics Education, a candidate must have completed at least 23 semester hours of undergraduate mathematics and statistics coursework at the level of calculus and above with a grade of C or better and have at least a 3.0 grade point averages in these courses. These 23 credit hours cannot include the teaching methods courses (such as MAT 301, 302, 401, 402) and must include: calculus II, applied statistics, foundations of mathematics and at least 9 hours of upper division coursework (including foundations of mathematics).

It is highly recommended that the 23 credit hours include modern geometry, abstract algebra and introduction to analysis since these topics will be expanded upon in MAT 505, MAT 504, and MAT 506, respectively.

• For the Certificate in Applied Statistics program, a candidate must have earned a bachelor's degree with a minimum grade point average of 3.0. In addition, you must have successfully completed an undergraduate course in statistics. Letters of recommendation are not required for this program.

Applicants must apply for admission to a specific program (M.S. Mathematics, M.S. Statistics, M.S. Mathematics Education, or Certificate in Applied Statistics), and must reapply to be admitted to another
program. If the regular admission requirements are not met, an applicant may still be admitted but on a provisional basis, subject to some additional requirements. Regular admission is granted if the provisions are met satisfactorily.

International students whose native language is not English must present a TOEFL (Test of English as a Foreign Language) score before being considered for admission. For admission, the department requires a minimum score of 89 on the internet-based test, 250 on the computer-based test, or 570 on the paper-based test.

II. TRANSFER CREDIT

Graduate students may obtain transfer credit for graduate coursework completed at other colleges and universities. To obtain such credit the Graduate College form “Petition for Transfer Credit” must be filled out (http://nau.edu/gradcol/policies-and-forms/forms) signed by the student’s advisor and submitted to the Graduate Operations Committee, along with catalog copy and transcripts for the courses in question. The Graduate Operations Committee must approve this petition before it is forwarded to the Graduate College for the final approval. Note that the number of units that may be transferred from other institutions cannot exceed twenty-five percent of the total minimum units of credit required for the Master’s Degree or graduate certificate. See the current Academic Catalog for additional details: https://policy.nau.edu/policy/results.aspx?type=g

III. FINANCIAL AID

A number of teaching assistantships are offered each year by the Department of Mathematics and Statistics. This number varies from year to year according to budgetary limitations. Subject to available funding and satisfactory progress toward completing the degree plan, a student who is offered an assistantship may expect four semesters of support as a graduate teaching assistant. In situations where a supported student is required to take provisional courses or begins the program mid-year, a semester of study beyond the normally supported four semesters may be required. In such cases, the student will be considered on a competitive basis for an additional semester of support as a graduate teaching assistant.

Northern Arizona University is committed to providing an excellent education to its undergraduates, and the department strives to have a quality team of graduate teaching assistants working as part of that commitment. The most common graduate teaching assistant appointment is for 20 hours per week (considered half-time). The half-time graduate teaching assistant is typically assigned to teach a load of 6 credit hours per semester. The half-time graduate teaching assistant is required to take 9 hours of coursework applicable towards his/her degree program each semester.

In filling teaching assistant positions, first preference is given to continuing students with the necessary skills and commitment required for good teaching, and who are making satisfactory progress toward their degree. For a half-time teaching assistant satisfactory progress means completion of 9 hours of coursework in his/her program each semester with a grade point average of at least 3.0. Assistantships for incoming students are usually available. Primary consideration is given to applicants who are considered the strongest academically; a secondary consideration is teaching experience. The department may also take into account a balance among its various graduate programs.

The stipend for a half-time graduate teaching assistant in the Department of Mathematics and Statistics for the 2015-2016 academic year is $14,213. All graduate teaching assistants at the university whose appointment is at least 10 hours per week receive an out-of-state tuition waiver, and a waiver of resident tuition each semester of their appointment. Graduate assistants who work 20 hours per week also receive a waiver of the student health insurance premium. All graduate assistants are expected to pay other
applicable fees. The schedule of tuition and fees for the Fall 2015 semester is available at http://nau.edu/SDAS/Tuition-Fees/Fall_Tuition/

In addition, the Graduate College offers a limited number of waivers of the nonresident portion of tuition available to nonresidents of Arizona. Graduate program coordinators across the university make annual recommendations for these waivers. The department is permitted to make just a few such recommendations, and waivers are given totally at the discretion of the Graduate Dean. Such recommendations are made with the goal of attracting the very best applicants, especially those with undergraduate degrees obtained elsewhere. Recommendations may also be made in cases of financial need.

Teaching assistantships are generally not offered to incoming international students whose native language is not English, although financial support may be available in the form of hourly wages. To be awarded a graduate teaching assistant position, a student whose native language is not English must demonstrate evidence of effective communication skills in English, through a personal interview and/or a score on the Test of Spoken English (TSE) of at least 50.

Graduate College link for student grants: http://nau.edu/Student-Orgs/Graduate-Student-Government/Funding-Opportunities/

IV. ADVISORS

After admission to a graduate program in the Department of Mathematics and Statistics, the admitted student is expected to write or e-mail the department Graduate Coordinator conveying his/her intent to enroll. At that point, the Graduate Operations Committee will formally assign the student an advisor, with this assignment recorded in the student’s department file. Any change of advisor must be approved by the Graduate Operations Committee and so recorded. Such a change will occur, in particular, if the student decides on, and is admitted to the Thesis Option whereupon the student’s thesis director will become the student’s new advisor.

