

2018-2019  
**Mathematics and Statistics Education  
Graduate Student & Faculty Handbook**

Department of Science, Technology, Engineering, & Mathematics  
Education  
College of Education  
North Carolina State University

Poe Hall  
Campus Box 7801  
2310 Stinson Drive  
Raleigh, North Carolina 27695-7801

<http://ced.ncsu.edu/academics/departments/stem/mathematics-education>

Also see the College of Education Graduate Student Services website for answers and links to commonly needed information

<https://ced.ncsu.edu/graduate/graduate-student-services/>

The NCSU Graduate Handbook contains the most up-to-date Information on all *university* Graduate School rules and regulations.

All Mathematics Education Rules and Policies fall within the parameters set by the Graduate School policies as of 10/02/2017.

**Please refer to the NCSU Graduate Handbook  
if you have questions about requirements that are related to the *university*.**

<http://www.ncsu.edu/grad/handbook/index.htm>

## General Information

### Introduction

The NC State Mathematics Education graduate programs are competitive and recognized for their quality at the state and national level. In 2007, Reys, Glasgow, Teuscher, and Nevels reported that NC State's doctoral program was ranked (19<sup>th</sup>) as one of the top programs in the nation for having a "particularly strong doctoral program and one you would recommend." Reys et al. (2007) also reported that the Mathematics Education Ph.D. program at NC State is a top producer of mathematics education doctorates in the United States -- ranked 8<sup>th</sup> in production since 1990. In 2016, Reys and Reys reported that between 2000 and 2009 NC State was the 6<sup>th</sup> largest producer of PhDs in mathematics education and between 2010 and 2014 the 4<sup>th</sup> largest producer of PhDs in mathematics education.

The Mathematics Education graduate programs are administered in the Department of Science, Technology, and Mathematics Education in the College of Education. A strong emphasis on pedagogical content knowledge, disciplinary content knowledge and technological innovation is a defining characteristic of our graduate programs. Masters students take their minor courses in the Departments of Mathematics, Statistics, Computer Science, and occasionally Operations Research. Two degrees are offered at the master's' level, a Master's of Education (M.Ed.) and a Master's of Science (M.S.). At the doctoral level students are enrolled in the Mathematics and Statistics Education Program Area of Study and receive a Ph.D.\* in the Learning and Teaching of STEM.

The **Ph.D. Degree** program in Mathematics Education enrolls students who are knowledge-seekers and are eager to pursue educational problems and develop critical thinking skills in a collaborative environment. The program prepares individuals to be knowledgeable about and prepared to accept positions related to:

- 1) scholarly inquiry and discourse in mathematics education,
- 2) preparation of K-12 mathematics teachers,
- 3) instruction and development issues in K-16 mathematics, and
- 4) leadership positions in mathematics education.

Close affiliation and research opportunities at the [William and Ida Friday Institute for Educational Innovation](#) provides our students with exceptional opportunities to explore the role of technological innovation in mathematics education and pursue related research.

Programs at each level build upon the preparation found in the mathematics education programs of the previous level. The **master's degree** program is built upon and assumes a strong preparation in mathematics and mathematics education at the undergraduate level. The design of the **Ph.D.** program, in turn, assumes the preparation defined in the master's degree program.

[\* Note: Students enrolled in the Master of Arts (M.A.T.) program pursuing 9-12 licensure take many classes within our department; however their program is administered through the M.A.T. office. See <http://ced.ncsu.edu/mat/mathematics>.]

## ADMISSIONS PROCEDURES

Applicants to Ph.D. degree program is strongly preferred to have K-16 teaching experiences. The faculty views such experience as a strong foundation on which to build rigorous advanced degree preparation. Although the Graduate School has made rare exceptions, applicants are expected to have at least a 3.0 undergraduate GPA (out of 4.0) in mathematics education or a related program of study. GRE scores are used as a complement to undergraduate performance; verbal scores at or above the 50th percentile and quantitative scores at the 75th percentile are preferred. Verbal and Analytical Writing scores on the GRE are especially important for Ph.D. applicants as they are deemed as an initial indicator of students' writing ability. Students' writing ability and their suitability for studying mathematics education are also assessed via the writing sample (personal statement) provided by students in the application process. Faculty members discuss each candidate's application folder and vote to admit or not admit. Graduate students who are admitted to our programs typically have an undergraduate GPA above 3.30 and GRE scores above: 151 V (50th percentile), 157 Q (75th percentile), and 4.5 AW. Overall, in 2013, the students that were admitted to our graduate programs had a mean score in GRE Verbal of 152.5 (53<sup>rd</sup> percentile), and mean score in GRE Quantitative of 159.1 (82<sup>nd</sup> percentile).

Applications are reviewed twice per year, with all documents submitted for review with deadlines of December 1st. Applicant's academic record, GRE scores, recommendations, and personal statement are considered jointly in making admission decisions. *Personal statements should include information about experiences in mathematics education but should also include career goals and why the applicant feels that the NCSU graduate program is a good fit for their experiences and career path.*

As applicants to the program are reviewed, faculty considers the applicant's background and interests in relation to faculty expertise. Upon recommendation of the graduate faculty to accept an applicant into the program, a faculty member agrees to be the initial advisor/chair.

Admissions decisions and any offer of financial aid are done as two separate processes. Admission does not guarantee an offer for financial aid.

**\*\*\*If a currently enrolled Master's student wishes to continue on to pursue a Ph.D., they need to submit a new application. An interested Master's student should submit a personal statement to the graduate program coordinator and graduate administrative assistant before the deadline of December 1st. The statement should address why the student wishes to pursue the PhD degree and discuss their progress on their research for their master's degree. \*\*\***

## IMPORTANT PLACES & PEOPLE

### Department of Science, Technology, Engineering, & Mathematics Education

Poe Hall Suites 326, 502, and 510

Main Telephone: (919) 515-2238

<http://ced.ncsu.edu/stem>

### Christy Buck

Graduate Administrative Assistant

Poe 510

Phone: 515-1740

Fax: 515-6892

[cjbuck@ncsu.edu](mailto:cjbuck@ncsu.edu)

Ms. Buck handles all aspects of graduate education, including: admission applications, initial forms for new students, scheduling students in courses based on permission of instructor, all paperwork for graduate education (e.g., Request for Preliminary or Final Examinations), completion of forms for graduation.