As well as fulfilling the normal advising duties (providing course and program information, graduation papers, career advice, etc.), the student’s advisor also has a role to play in setting up the student’s Comprehensive Oral Examination Committee or Research Committee.

V. COURSE SUBSTITUTION

It may be necessary for a graduate student to substitute a course for one that is required in his/her program. The student’s advisor and the Graduate Operations Committee must approve all such course substitutions in writing. By Graduate College policy no more than two 400-level courses may be applied toward a master’s degree program. Department policy on course substitution varies by program and is applied on a case-by-case basis.

VI. RETENTION

Graduate College policy requires that a graduate student (i) maintain a 3.0 grade point average for all graduate courses taken, and for all courses required in your plan; (ii) earn no more than six credits with a grade of C, and (iii) earn no course grades of D or F.
A graduate student with a grade point average below 3.0, or who earns a grade of C or below, is placed on academic probation. Admission to a program may be denied or revoked for any graduate student who receives unsatisfactory grades. If you have more than 6 units of graduate work with a grade of C or below, you cannot continue in your master’s plan, regardless of your grade point average.

A student who is admitted provisionally to a Department of Mathematics and Statistics graduate program will be asked to meet certain requirements before their admission status is changed to regular standing. A provisional student who fails to meet such requirements will not be allowed to continue in their graduate program. In these circumstances, a graduate teaching assistantship would be terminated due to unsatisfactory performance.

Students are expected to make continued satisfactory progress toward their degree. Normally, a student who is admitted with regular standing, but whose grade point average falls below a 3.0 because of a single C grade will be allowed to continue in the program under probationary status for one semester. In rare circumstances, this probationary period may be extended for a second semester, but only if there is a reasonable expectation that the student will be able to meet the requirements of the degree. In any case, if a student’s grade point average falls below a 3.0 to a greater extent than a single C, the student will normally not be allowed to continue in their graduate program.

Grade point average requirements are also in place for admission to the thesis option, and have a bearing on the awarding of graduate teaching assistantships. A graduate teaching assistant may have their assistantship terminated due to unsatisfactory progress toward their degree.

VII. COMPREHENSIVE ORAL EXAMINATION (NON-THESIS OPTION)

The Comprehensive Examination Committee shall normally consist of 3 members. The Committee and topics to be covered shall be selected by the student’s assigned graduate advisor in the program, and approved by the Graduate Operations Committee. Where possible, the committee membership should be restricted to those faculty members under whom the student has completed or is in the process of completing coursework in their program. The Chair of the Committee shall be the student’s assigned graduate advisor or a member designated by the advisor should he/she not be a member of the Committee.

The Comprehensive Examination will take place on the NAU Flagstaff campus and the student being examined must be physically present on campus, and is responsible for any and all costs associated with his/her travel to Flagstaff for the examination.

To be eligible to take the Comprehensive Examination, a student must:

a) Have a cumulative grade point average of 3.0 or better for all courses completed in their program;
b) Have no more than 9 hours of required coursework remaining, and anticipate completing this coursework in the current semester or session; and
c) Be formally registered in graduate coursework at NAU at the time of the exam.

A student will be tested over three courses, selected with the guidance of the student's advisor and approved by both the advisor and the Graduate Operations Committee. The Comprehensive Oral Examination Approval form may be found on the Graduate Forms page at: http://nau.edu/CEFNS/NatSci/Math/Student-Resources/Forms/

This form must be submitted by the graduate student and his/her advisor AT LEAST 2 MONTHS before the date the exam is being requested. Early in your study for the exam you should consult each of the members of your committee for guidance in preparing for your exam. You should allow yourself a period
of six to eight weeks of intensive study to prepare for the exam. Note: If the oral exam includes courses that are currently in progress, then the exam may not take place until after the 12th week of instruction (after the 4th week of instruction in the summer).

Depending upon the program:

- For the M.S. program in mathematics, the three courses selected must include at least one required course and should form a coherent group of coursework.

- For the M.S. program in statistics, the examination should cover both theoretical and applied coursework.

For the M.S. program in mathematics education, please see the Final Portfolio & Oral Exam Description document (http://nau.edu/cefns/natsci/math/student-resources/forms/)

Each examination typically lasts 2 hours with 30-45 minutes allowed per course. At the end of the exam a discussion of the committee members shall occur, with a vote taken following the discussion. The committee members vote to pass or fail a student based on their performance on the examination as a whole. If a two-thirds majority is not obtained to pass, then the student fails the examination. The student may retake the oral exam on the same set of course work after a period of one month has passed. Should the student fail the exam a second time, or fail to retake the examination within a six month period, then their enrollment in the program will be terminated.

The Chair of the Comprehensive Exam Committee will promptly convey the result (pass/fail) of the exam to the Chair of the Graduate Operations Committee and the Department Chair.

VIII. THESIS OPTION

The Thesis Option is available only to students pursuing the M.S. in Mathematics. To be eligible for the Thesis Option, the student should have a minimum grade point average of 3.3 at the time of their initial enrollment in MAT 699: Thesis.

A student interested in pursuing the Thesis Option should first seek a department faculty member willing to serve as the students’ thesis director who, together with the student, will decide on a research topic. Once this is done, the student and his/her thesis director must submit a research plan to the Graduate Operations Committee together with the names of the three-member Research Committee (which is to include the thesis director and at least one other faculty member from the Department of Mathematics and Statistics). Before submission to the Graduate Operations Committee, all three members of the Research Committee should approve the research plan. The thesis director will become the student's new advisor and an Advisor Change form will be submitted to the department office.

A student can only enroll for MAT 699 once the Graduate Operations Committee has approved his/her research plan. A student interested in pursuing this option should therefore meet with a faculty member to discuss possible thesis topics in the semester prior to the planned start of the research project, and should submit a research plan to the Graduate Operations Committee for approval at least one week prior to the start of the semester in which the research will begin. At least 6 credit hours of MAT 699 are required to fulfill the requirements of the Thesis Option, and the research is to be carried out over at least two semesters (or one semester and the 10-week summer session). In the event that a student's research diverges substantially from the initial plan, the student must submit a revised research plan to the Graduate Operations Committee for their approval. This should be done no later than the start of the second semester in which the student enrolls for MAT 699.
Once the research work is completed, the student must write the thesis according to Graduate College regulations as described in the Format Manual. In particular, the graduate College's format editor should give the thesis an initial format check at least a few weeks in advance of the thesis defense.

Before the thesis defense is scheduled, the student must first give copies of his/her thesis to the members of his/her Research Committee. This committee will verify that the objectives of the student's research plan have been met and that the work is of an appropriate standard. Only once it is agreed that the student is ready to defend, and following an initial format check, may the defense be scheduled.

On the completion of the written thesis, the student is required to give a public presentation of their work on the NAU campus. This presentation must occur within the month prior to the formal thesis defense.

The student's Research Committee must all be present at the thesis defense, and are free to ask questions on any material contained in the student's thesis. The defense is closed to all but the student and the Research Committee.

The Approval of Research Plan for Thesis form may be found on the Graduate Forms page at: http://nau.edu/cefns/natsci/math/student-resources/forms/

Also see the Graduate College link for formatting and procedures requirements: http://nau.edu/gradcol/student-resources/theses-and-dissertations/

The Department has resources to assist thesis students to produce their thesis in the correct format using LaTeX; ask your thesis advisor.

**IX. GRADUATE STUDENT GRIEVANCE PROCEDURE**

The Department of Mathematics and Statistics endeavors to maintain a congenial and responsive atmosphere for its students conducive with the educational purposes of the department and university. From time to time, misunderstandings and disagreements may arise during the course of a student's enrollment. In such cases the department utilizes procedures established by the university for handling student grievances and appeals.

Students with grade appeals should follow the grade appeal procedure described in the Student Handbook:

http://www4.nau.edu/ua/ASC/

Students with grievances related to academic issues other than grades should follow the Graduate College Academic Appeals Process:


Violations of the Safe Working and Learning Environment policy should be reported to the Office of Affirmative Action and Equal Opportunity:

http://nau.edu/diversity-nau/
These grievance procedures are available only for those matters for which the department or university has the ability to provide a remedy to the student.
X. DEPARTMENT OF MATHEMATICS AND STATISTICS
PERMANENT FACULTY

Chair: Michael Falk, Ph.D. (University of Wisconsin) Topology; Combinatorics
Jarrett Barber, Ph.D. (N.C. State University) Statistics, Bayesian Statistics, Spatial Statistics
Brian Beaudrie, Ed.D. (Montana State University) Mathematics education
Terence Blows, Ph.D. (University College of Wales, Aberystwyth) Ordinary differential equations
Barbara Boschmans, Ph.D. (Northern Arizona University) Mathematics, Technology Education
Brent Burch, Ph.D. (Colorado State University) Statistics; mixed linear models, variance components
Christina C., M.S. (Northern Arizona University) Mathematics
Terry Crites, Ph.D. (University of Missouri) Mathematics education
Robert Daugherty, M.E., M.S. (Northern Arizona University) Statistics
Arthur DeGraw, Ph.D. (University at Albany, SUNY) Optimal recovery theory
Stephanie Edgerton, M.S. (Mary Grove College) Mathematics
Dana Ernst, Ph.D (University of Colorado-Boulder) Combinatorics, Diagram algebras, Inquiry-based learning
Matthew Fahy, M.S. (Northern Arizona University) Undergraduate mathematics
Shannon Guerrero, Ph.D. (University of California-Davis) Mathematics education
Nellie Gopaul, M.S. (University of Arizona) Statistics
John Hagood, Ph.D. (University of Utah) Measure theory and integration; Probability
Jeffrey Hovermill, Ph.D. (University of Colorado-Boulder) Mathematics education
Guenther Huck, Ph.D. (University of Frankfurt) Low dimensional topology; combinatorial group theory
Shafiu Jibrin, Ph.D. (Carleton University) Operations research, semidefinite programming
Monika Keindl, M.A., M.S. (Arizona State University) Number theory, Statistics
Ellie Kennedy, M.A. (University of Colorado-Boulder) Mathematics
Katie Louchart, M.S. (Northern Arizona University) Undergraduate mathematics
John Neuberger, Ph.D. (University of North Texas) Nonlinear differential equations; Numerical analysis
Amy Rushall, M.M. (University of Tennessee-Knoxville) Undergraduate mathematics
Jeffrey Rushall, M.A. (University of Texas-Austin) Number theory; Undergraduate education
Roy St. Laurent, Ph.D. (University of Minnesota) Statistics; nonlinear regression; Diagnostics
Nándor Sieben, Ph.D. (Arizona State University) Operator algebras; Combinatorics; Game theory
Derek Sonderegger, Ph.D. (Colorado State University-Fort Collins) Statistics; Fiducial inference
James Swift, Ph.D. (University of California-Berkeley) Dynamical systems
Jin Wang, Ph.D. (University of Texas-Dallas) Statistics
Todd Wolford, Ph.D. (New Mexico Institute of Mining and Technology) Differential equations
XI. SCHEDULE OF GRADUATE COURSES