## FINANCIAL AID

The following opportunities are by no means exhaustive. Graduate students are encouraged to discuss opportunities with their advisor and to seek a variety of outlets for financial aid.

### *Internal*

#### 1. Teaching and Research Assistantships

Many assistantships (20 hrs per week) are available in Mathematics Education through a variety of venues. Some students are hired as Teaching Assistants (TAs) in the department to teach undergraduate courses such as EMS204, EMS480, EMS470, and supervise middle and high school mathematics student teachers. TAs are typically full-time Ph.D. students. Teaching Assistants are also hired during the summer to teach MA 101 in the mathematics department. Some students are also hired as Research Assistants to work on particular research projects with faculty. Most RA positions are funded through grant sources that are only available for the duration of a particular grant. Other RA positions are supported by departmental funds or funds through the Friday Institute for Educational Innovation. Some Assistantships are 9-month contracts while others are for 12-months. Thus the salary range for positions varies and depends on the funding source. Typical salaries are \$12,000-\$22,000 for 9 months. All TAs and RAs who are eligible for the Graduate Student Support Program (GSSP) will receive in-state tuition and health insurance. Those coming from out-of-state are typically eligible for 1 year of support of out-of-state tuition until they meet residency requirements. Please see GSSP and North Carolina Residency information on page.

Interested students can complete an application for an assistantship through the Graduate Secretary. TA and RA positions may or may not be advertised through a central source. Thus, *it is very important for students seeking assistantships to talk directly with faculty about their interests and possibilities for funding.*

## 2. Part-time Opportunities

**Work-study** – Work-study jobs are available through the University for qualifying students. See the University’s work-study page ([http://www.fis.ncsu.edu/workstudy\\_jobs/workstudy.asp](http://www.fis.ncsu.edu/workstudy_jobs/workstudy.asp)) for more information. The University also maintains a listing of student job opportunities that do not require work-study at [http://www.fis.ncsu.edu/student\\_jobs/selectjobs.html](http://www.fis.ncsu.edu/student_jobs/selectjobs.html).

**Hourly RA appointment** – University professors may have hourly RA appointments available for short durations. Students are encouraged to ask faculty directly about such opportunities. These are great opportunities for becoming involved with research projects on a limited basis.

## 3. Scholarships available through College of Education

There are a variety of small scholarships available through the College of Education that master’s and doctoral students can apply for. Please see the webpage for more information. <https://ced.ncsu.edu/graduate/financing-graduate-education/scholarship-opportunities/>. You can also call or email questions at 515-3325 or [CED\\_Scholarships@ncsu.edu](mailto:CED_Scholarships@ncsu.edu).

### *Norman Anderson and J. Conrad Glass, Jr. Fellowship*

Provides one scholarship to a Graduate student enrolled in Adult and Higher Education and one scholarship to a Graduate student enrolled in Mathematics, Science, and Technology Education.

### *Agnes and Garfield Stiff Endowment for Graduate Travel*

Supports Doctoral or Master of Science degree students in the Department of Mathematics, Science, and Technology Education who make presentations at professional meetings. No single award shall exceed \$1000 or be less than \$500. To be eligible for an award, a graduate student must have a presentation that has been accepted at a regularly scheduled conference, symposium, or workshop sponsored by a national or state professional organization representing the disciplines in the Department. (Poster sessions do not qualify.)

## 4. Scholarships or Fellowships available through NC Graduate School

A number of fellowship and grant programs which are administered by the Graduate School. Some of these programs require a student to be nominated by faculty, while others allow a student to apply directly. Please see <http://www.ncsu.edu/grad/financial-support/opportunities.html>. A few of the programs that students can apply for include:

- *Diversity Enhancement Program*. Students must be fulltime US citizens to apply. There are two parts to this program, the UNC Campus Scholarship program for NC residents, and the Diversity Graduate Assistance Grant. Criteria for selection include: academic record, character, creativity, educational and economic background, race and ethnicity, gender, exceptional personal talents, unique work or service experience, and leadership potential. Applicants must add to the goal of increasing diversity in graduate education at North Carolina State University. Grant awards are

based on financial need and require that a FAFSA (Free Application for Federal Student Aid) form. Stipend amounts are based on financial need up to \$3000 for the academic year. Priority deadlines are typically in early April. See <http://www.ncsu.edu/grad/diversity/grants.html>.

- *Preparing for the Professoriate* program gives faculty and doctoral students the opportunity to engage in a significant mentoring activity over the course of an academic year. It is a central component of NC State's professional development programs for graduate students through providing students with a hands-on teaching opportunity under a distinguished faculty mentor who is recognized for his or her teaching skills. The program is open to doctoral students who plan careers as faculty members at colleges and universities. Students earn a \$500 stipend and valuable teaching experience. See <http://www.ncsu.edu/grad/preparing-future-leaders/teaching-programs/ptp>.
- *Graduate Research Ethics Fellowship*. This fellowship will be awarded to a doctoral student at NC State University who is interested in conducting an in-depth study of research ethics for one academic year. Applicants should be enrolled in a doctoral program with at least 18 credit hours completed and have had some research experience by the beginning of the fellowship term. Stipend is \$5000. Applications typically due in late September. See <http://www.ncsu.edu/grad/financial-support/wilkinson.html>.

#### 5. GSA Travel Grants

The Graduate Student Association (GSA) offers travel subsidy to fund graduate student conference travel. To find more about the grant see <http://gsa.ncsu.edu>.

### **External**

#### 1. Scholarships for full-time teachers from

- National Council of Teachers of Mathematics offers Mathematics Graduate Course Work Scholarships for grades 6-8 teachers.