We have established a two-year rotation schedule for most graduate courses in the Department of Mathematics and Statistics (MAT and STA prefixes). What this means is that not every course is offered every year. Because of this, you should carefully plan your schedule of coursework in consultation with your advisor.

The Master of Science programs in Mathematics and Statistics are typically four-semester programs (no summer courses are available), while the M.S. Mathematics Education program is year-round.

The Rotation Schedule for graduate courses is updated regularly at:
DEPARTMENT OF MATHEMATICS AND STATISTICS
GRADUATE TEACHING ASSISTANT POLICIES

I. INTRODUCTION

This handbook sets forth some of the requirements regulating the teaching and classroom management of Graduate Teaching Assistants (GTAs) in the Department of Mathematics and Statistics at Northern Arizona University. In addition, this handbook provides suggestions and resources for new and continuing GTAs who are facing challenges in the classroom or who strive to improve their teaching. Finally, this handbook explains the structure of support and accountability for GTAs provided by several members of the Department of Mathematics and Statistics.

II. GENERAL INFORMATION

A number of ‘half-time’ 20 hours/week teaching assistantships are offered each year by the Department of Mathematics and Statistics. This number varies from year to year according to budgetary limitations. Subject to the normally available funding and satisfactory progress toward completing the degree plan, a student who is offered an assistantship may expect four semesters of support as a GTA. A half-time GTA is required to take 9 hours of coursework applicable towards his/her degree program each semester. For a half-time teaching assistant satisfactory progress means completion of 9 hours of coursework in his or her program each semester with a 3.0 grade point average.

The stipend for a half-time GTA in the Department of Mathematics and Statistics for the 2014-2015 academic year is $14,213. All GTAs at the university whose appointment is at least 10 hours per week receive an out-of-state tuition waiver, and a waiver of the resident tuition each semester of their appointment. GTAs who work 20 hours per week also receive a waiver of the student health insurance premium. All GTAs are expected to pay other applicable fees. The schedule of tuition and fees for the Fall 2015 semester is available at: http://nau.edu/SDAS/Tuition-Fees/Fall_Tuition/.

III. TYPICAL DUTIES OF A GTA

In the Department of Mathematics and Statistics at Northern Arizona University, when a GTA is assigned as the instructor of a course, he or she is responsible for every aspect of the delivery, assessment, and management of that course. To help prepare GTAs for these responsibilities, the department holds a GTA Training Week for first-year GTAs, typically the week prior to the start of the Fall semester, with training sessions led by members of the GTA Training Committee as well as other members of the department faculty.

Once a GTA is notified of his or her teaching assignment, it is the GTA's responsibility to consult the Master Syllabus for the course (kept on file in the department office) to become familiar with content and pacing requirements for that course. In addition, each GTA should borrow from the department office all textbooks and related materials required for his or her course. Prior to the start of the semester, each GTA should attend a coordination meeting for the course he or she has been assigned to teach at which the GTA will receive further information concerning the course from others who will be teaching it that semester as well the Course Coordinator. For many courses, such coordination meetings are held regularly throughout the semester (as often as weekly), and GTAs are required to attend all such meetings.

With the assistance of the Course Coordinator as well as other faculty who have taught the course in the past, each GTA will create his or her own syllabus (the requirements of which are explained further on
pages 17-19), which must clearly explain the structure, content, and requirements of the course. This syllabus, as well as all other significant course documents such as tests, projects, and major quizzes, must be looked over and approved by their Course Coordinator several days in advance of its distribution.

Creating lessons and assessments and assigning, collecting, and grading homework are the responsibility of each GTA, as guided by Course Coordinators. Members of the department faculty strive to assist and guide GTAs in all of these aspects of teaching to ensure quality instruction in the department.

To further meet the needs of their students, GTAs will hold office and/or lab hours on a consistent, scheduled basis, as assigned. The priority for office and lab hours must always be attention to students.

Course coordination meetings will notify GTAs of important deadlines, answer questions, and address issues and challenges faced by GTAs. These meetings also provide GTAs details of further requirements concerning faculty observations, special teaching projects they may be assigned or any other responsibilities, which may arise throughout the semester. *Attendance at these weekly meetings is mandatory.*

In addition to these *teaching* responsibilities for GTAs, each must also prioritize his or her time to diligently fulfill all the requirements of the courses he or she is taking as a student. This is clearly a difficult task, and the department strives to support and assist all GTAs in every aspect of their GTA experience.