The purpose of this \$3200 grant is to provide *NCTM members* financial support for improving teachers' understanding of mathematics by completing graduate course work in mathematics. See links to grant opportunities <http://www.nctm.org/Grants/>

- North Carolina Council of Teachers of Mathematics offers Graduate Scholarships to support practicing teachers. Supports *NCCTM members* who are elementary or secondary school teachers of mathematics and who are enrolled in a graduate program taking graduate courses in mathematics and/or mathematics education. The Trust Fund Committee awards scholarships of \$1000 to as many qualified applicants as the available investment income from the proceeds of the Trust Fund will permit. Scholarship applications may be submitted during the year, but will be reviewed each October 1 and March 1, with grants made at that time. Please see <https://www.ncctm.org/grants-scholarships/>

#### 2. College Foundation of NC.

The Foundation has a scholarship-loan program called the North Carolina Student Loan Program for Health, Science, and Mathematics. Deadlines are typically May 1 for initial applications and April 1 for renewals. North Carolina residents may borrow up to \$10,000 per year (masters) and \$14,000 per year

(doctoral) if there is demonstrated need. For each year of full-time study supported by the loan, the recipient must teach in a NC public K-12 school or post-secondary institution for one year to forgive the loan. For further information and/or application, please call 1.800.700.1775 and select option "1" or visit <http://www.ncseaa.edu/HSM.htm>.

### ***Support for Dissertation Research***

1. National Academy of Education/ Spencer Foundation Dissertation Fellowships. These are competitive Dissertation Fellowships for Ph.D. students. The program seeks to encourage a new generation of scholars from a wide range of disciplines and professional fields to undertake research relevant to the improvement of education. These \$25,000 fellowships support individuals whose dissertations show potential for bringing fresh and constructive perspectives to the history, theory, or practice of formal or informal education anywhere in the world. Applications are generally due in early October for work that can begin as early as the next June. Please see [http://www.naeducation.org/NAED\\_080200.html](http://www.naeducation.org/NAED_080200.html)
2. Ford Foundation Dissertation Fellowships  
Annual awards of approximately 20-30 dissertation fellowships worth \$25,000. The dissertation fellowships provide one year of support for individuals working to complete a dissertation leading to a Doctor of Philosophy (Ph.D.) or Doctor of Science (Sc.D.) degree. Dissertation fellowships are awarded in a national competition administered by the National Research Council (NRC) on behalf of the Ford Foundation. Application deadline is typically mid-November. See the website for details [http://sites.nationalacademies.org/PGA/FordFellowships/PGA\\_047959](http://sites.nationalacademies.org/PGA/FordFellowships/PGA_047959).
3. National Science Foundation Graduate Research Fellowship Program. The purpose of the NSF Graduate Research Fellowship Program (GRFP) is to help ensure the vitality and diversity of the scientific and engineering workforce of the United States. The program recognizes and supports outstanding graduate students who are pursuing research-based master's and doctoral degrees in science, technology, engineering, and mathematics (STEM) or in STEM education. The GRFP provides three years of support for the graduate education of individuals who have demonstrated their potential for significant research achievements in STEM or STEM education. NSF especially encourages women, members of underrepresented minority groups, persons with disabilities, veterans, and undergraduate seniors to apply. See [https://www.nsf.gov/funding/pgm\\_summ.jsp?pims\\_id=6201](https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=6201) for more information.
4. AERA Minority Dissertation Fellowship in Education Research  
The Council of the American Educational Research Association (AERA) established the AERA Minority Dissertation Fellowship in Education Research to provide support for doctoral dissertation research. The purposes of the program are to advance education research by outstanding minority graduate students and to improve the quality and diversity of university

faculties. This program offers doctoral fellowships to enhance the competitiveness of outstanding minority scholars for academic appointments at major research universities. It supports fellows conducting education research and provides mentoring and guidance toward the completion of their doctoral studies. For more information go to:

<http://www.aera.net/ProfessionalOpportunitiesFunding/FundingOpportunities/AERAMinorityFellowshipProgram>.

## FULL-TIME STATUS

Students will be classified as full time if they take at least 9 hours per semester until the semester in which a load between 3 and 8 hours will reach an accumulated total equal to the minimum number of hours required by the program. Full time for that semester will be that load. Full time thereafter will be a **minimum of 3 hours per semester**. Course number does not matter. Students who are registered for less than that required for full-time but are registered for at least 4.5 hours will be considered half-time.

## GRADUATE STUDENT SUPPORT PLAN (GSSP)

The Graduate Student Support Plan is a financial package that the university offers to attract and retain excellent graduate students. Under this plan, any eligible students whose research assistantship (RA) or teaching assistantship (TA) pays at least an annualized salary of \$8,000 qualifies to receive health insurance and tuition coverage. Students must also meet minimum registration requirements for the semesters in which they are eligible. Detailed information about the GSSP timeline is at [http://www.ncsu.edu/grad/support-plan/docs/pocket\\_chart.pdf](http://www.ncsu.edu/grad/support-plan/docs/pocket_chart.pdf). Please note that GSSP funding is only available for 4-10 semesters depending on your degree program and that the **timeline begins on the date of your initial enrollment** (full or part time). Although students are no longer eligible for tuition beyond the specified number of semesters, they can receive health benefits if they meet minimum registration requirements.

Degree Sought	Full Tuition and Health GSSP Coverage
Master's Only	4 semesters
Ph.D. (Student has previously earned a Masters in related field)	8 semesters
Ph.D. (Student does NOT already have a Masters in related field) **	10 semesters

\*\*If a student starts in a master's program and continues straight through to a PhD program, they are eligible for a total of 10 semesters starting with the date of enrollment in the master's program. To find more information about the GSSP, please see the annual GSSP handbook published by the graduate school. An electronic version can be found at: <http://www.ncsu.edu/grad/support-plan/docs/gsspdbk.pdf>. All information about GSSP benefits, eligibility requirements, enrollment requirements and any other information can be found in this document.

## NORTH CAROLINA RESIDENCY

Graduate students entering the program who are not residents of North Carolina are highly encouraged to establish legal residency in North Carolina for tuition purposes. Out-of-state



students funded as TAs or RAs are typically only eligible for 1 year of out-of-state tuition support until they meet residency. Detailed information about this process is provided at <http://www.ncsu.edu/grad/tuition-residency> and all students applying for residency should thoroughly read this website. Applications are accepted for the below listed semesters or summer session beginning with the stated date:

For Spring Semester	Opens: September 14 <sup>th</sup>	Closes: 10 <sup>th</sup> day of class, spring semester
For First Summer Session	Opens: March 1 <sup>st</sup>	Closes: 3 <sup>rd</sup> day of class, summer session I
For Second Summer Session	Opens: March 1 <sup>st</sup>	Closes: 3 <sup>rd</sup> day of class, summer session II
For Fall Semester	Opens: March 1 <sup>st</sup>	Closes: 10 <sup>th</sup> day of class, fall semester

Although the last day of any semester or term that the complete residency applications will be received is the last day of exams for that semester or term, **students are encouraged to submit their application as soon as possible and before tuition bills are mailed** in case problems occur and an application is returned for further clarification and to avoid being billed for out-of-state tuition.

## INTERNATIONAL STUDENT INFORMATION

The University and the Graduate School have many web pages devoted to information for international students. The Office of International Services (<http://internationalservices.ncsu.edu/>) has important information on immigration regulations and University policies. The Office of International Affairs (<http://www.ncsu.edu/oia/>) sponsors many activities for international students. Finally, the University maintains a listing of international student programs <http://internationalservices.ncsu.edu/ois-programs>.

## LIVING

Transitioning to life as a graduate student can be a difficult process. Acclimating back to academic life, meeting new colleagues, making new friends, and adjusting to life in a new city are just some of the challenges. The graduate school has an excellent *New Student Survival Guide* at <https://grad.ncsu.edu/students/survival-guide/>. This web page covers a range of important topics for entering graduate students including how to obtain an AllCampus Card, health insurance, housing, parking, registration, and useful information about moving to Raleigh including utilities, transportation, restaurants, and shopping.

## GRADUATE STUDENT COMMUNITIES

A large part of the graduate student experience is becoming a member in an academic community. Students should take full advantage of North Carolina State's academic community by joining formal student and professional communities, as well as attending informal and social gatherings with faculty and other graduate students. Having a strong support group of colleagues can make the graduate experience more enjoyable and less stressful.

There are many opportunities at NCSU to join organizations for graduate students. These can provide both academic and social experiences. Some common centers and organizations:

[Graduate Student Association](#)

[NCSU Student Organizations](#)  
[NC Council of Teachers of Mathematics \(NCCTM\) – NCSU Kappa Student Chapter](#)  
[Association for the Concerns of African American Graduate Students](#)

There are also support networks available for stressful times and the counseling center offers workshops on coping with the graduate school, dissertation support groups, and personalized counseling. [Counseling Center](#)

## NC COUNCIL OF TEACHERS OF MATHEMATICS—KAPPA CHAPTER

The North Carolina Council of Teachers of Mathematics – Kappa Chapter (NCCTM) is a professional chapter of the NCCTM organization here at NC State. The local organization at NCSU is open to undergraduate and graduate students in mathematics education. Students in elementary education, middle school mathematics education, high school mathematics education, and all graduate students interested in mathematics education are welcome. The group holds 4-5 meetings each semester with speakers who are active teachers, administrators, professors, graduate students and other members of the educational community. Members are involved in service projects including tutoring, STEM family nights, and other campus service activities. For more information see the club's facebook page (NCCTM-NC State).

## ELECTRONIC THESIS AND DISSERTATION (ETD)

At NC State, all dissertations and theses are submitted and published electronically. The software used by the University allows all theses and dissertations to be saved as a PDF, submitted to the graduate school electronically for approval and then sent electronically to the library for cataloging and uploaded to the University server. The Graduate School has a comprehensive website concerning ETDs at NC State at <http://etd.ncsu.edu>.

One of the most important documents at this website, the ETD Guide, walks graduate students through the exact process and formatting requirements for a thesis or dissertation. Please see <http://www.ncsu.edu/grad/etd/docs/etd-guide.pdf>

ETD Workshops are offered several times each semester. It is imperative to go to an ETD workshop to acquaint yourself with the publication process including formatting and timelines. For a current list of available dates and information about workshop registration, use the following link: <http://www.grad.ncsu.edu/reports/etd/etdwwk.asp>

There are helpful templates for MS Word documents or LaTeX documents for creating your thesis or dissertation in the proper format. See <http://www.ncsu.edu/grad/etd/templates.html>.

Every Master Thesis and Doctoral student has **3 ETD deadlines** to meet:

- (1) ETD **Review** Deadline (*A choice of 2 review deadlines to pick from; 1. No Registration Required or 2. Registration Required*)
- (2) **Final** Error Free ETD Deadline (*For both No Registration Required and Registration Required*)
- (3) **Final** Committee Approval Deadline (*For both No Registration Required and Registration Required*)

All deadlines for submission are updated each year and can be accessed by visiting the following link: <http://www.ncsu.edu/grad/etd/deadlines.html>

In addition to the standard requirements for ETD submission, doctoral students have a few additional requirements that need to be fulfilled to complete the process. Prior to the awarding of the doctoral degree, the *Survey of Earned Doctorate* (SED) survey must be completed and turned in to the ETD editor. This form is completed on line and can only be printed at the time of completion. Doctoral students are also required to complete and submit a *Doctoral Dissertation Agreement Form* (DAF). This two-part form is available on line and also must be submitted to the ETD editor. For more information about both of these forms (including links) and other required doctoral paperwork, please visit the following link: <http://www.ncsu.edu/grad/etd/doc-req-forms.html>

## ACADEMIC INTEGRITY AND RESEARCH ETHICS

All students are expected to follow University rules and procedures in regards to academic integrity and research ethics. Because these rules and policies may not be covered explicitly in your coursework, please carefully read Section 7 of the code of student conduct (<http://policies.ncsu.edu/policy/pol-11-35-01>). Seemingly minor errors such as forgetting to cite a source or claiming another scholar's research conclusions as your own can lead to major disciplinary action such as probation, a reduction in a course grade, or expulsion from the University.

It is important that students involved on a research project or engaging in their dissertation research be familiar with responsible conduct of research, especially as it relates to human subjects. The Responsible Conduct of Research (RCR) Program maintains a website at <http://www.ncsu.edu/grad/research-ethics/index.php> and offers courses and training.