**IV. SUPPORT FOR GTAS**

Many members of the faculty and staff throughout the Department of Mathematics and Statistics serve roles in which they provide direct support and guidance for GTAs in both their teaching and academic endeavors.

**GRADUATE OPERATIONS COMMITTEE**

This committee oversees the majority of academic issues for graduate students in the department. GTAs will be introduced to the chair of this committee and should address questions to him or her concerning such areas as advisor changes, transcript concerns, degree requirements, course availability, thesis and oral exam possibilities, and any other academic questions not immediately answerable by the GTA's Advisor.

**GTA Coordinator**

The GTA Coordinator supervises the teaching responsibilities of GTAs. He/She leads the Training Week and conducts monthly meetings with all GTAs. While a GTA’s Mentor and Course Coordinator provide much support and accountability, the GTA Coordinator serves as the primary supervisor regarding GTA performance evaluation.

**ADVISOR**

Upon acceptance to the graduate program, each graduate student is assigned an academic advisor. As well as fulfilling the normal advising duties (providing course and program information, graduation papers, career advice, etc.), the student’s Advisor also has a role to play in setting up the student’s Comprehensive Oral Examination Committee or Research Committee.
In addition to an academic Advisor, each GTA will also be assigned a Course Coordinator and a Mentor who will supervise and support the teaching responsibilities of the GTA. Mentors and Course Coordinators are faculty members in the department chosen by the department Chair. Course Coordinators have extensive experience with the courses they oversee, and they can often provide significant resources (planning calendars, past syllabi, exams, projects, etc.) as well as informed advice concerning the teaching of a particular course.

Course Coordinators are required to observe the teaching of their GTA mentee at least once per semester, completing an evaluation form and sharing their observations with the GTA after each observation. GTAs are required to have their syllabus, exams and other significant course documents approved by their Course Coordinator prior to distributing them. Along with their Course Coordinator, GTAs should also feel open to utilize their Mentor as a valuable resource concerning structuring their instruction and assessments, handling classroom management issues, and any other challenges they have regarding their teaching responsibilities. (For a detailed description of the responsibilities of a Course Coordinator and the evaluation form to be filled out during GTA observations, see Appendices 1 and 2.)

V. REQUIREMENTS OF GTAS

The following are some of the requirements to which GTAs must adhere in their teaching and classroom management. All other pertinent policies mentioned in other official documents of the Department of Mathematics and Statistics and Northern Arizona University must also be followed by GTAs.

1. To continue his or her appointment, a GTA must make satisfactory progress toward his or her chosen degree plan; specifically, a GTA must complete 9 hours of coursework in his or her program each semester with at least a 3.0 grade point average.

2. GTAs are required to attend all regularly scheduled meetings held by the GTA and Course Coordinators.

3. GTAs are required to maintain an active relationship with their Course Coordinators. GTAs must have all significant course documents (including, but not limited to, the course syllabus and exams) approved by their Course Coordinator prior to the distribution of these documents. Course Coordinators must also approve mid-semester and end-of-semester grades before they can be submitted by a GTA. At the end of each semester, each Course Coordinator must view, discuss, and approve a hard copy of their mentee's entire grade sheet.

4. An electronic grade sheet must be created and maintained by each GTA for each course taught. The Course Coordinator will provide a template for this grade sheet. This grade sheet and the scores it contains must be clear and easily understood, especially how its various portions combine to generate a student's overall course grade.

5. All faculty members of the Department of Mathematics and Statistics are required to hold regularly scheduled office and lab hours to provide further assistance to their students. Missing any class or lab hours without advance permission is strictly prohibited. If a GTA must miss class or lab due to illness or any other reason, they should notify the Course Coordinator by email in advance, with copies to the GTA Coordinator, the Administrative Associate in the department office, and the chair. GTAs are expected to be physically available to their students during their regularly-scheduled office hours.

6. Each GTA will create a syllabus for each course taught, to be distributed to students on the first day of class. This syllabus must conform to the department's Master Syllabus for the course and must be
approved in advance of distribution by the Course Coordinator. The university's approved format for course syllabi requires the following information:

General Information
   Name of college and department
   Course prefix, number, and title
   Semester in which course will be offered
   Clock hours, credit hours
   Instructor's name
   Office address
   Office hours
Course prerequisites
Course description
Student learning expectations/outcomes
Course structure/approach
Textbook and required materials
Recommended optional materials/references
Course outline
Assessment of student learning outcomes
   Methods of assessment
   Timeline of assessment
Grading system
Course policies
   Retests/makeup tests
   Attendance
   Statement on plagiarism and cheating

Attached to the syllabus must be a statement of university policies which is made available by the department.

In addition to these requirements, GTAs should include a statement of course policies on other pertinent issues such as calculators and cell phones. The syllabus must also contain the date and time of the Final Exam (as determined by the university's End of Term Week Policy and Final Exam Schedule, viewable at http://nau.edu/Registrar/Important-Dates/Fall/).