Students working with human subjects need to file appropriate paperwork with the Institutional Review Board for the Protection of Human Subjects in Research (IRB) at <http://www.ncsu.edu/sparcs/IRB/index.html>.

If data will be collected through a local school districts (with teachers or students), then one must follow the review protocols for that school district before collecting any data. For example, see policies for Wake County at [http://www.wcpss.net/evaluation-research/external\\_research/index.html](http://www.wcpss.net/evaluation-research/external_research/index.html).

## TAKING COURSES FOR CREDIT AT LOCAL INSTITUTIONS

NC State participates in an Interinstitutional Registration program with the University of North Carolina at Chapel Hill, the University of North Carolina at Greensboro, University of North Carolina at Charlotte, North Carolina Central University, and Duke University. Under this agreement, NC State graduate students are permitted to register for classes on one of these other campuses, *upon recommendation and approval of their advisory committees*. Please see: <http://www.ncsu.edu/registrar/inter-institutional/ii/index.html>

Even though taking a course on another campus, the student is exclusively under the administrative direction of the NC State Graduate School. Enrollment for courses on other campuses will take place on this campus, following procedures at the website listed above. Such courses are considered by the Graduate School to be a part of a student's normal load and the student will be billed for courses through NC State University Cashier's Office. During the summer, the procedure is somewhat different in that a student must be enrolled in a least

one course on the NC State campus during the same session as the requested interinstitutional registration.

When the grading system of the other institutions varies from that of NC State, grades received under Interinstitutional Registration will be converted to the NC State system. "H," "P," "L," and "F" grades earned at the University of North Carolina at Chapel Hill and "E," "G," "S" and "F" grades earned at Duke University will be converted to "A," "B," "C" and "F" grades, respectively.

## **FORMS**

All formal actions to your program and degree status require a FORM. A link to all Graduate School forms can be found at <https://grad.ncsu.edu/faculty-and-staff/forms/graduate-school-forms/>

A comprehensive timeline for forms can be seen at the Graduate School at [http://www.ncsu.edu/grad/handbook/section3\\_24.php](http://www.ncsu.edu/grad/handbook/section3_24.php). Note that forms should be turned into the STEM Ed department Graduate Student Services Coordinator after obtaining student and advisor signatures. Additionally, it is best to check the current web pages for the most current versions of the forms.

## Doctoral Degree Program in Learning and Teaching in STEM Mathematics and Statistics Education

### INTRODUCTION

Through the doctoral program, students further develop their instructional expertise, extend their knowledge of learners, teaching, teacher education, professional development, technology, equity and policy, deepen their knowledge of mathematical sciences, use, conduct and evaluate educational research at the highest level, and engage in professional leadership activities. In particular, they will develop:

1. A strong foundation in advanced mathematical sciences.
2. A profound understanding of K-12 school mathematics.
3. A theoretical foundation in the learning of mathematics for a broad range of age groups and diverse populations.
4. An applied foundation in the teaching of mathematics to a range of age groups with diverse populations.
5. The knowledge and ability to lead and contribute to dialogues and debate about historical, philosophical, psychological and sociological perspectives in mathematics education.
6. An ability to analyze, critique and conduct research related to the teaching and learning of mathematics.
7. An ability to apply theoretical knowledge and research results in settings such as: mathematics instruction, mathematics teacher education, evaluation, supervision, curricula development, technology development and policy-making.

### EXPECTATIONS & RESIDENCY

Upon acceptance into the program, the Ph.D. student must:

- **maintain continuous enrollment of 3 credits every Fall and Spring until graduation.** If the student has earned all the credits needed for the doctorate but is just completing a dissertation, then one credit hour is allowed. The student may also request a leave of absence. If a student requires a leave of absence, a request must be filed at least one month before the effected term. A maximum of two semesters of leave is allowed during the program.
- be knowledgeable and competent in the following areas:
  - Using a computer (for word processing, coding data, statistical packages, presentations)
  - Techniques for literature searches, periodicals
  - Familiarity with APA writing style for professional articles
  - Delivering clear, concise oral and written presentations of reviews and research
- complete a residency requirement consisting of 2 consecutive semesters (either Spring and Fall or Fall and Spring, with Summer excluded) **during which one carries a minimum of 6 semester hours each semester (our rules are more restrictive than those stated in the graduate school handbook). During each of these two semesters, the student must be enrolled in at least one course and at least one experience (EMS893, EMS851, EMS841)** in addition to courses taken, encouraged activities during residency are as follows:

- Attend state, regional, and national professional meetings.
- Present a paper (single, or co-authored) at a professional meeting.
- Write an article (about educational research, philosophy, or teacher activities) and submit for publication in a refereed journal. Collaboration with faculty is encouraged.
- Assist with on-going faculty research projects, such as proposal writing, development of research instruments, data collection, data analysis, workshop development or presentation.
- Must attend or participate in Department colloquia, Departmental seminars, even when not taken for credit, and Departmental luncheon seminars.

**Graduate Students and Advisors should check the official summary in the Graduate School Administrative Handbook for complete and up-to-date requirements.** <http://www.ncsu.edu/grad/handbook/sections/3.1-minimum-degree-requirements.html#E>

The maximum time allowed for completion of a doctoral program (i.e., successful defense and approval of the Final Doctoral Oral Examination) at NC State University is 10 years. The student's degree clock for time to completion starts with the first course approved for inclusion in the plan of work, including courses taken as a PBS student or towards a different PhD degree before being formally admitted to Mathematics Education. Graduate Students and Advisors should check the official summary in the Graduate School Administrative Handbook for complete and up-to-date requirements. <http://www.ncsu.edu/grad/handbook/sections/3.1-minimum-degree-requirements.html#E>

There are three phases to a doctoral program: Coursework (includes choosing a Committee and preparing a Plan of Work), Preliminary Exams, and Dissertation. Students must progress through the Coursework and successful completion of Preliminary Exams in 4 years or after 48 credit hours are completed, whichever is later.

### *Coursework*

The coursework phase introduces the student, both broadly and deeply, to significant concepts and methods in mathematics education research. As different students may focus their work in different ways, it is crucial to choose elective and research methods courses with consultation of the advisor and committee members. Required coursework, including general education, methodology, and concentration requirements are listed as follows. Students should expect coursework to take between two to three years of fulltime study depending on previous coursework experience at the master's level. Specific coursework requirements may change based on decisions by the graduate faculty with specified dates of applicability. All students must demonstrate at least 72 hrs of coursework taken beyond the bachelor's degree and no student will be awarded a Ph.D. with fewer than **54 semester hours of course work** taken at NCSU in the Ph.D. Plan of Work. These are NCSU Graduate program policies.

### *Master's Degree*

Students must have a master's degree to enter the program. Students may enter with a master's degree in a variety of fields, such as: Mathematics, Applied Mathematics, Statistics, Mathematics Education, Instructional Technology, Educational Psychology, Elementary Education, or Curriculum and Instruction. Each of these degree programs gives students different strengths and knowledge in mathematics, mathematics education, and teaching and learning issues. Students will have completed a master's thesis, or its equivalent, or may complete the equivalent early in PhD program using the research course EMS 893.

**PHD Course Requirements Worksheet**  
**TOTAL CREDIT HOURS = 60**  
**(After Master's Degree)**

Mathematics and Statistics Education students can focus their program of study in learning and teaching mathematics and/or statistics at one of the following three levels:

- **upper/advanced secondary and collegiate level**
- **middle or secondary level (grades 6-12)**
- **elementary level (grades PreK-5)**

Your choice should influence courses and experiences with which you engage, your dissertation focus, and the **requirements for your mathematics and statistics background (see next page)**.

<b>Mathematics and Statistics Education Specific Courses</b>	<b>24 hours</b>
<b>Foundations course: choose 1</b> EMS 770 Foundations of Mathematics Education or EMS/ST 7** Foundations of Statistics Education	3
<b>Teaching and Learning course: choose 1</b> EMS 711 Teaching and Learning of Mathematics 6-14 EMS 712 Teaching and Learning of Mathematics K-8 (Pre-Req: learning theories or a psychology course)	3
<b>Two additional Doctoral level (700 level) courses in Mathematics and Statistics Education</b> EMS 704 Curriculum Development in Math and Science; EMS 705 Education and Supervision of Teachers of Science and Mathematics EMS 792 Special Topics in Mathematics Education; and <b>Any course not chosen in Foundations or Teaching and Learning categories.</b>	6
<b>Experiences in Mathematics Education:</b> EMS 841 Practicum in Science and Mathematics Education EMS 851 Internship in Science and Mathematics Education These experiences are planned in coordination with an advisor and are meant to enhance a student's applicable experience in educational settings This could be one experience of 3 hours or any combination of hours.	3
<b>Seminars and Preliminary Exam</b> EMS 802 (Intro Seminar in Mathematics Education--1 credit, taken within one of the first two semesters at beginning of program) EMS 802 (Advanced Seminar in Mathematics Education-1 credit, taken near end of program) EMS 890 (Doctoral Prelim Exam - 1 credit minimum)	3
<b>Specialty Courses</b> Take graduate courses (500 or above level) that deepen or broaden your understanding of issues related to the focus of your research and grade level, and future career interests. Courses should be chosen in consultation with your advisor and/or committee members	6

NOTE: All doctoral students need to demonstrate some understanding and competency in the teaching and learning of mathematics/statistics with technology. This could be from a course chosen in their program, prior experiences or courses in a master's degree, or potentially as part of the prelim exam.

<b>Learning and Teaching in STEM Required Courses</b>	<b>6 hours</b>
EMS 7** Foundational Learning Theories in STEM Education	3
EMS 7** Contemporary Topics and Issues in STEM Education <i>topics will change</i>	3

<b>College of Education Core Course Requirements</b>		<b>21 hours</b>
<b>Scholar Leader Courses</b>		<b>6 hours</b>
Scholar Leader: Diversity and Equity in Schools and Communities		3
Scholar Leader: Systemic Change in Education and Society		3
<b>Research Methods</b>		<b>15 hours</b>
ED 711 Applied Quantitative Methods in Education II or equivalent (See Prerequisite) *		3
ED 730 Introduction to Qualitative Research in Education, <i>or its equivalent</i>		3
One Advanced Methods ED 750 Mixed Methods Research in Education ED 731 Advanced Qualitative Research and Data Analysis in Education, <i>or an equivalent advanced methods course</i>		3
Additional advanced research course taken from the following: <ul style="list-style-type: none"> <li>• ED 731 Advanced Qualitative Research and Data Analysis in Education</li> <li>• ED 712 Survey Methods in Educational Research</li> <li>• ED 750 Mixed Methods Research in Education</li> <li>• ED 795 Special Topics in Education Research</li> <li>• A design-based research course</li> <li>• courses in the Department of Statistics or Psychology at the level 500 or above (e.g., ST 505, PSY 880)</li> </ul>		3
3 hours of Applied Research Experience EMS 893 Doctoral Supervised Research		3

\***PreReq:** ED 710 Applied Quantitative Methods in Education, *or its equivalent*)

<b>Dissertation Research</b>		<b>9 hours</b>
EMS 895 Doctoral Dissertation Research (typically taken over 1-3 semesters)		9

## **Mathematical Sciences Requirements (not included in 60 hrs above)**

Between masters and Ph.D. courses, students must show equivalent of the following coursework for their chosen career focus. These requirements are designed to enhance students' foundation in mathematical sciences and prepare them for a highly competitive job market. Credits listed below could have been taken during a master's degree. If not, then students may take some as part of their program (6 credits could be taken as Specialty Courses), or credits could be above and beyond the 60 hrs in the PhD plan of work.

<b>Focus on Mathematics or Statistics Education at the upper secondary and collegiate level</b>	<b>Focus on Mathematics or Statistics Education at the middle or secondary level (grades 6-12)</b>	<b>Focus on Mathematics or Statistics Education at the elementary level (grades PreK-5)</b>
should earn a master's degree in mathematics, applied mathematics, or statistics, or a <i>strong equivalent</i> of 30 credit hrs.	at least 18 credit hrs of graduate level mathematics or statistics courses (24 hrs recommended to be competitive in job market).	at least 18 hours of masters or PhD courses in mathematics or statistics content. At least 9 hours must be focused on elementary mathematics content (e.g., from ELM 500 series in mathematics education).