To assist GTAs in preparing their course's syllabus, samples of past syllabi can be made available by the Course Coordinator and the GTA Coordinator.

7. To provide important and timely feedback, GTAs should return all assessments to students as quickly as possible, except the Final Exam. Final Exams cannot be returned to students. Graded Final Exams must be organized neatly, clearly labeled, and turned in to the department office after course grades have been submitted.

8. GTAs must be aware of and hold to the guidelines for distributing student information determined by the Family Educational Rights and Privacy Act (FERPA). Online FERPA training is provided through the university and must be completed before GTAs can access important course information, such as class rosters.
9. The department makes every effort to equip all faculty with enough resources and facilities to provide excellent instruction to its students. Nevertheless, it is each faculty member's responsibility to be conscientious in his or her use of resources, minimizing waste and seeking ways to limit the use of department supplies and equipment. Specifically, GTAs must adhere to limits set by the department on printing and photocopying (the specifics of these limits are available from the department building manager).

10. GTAs must adhere to all other applicable policies of the department and university.

**Ethics and Professionalism**

Graduate assistants, trainees and fellows must adhere to general standards of professionalism and to the specific professional ethics of each discipline, just as NAU’s faculty and professional staff must do. This involves exercising the highest integrity in the various activities as a graduate student, fellow and assistant, which include, but are not limited to the following:

- taking examinations;
- engaging in field internships and practica;
- collecting, analyzing, and presenting research data;
- working with undergraduate students.

**Probationary Period**

A new graduate assistant is on a probationary appointment for one semester.

During the probationary period, all graduate assistants must complete NAU’s Safe Working and Learning Environment training. This training is offered at the orientation for new graduate students. Failure to complete this training during probation is cause for dismissal. It is mandatory that all graduate assistants must complete training in the prevention of sexual harassment within 30 days of hire. This training may be completed during the orientation for new graduate students held in August, or the student may complete the online Preventing Workplace Harassment Training.

During the probationary period, a graduate assistant can be released from employment without cause, without notice, and without a statement of reasons; however, graduate assistants must be evaluated at least once during the probationary period, and must be given a written copy of the evaluation. If performance-related problems arise during this period, the supervisor should meet with the graduate assistant on a regular basis to discuss problems and work on ways to resolve them. Graduate assistants may appeal their release to the Graduate Dean, whose decision is final.

Graduate assistants who successfully complete the probationary period do not serve another probationary period, unless they move into a new position.

**GTA Oversight Protocol**

Course Coordinators, Assistant Course Coordinators, Department of Mathematics & Statistics and LMC Staff, and others as appropriate, are to complete a GTA FEEDBACK FORM (Appendix 1) documenting any perceived negligence, inappropriate behavior, failure to fulfill required duties, unsatisfactory performance, or any other incident which is believed to worth documenting. The GTA FEEDBACK FORM is given to the appropriate Course Coordinator (even if the incident is not directly related to responsibilities associated with the specific course the GTA is assigned to teach). Repeated or serious
incidents must be reported to the GTA Coordinator immediately (in addition to the completion and submission of a GTA FEEDBACK FORM).

Each Course Coordinator (or Assistant Course Coordinator) will conduct a classroom observation of each GTA teaching her/his course within the first three weeks of the semester and complete a GTA OBSERVATION FORM (Appendix 2). As soon as possible after the observation, the Course Coordinator will meet with the GTA to discuss the observation and both will sign the GTA OBSERVATION FORM documenting their discussion.

As deemed appropriate by each Course Coordinator, she/he (or the Assistant Course Coordinator) will conduct a second classroom observation of each GTA teaching her/his course later in the semester, completing another GTA OBSERVATION FORM, meeting again with the GTA to discuss the observation, and signing the GTA OBSERVATION FORM to document their discussion.

Four times throughout the semester (roughly during weeks 2, 8, 12, and 16), each Course Coordinator (or Assistant Course Coordinator) will view the gradebook (and/or other vital course management documents or systems) of each GTA teaching her/his course. The Course Coordinator will document their approval of the gradebook on these occasions on the GTA GRADEBOOK APPROVAL FORM (Appendix 3). Prior to the submission of midterm and final semester grades, each Course Coordinator will discuss overall course grades with each GTA teaching her/his course, indicating their approval of the grades on these occasions on the GTA GRADE APPROVAL FORM.

At the end of each semester, each Course Coordinator will complete a GTA SEMESTER SUMMARY REPORT (Appendix 4) for each GTA teaching her/his course. This summary report should cite all of the forms/reports completed regarding each individual GTA throughout the given semester (e.g. forms/reports described above). The GTA SEMESTER SUMMARY REPORT, along with all other forms/reports generated for the given semester will be submitted to and stored by the GTA Coordinator.

At the end of each semester, the GTA Coordinator will complete a GTA EVALUATION FORM (Appendix 5) for each GTA. This evaluation form will reflect the input provided in forms/reports supplied by Course Coordinators. The GTA Coordinator will discuss each GTA EVALUATION FORM with each individual GTA, with both signing the form to document their discussion, and a copy of all GTA EVALUATION FORM will be supplied to the Graduate Operations Committee and will be available to the Department Chair.

Unsatisfactory academic or professional performance will result in the completion of a Professional Growth Plan (Appendix 6).