## DETAILS ABOUT CHOOSING COURSES

### Choose One Foundations course (3 hrs)

#### **EMS 770 Foundations of Mathematics Education**

This course provides students with a foundation in historical and current perspectives and practices in mathematics education, including issues related to policy, curricula, instruction, and teacher education. The course emphasizes how to interpret and synthesize literature in the field through understanding foundational influences and multi-disciplinary perspectives.

#### **EMS 771 Foundations of Statistics Education (When approved)**

This course provides students with a foundation in historical and current perspectives and practices in statistics education, including issues related to policy, curricula, instruction, and teacher education. The course emphasizes how to interpret and synthesize literature in the field through understanding foundational influences and multi-disciplinary perspectives.

### Choose one of the following courses (3 hrs)

#### **EMS 711 Research on the Teaching and Learning of Mathematics at the Secondary and Early College Levels**

This course familiarizes students with theories and research related to mathematical thinking, learning and teaching at the secondary and early college levels with a focus on the following topics: function, expressions and equations, geometry, proof, limit, calculus, differential equations, and linear algebra. Students will apply theories to analyze secondary and early college students' mathematical thinking, synthesize research findings, explain difficulties students experience, and design and conduct research. Restriction: At least 18 hrs of 400-500 level mathematics and a PhD student in Mathematics Education.

#### **EMS 712 Teaching Mathematics in Elementary and Junior High School**

Comprehensive study of teaching mathematics in elementary and junior high schools. Major emphasis on building skills in teaching arithmetic, elementary algebra and intuitive geometry. Thorough search of literature relative to mathematics curricula conducted, designing and sequencing of learning activities, teaching mathematical concepts and relationships, building skill in computation, reading mathematics, problem solving and measurement.

### Choose two of the following courses (6 hrs) or you may take EMS711 or 712 (whichever was not used above)

#### **EMS 704 Curriculum Development and Evaluation in Science and Mathematics**

Critical study of elements of curriculum design and theory in mathematics education and science education and examination of evaluation procedures for assessing educational innovations.

#### **EMS 705 Education and Supervision of Teachers of Mathematics and Science**

Critical analysis of theories, programs and techniques designed to promote interpersonal interactions leading to more effective teaching of science and mathematics.

#### **EMS 792 Special Topics**

These courses are occasionally offered by faculty on various topics in Mathematics Education (e.g. Teaching and Learning of Statistics) and can be used as an elective or

as a substitution for other EMS courses *upon approval by the committee*. Course must be focused on Mathematics Education issues to count as a core Math Education course. For example, some recent offerings of EMS 792 have included:

### **Experiences in Mathematics Education (3 hrs)**

Each doctoral student comes to the program with varying experiences in the field of mathematics education and also vary in their career trajectories. The intent of these 6 hours is to enrich and expand the doctoral student's practical knowledge base in three types of activities in which mathematics educators engage (K-12 teaching, teacher education, research). Students may choose two of the three choices below for 3 hours each, or they may engage in all three experiences for 2 hours each to comprise the 6 hours of experiences. The exact choices will vary by student and should be approved by the advisor and Graduate Advisory Committee. *A student may not use a paid experience as an RA or TA or a teaching job in a K-16 classroom to fulfill the requirements for a practicum or internship. The purpose is to provide additional experiences that strengthen a doctoral student's knowledge base and range of experiences*

#### **EMS 841 School Based Practicum 2-3 hr**

Student engages in a field-based practicum at the K-12 setting that is significantly different from their prior teaching experience. This practicum (generally 45 contact hours in a classroom with students, plus meetings with supervisors and preparation time needed) is intended to allow the doctoral student to connect their understanding of learning theories to instructional practice. **See sample letter to teacher and administrators in Appendix section.** Please follow the procedures.

1. Students and advisors should discuss what grade level/content experience makes sense for the student to enhance their understanding/experience with K-12 classrooms. Recall that an EMS841 experience should include about 45 hrs for 3 cr. and 30 hrs for 2 cr of classroom contact time with students. But the scheduling of these hrs can be very flexible (e.g., an intense 2 week experience, a once a week experience over an entire semester). The advisor and student should discuss the explicit expectations that are needed for the student to complete. For example, how much time should be spent observing, working with small groups, co-teaching and co-planning, as well as expectations for how many lessons the student should be responsible for planning and implementing during the experience. This will vary across students to meet their needs for their professional goals.
2. Perhaps INFORMALLY contact classroom teachers you know who could provide such an experience (not necessary but highly suggested to take advantage of teachers known to faculty and students). Have teachers discuss this possible opportunity with their administration.
3. Complete the Graduate Professional Internship Request for Math Education form (See Appendix. add as much info as possible, including approximate begin and end dates, info for requested district, school and teacher, and a brief description of the frequency of visits or class periods and expectations). **BOTH STUDENT AND ADVISOR MUST SIGN THIS FORM.**

4. Student must see Ms. Bonita Apperson to submit the SIGNED Graduate professional Internship Request Math Education form and to complete a criminal background check.
5. Complete the following paperwork to submit to Ms. Apperson, IF NEEDED (this will be determined based on placement details)
  - a. Triangle Alliance Form
  - b. Health certification form (required by law in NC schools)
6. Register for 2-3 credits of EMS 841, whichever applies.

### **EMS 851 Teacher Education Internship 2-3 hrs**

Student engages in a teacher education internship supervised by a faculty member. This typically involves co-teaching an undergraduate methods course and/or supervising student teachers in mathematics. This internship (generally 45 contact hours with students, plus meetings with faculty and preparation time needed) is intended to allow the doctoral student to develop an understanding of issues related to the preparation of mathematics teachers and to gain valuable teaching experience.

### **Graduate 1 hour seminars**

#### ***EMS 802 Seminar in Mathematics Education 2 hrs.***

Student takes this course their first fall semester as an introductory seminar to the PhD Mathematics Education program at NC State and then again in the spring semester of their second year in preparation for their dissertation and preliminary exams.