VI. SUGGESTIONS FOR TEACHING

The following are a few tips for teaching and classroom management for GTAs who may have little to no previous teaching experience or for those who do, but who strive to improve the quality of instruction they provide.

1. *Be thorough and clear on the syllabus.* The syllabus is a form of contract between the instructor and the students, so careful attention should be paid to the details which are included in the syllabus. Trying to foresee questions or concerns students may have and addressing them beforehand in the syllabus can drastically reduce decisions and difficulties which could arise throughout the semester. (Examples include policies about calculators, cell phones, makeup tests, and extra credit.) Any changes which need to be made to policies outlined in the syllabus should be expressed in writing and distributed to all students.
2. *Strive to make the first day of class a clear reflection of the structure and nature of the overall course.* First impressions are very important, and students often draw strong conclusions about a course or instructor after the very first day. Carefully preparing the details of the first day of instruction help assure it is representative of what can be expected throughout the remainder of the semester. At a minimum, GTAs should plan on calling roll, distributing, reading, and answering questions on the syllabus, and providing a small amount of lecture on the first day. Carefully explaining the syllabus should give students a feel for the day-to-day processes of the course (when will homework be assigned and collected, how much material will be covered on each exam, whether calculators or notes can be used on tests, etc.) and making time to give some lecture allows the students to begin getting a feel for the instructor's style of teaching.

3. *Learn students' names as quickly as possible.* Knowing students' names and attempting to connect with them on a personal level shows them that you have an interest in their individual performance.

4. *Understand the content you teach from many perspectives.* It is essential for effective instruction that you have a solid knowledge of the material being covered. But, as graduate students in mathematics or statistics, GTAs have significantly more background knowledge and experience with mathematical concepts than their students in introductory level mathematics courses. It is often a difficult task to appreciate the perspective of students and to be capable of understanding and explaining content from that perspective.

5. *Make an effort to frequently observe the teaching of other department members.* GTAs should make the time to sit in on courses taught by several different instructors, especially during their first semesters teaching. This will expose them to varying teaching styles and methods for covering content. If possible, GTAs should try to observe in the same course which they are teaching, providing fresh perspective on material they are familiar with.

6. *Build the answer to the question "Why?" into your lectures and presentations.* In preparing to teach a topic, you should make every effort to anticipate questions students may have and incorporate the answers to these questions into your explanation. A very common example of this in mathematics and statistics courses is "why do we need to know this?" By understanding and showing the importance and application of the material, both within the particular course in which it is taught and within other courses and disciplines, an instructor can increase students' interest and appreciation for a topic, as well as improve their overall motivation toward the course.

7. *Use a "snapshot philosophy" when working at the board.* For reasons good and bad, students often lose track of a lecture and must copy notes from the board without following the flow of what they are writing or understanding its context. Recognizing this, you should not only endeavor to write clear and thorough notes on the board, but you should arrange your notes on the board in such a way that, if students were to take a "snapshot" of the board at any given time, they could make out the flow of thought and purpose behind the examples, definitions, explanations, etc. which you have written. Producing such a "snapshot" involves many factors, including: always proceeding in your notes from left to right and from top to bottom, just as English is read; writing in complete sentences with correct spelling; limiting the use of personal shorthand or abbreviations, and only using these when they are preceded by a careful explanation; clearly labeling drawings and graphs and annotating examples with pertinent references and reminders; distinguishing between different categories of text (e.g. definitions, theorems, examples, etc.); and writing everything you expect the students to know and remember on the board.

8. *Be conscientious and assertive regarding classroom management.* Even though GTAs will be teaching university courses, the possibility for discipline and behavior issues still unfortunately exists.
As often as possible, situations should be avoided by stating clear policies in the syllabus governing issues such as attendance (including arriving late to and leaving early from class), cell phone use, etc. If instances do occur which the GTA feels merit attention, he or she should notify his or her mentor and the GTA Coordinator as soon as possible. In the event that instances recur, the GTA should document these in writing and update his or her Course Coordinator and the GTA Coordinator as needed. In general, GTAs should not hesitate to notify the GTA Coordinator of any circumstance with which they are uncomfortable.

9. *Have fun.* Teaching is a rewarding opportunity to challenge and interact with students. GTAs should value the chance they have to be a positive influence on their students’ academic pursuits and should approach their teaching with excitement and enthusiasm. Unfortunately, many students in introductory mathematics courses have negative attitudes toward school in general and mathematics in particular, but a GTA who shows real enjoyment of the content being taught can make such students relaxed and more receptive to the material.
APPENDIX 1: GTA Feedback Form

<table>
<thead>
<tr>
<th>Your Name</th>
<th>GTA’s Name</th>
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</thead>
<tbody>
<tr>
<td>GTA’s Teaching Assignment</td>
<td>Semester</td>
</tr>
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</table>

*Note: If multiple GTAs were involved in a single incident, please complete a separate form for each GTA*

Description of Incident

Are you aware of any previous occurrences of this or related incidents involving this GTA? If so, briefly describe the details of any previous occurrences.

Please promptly submit this form to the Course Coordinator responsible for the course this GTA is currently teaching. (Contact the GTA Coordinator, Matthew.Fahy@nau.edu, if you are unsure of who the appropriate Course Coordinator is.)

*Note: Repeated or serious incidents must be reported (via the most immediate form of communication possible) to the GTA Coordinator in addition to the completion and submission of this form.*
APPENDIX 2: GTA Observation Form

<table>
<thead>
<tr>
<th>Your Name</th>
<th>GTA’s Name</th>
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</thead>
<tbody>
<tr>
<td>GTA’s Teaching Assignment</td>
<td>Semester</td>
</tr>
</tbody>
</table>

Approximate number of students present

Briefly comment on these aspects/features of the class you observed:
GTA’s punctuality

GTA’s demeanor

Organization and delivery of course content

Student engagement

Other observations

Some specific things this GTA could improve upon

Overall summary

The signatures below document that we have met and discussed this observation. We have also discussed the recommendations of the observer and appropriate follow-up measures.

<table>
<thead>
<tr>
<th>Observer’s Signature</th>
<th>Date</th>
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<tbody>
<tr>
<td>GTA’s Signature</td>
<td>Date</td>
</tr>
</tbody>
</table>
APPENDIX 3: GTA Gradebook Check-In Form

<table>
<thead>
<tr>
<th>Your Name</th>
<th>GTA’s Name</th>
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</thead>
<tbody>
<tr>
<td>GTA’s Teaching Assignment</td>
<td>Semester</td>
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</table>

**Check-in #1**

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<td>Comments</td>
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Course Coordinator Signature

**Check-in #2**

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<td>Comments</td>
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Course Coordinator Signature

**Check-in #3**

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<td>Comments</td>
<td>Comments</td>
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Course Coordinator Signature

**Check-in #4**

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<tr>
<td>Comments</td>
<td>Comments</td>
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</tbody>
</table>

Course Coordinator Signature
APPENDIX 4: GTA Grade Approval Form

<table>
<thead>
<tr>
<th>Your Name</th>
<th>GTA’s Name</th>
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</thead>
<tbody>
<tr>
<td>GTA’s Teaching Assignment</td>
<td>Semester</td>
</tr>
</tbody>
</table>

**MIDTERM GRADES**
Is the GTA’s gradebook clearly organized and up to date?

List any specific gradebook items and/or students for which/whom it appears appropriate to deviate from the standard grading policy dictated by the course syllabus. Please provide thorough explanation and justification of all such deviations.

The signatures below document that we have met, viewed, and discussed the gradebook and overall Midterm Grades of the GTA named below.

<table>
<thead>
<tr>
<th>Course Coordinator’s Signature</th>
<th>Date</th>
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</thead>
<tbody>
<tr>
<td>GTA’s Signature</td>
<td>Date</td>
</tr>
</tbody>
</table>

**FINAL COURSE GRADES**
Is the GTA’s gradebook clearly organized and up to date?

List any specific gradebook items and/or students for which/whom it appears appropriate to deviate from the standard grading policy dictated by the course syllabus. Please provide thorough explanation and justification of all such deviations.

The signatures below document that we have met, viewed, and discussed the gradebook and overall Final Course Grades of the GTA named below.

<table>
<thead>
<tr>
<th>Course Coordinator’s Signature</th>
<th>Date</th>
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<tbody>
<tr>
<td>GTA’s Signature</td>
<td>Date</td>
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</tbody>
</table>
APPENDIX 5: GTA Semester Summary Report

<table>
<thead>
<tr>
<th>Your Name</th>
<th>GTA’s Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>GTA’s Teaching Assignment</td>
<td>Semester</td>
</tr>
</tbody>
</table>

*Once completed, this form should be submitted, along with all related forms/reports, to the GTA Coordinator*

Indicate whether the GTA named above satisfactorily completed the following aspects of her/his responsibilities. Please provide explanation and cite specific details (date, location, etc.) of any incidents of negligence.

Preparation and delivery of course content

Timely grading and return of course assessments

Attendance at course coordination meetings

Regular maintenance of gradebook

Regular posting of student grades in BbLearn

Please provide a brief summary of this GTA’s overall performance this semester

Course Coordinator’s Signature

Date
APPENDIX 6: PROFESSIONAL GROWTH PLAN (PGP) FORM

Student: ________________________________  Student ID #: ______________

Program: [ ] M.S. Mathematics  [ ] M.S. Statistics  [ ] M.S. Mathematics Education

Year in Program: ______

Advisor: ________________________________  Evaluation Date: __________

Print Name

Objective 1. _____
Activities to Accomplish the Objective: _____
Timeline for Completing Activities: _____
Criteria for Successfully Completing the Objective: _____

Objective 2. _____
Activities to Accomplish the Objective: _____
Timeline for Completing Activities: _____
Criteria for Successfully Completing the Objective: _____

Objective 3. _____
Activities to Accomplish the Objective: _____
Timeline for Completing Activities: _____
Criteria for Successfully Completing the Objective: _____

Objective 4. _____
Activities to Accomplish the Objective: _____
Timeline for Completing Activities: _____
Criteria for Successfully Completing the Objective: _____

Date PGP Successfully Completed: ________________

Advisor Signature: ________________________________

Student Signature: ________________________________

Graduate Coordinator Signature: ________________________________

Chair (or Representative) Signature: ________________________________