### **Research Methods (15 Hours)**

#### **Required (6 hours)**

ED 711 Applied Quantitative Methods in Education I (ST 507/511 or ED 710 prereq) or equivalent.

*If student has not taken ST507 or 511, it can be taken as part of the mathematical sciences requirement. Consider courses such as: ST 508 Statistics for the Behavioral Sciences II, or ST 512 Experimental Statistics for Biological Sciences II (ST 511 prereq) or ST 514 Statistics For Management and Social Sciences II (ST 513 prereq)*

ED730 Introduction to Qualitative Research in Education (or equivalent)

#### **Required: One Advanced Methods Course (3 hours)**

ED731 Advanced Methods in Qualitative Research

OR

ED750 Mixed Methods in Educational Research

#### **Required: A Second Advanced Methods Course (3 hours) (could be qualitative or quantitative):** Some possibilities:

ST 432 Introduction to Survey Sampling

ST 505 Applied Nonparametric Statistics (ST 511 prereq)

ST 708 Applied Least Squares (ST 512 prereq)

ST 731 Applied Multivariate Statistical Analysis (ST 512 prereq)

ST 732 Applied Longitudinal Data Analysis (ST 512 prereq)

ED 711 Applied Quantitative Methods in Education II (ED 710 prereq)

PSY 880 seminar courses offered through psychology:

Quantitative Methods in Psychology, (*cannot get credit for this and ST 507/ST511*)

Applied Multiple Regression in Psychology (*cannot get credit for this and ST508/512/514*)

Applied Multivariate Statistics in Psychology  
 Multilevel Modeling in Psychology.  
 ED 712 Survey Methods in Educational Research  
 ED 750 Mixed Methods Research in Education  
 ED 795 Special Topics in Education Research  
 A design-based research course courses in the Department of Statistics or Psychology at the level 500 or above (e.g., ST 505, PSY 880)  
 ED/EDP 700 Mixed Methods Research in Education  
 ELP 754 Qualitative Education Research Data Analysis Using Personal Computers,  
 ED 795 Special Topics in Education research  
 SOC 712 Advanced Survey Research Methods

### **EMS 893 Doctoral Supervised Research (3 hours)**

Student engages in a supervised research experience with a faculty member, often connected with a research project. Students can also engage in research or evaluation projects external to the department or university that is agreed upon and supervised by a faculty member. The intent of this experience is to allow doctoral students to expand their understanding of applying research methods and analysis techniques to problems in mathematics education that will support their further development as a researcher.

### **Specialty Professional Courses (6 Hours)**

The two general professional elective courses can be chosen from any 500-level course or above of interest to the student and approved by the doctoral committee. Students should choose courses that support their career goals and research interests. For example, many may choose ECI 705 Instructional Supervision of Teachers if they intend to work in teacher education or be in a supervisory role in a district. Some may take additional EMS courses in mathematics or science education that are of interest to them. Psychology or Sociology courses may provide needed theoretical background to support one's research interests in learning. A variety of courses in ECI (Curriculum and Instruction) are offered that may enhance one's ability to develop, evaluate, or research curriculum issues, particular those with an instructional technology component. Some students may also take additional Research Methods courses.

### **Mathematics and Statistics Courses**

Depending on the choice of emphasis, K-5, 6-12, or Upper Secondary/Collegiate, more mathematics and statistics courses may be taken. For example, if the PhD student has a master's in mathematics already when beginning, with 30 hours of mathematics, those courses can be used here. If a student has a master's where they passed 9 hours of mathematics, then additional courses in mathematics or statistics would be part of the program. However, mathematics courses that fulfill this requirement but were passed when not in the program do NOT count towards the 54 hours required for the PhD by the graduate school.

## **PLAN OF WORK AND GRADUATE ADVISORY COMMITTEE**

The initial advisor should help the student develop an initial Plan of Work based on program requirements and considering the student's individual background from their B.S. and master's degrees. The initial advisor does not necessarily need to become a student's Chair of their Graduate Advisory Committee. Students should carefully consider their own research interests, and the interests and research programs of faculty as they select their chair and committee. A student then makes a request of the faculty they wish to chair to ensure they will be accepted by them and that they have adequate time and expertise for their interests. Once the new chair has accepted, the student should discuss their intentions with the previous chair to briefly explain

their reasons. The student should identify candidates **for a Graduate Advisory Committee (GAC)** as soon as possible after one begins taking course work and *before completing 18 hours of graduate work* toward the Doctorate. Failure to do so may result in work previously taken not counting toward the degree.

The Graduate Advisory Committee needs to consist of *at least* 4 faculty members, 2 of which must be Mathematics Education graduate faculty members. Up to 2 additional faculty members from any field can also serve on the committee to complement the student's research interests. **The student and GAC meet formally to develop and agree upon the final Plan of Work for Graduate Study.**

The worksheet on page 39 should be used to make sure all requirements in the program are fulfilled, either from courses taken at NCSU, during a master's degree at NCSU or another institution, or as a Post Baccalaureate Student (PBS). **All Ph.D. students must take a minimum of 60 hours at NCSU in the official Plan of Work for the Ph.D.** but the Mathematics Education requirements are 56-62 hours. Coursework from another institution does not transfer to NCSU to count towards the 54-hour minimum; however such courses can count towards fulfilling program requirements.

The Plan of Work form should be filed online through MyPack Portal (using the Student Information System) before completing 18 hrs towards the degree. The form includes a place to record the courses, semesters planned to take, and grades for all courses in a student's plan.

When a student meets with the Graduate Advisory Committee to discuss the Plan of Work and have them sign on their agreement with the plan, the Doctoral Program Worksheet should be completed. This will facilitate discussions on how the student is meeting all requirements in the program.

### **Minors**

Ph.D. students do **not** have to have a Minor. However, if they would like to earn one, look at the requirements in other departments to complete a minor.

### **Grades in Courses and Overall GPA**

Students must maintain above a 3.0 GPA throughout their program, or face probation, suspension, or termination. **In addition, only courses in which a student earns a B- or better may count towards graduate credit as MAJOR courses listed in the Plan of Work.** This rule is in effect for all students who began their PhD program in Summer 2011 or later. If program started before Summer 2011, courses in the Major category must have a C- or better.

### **Preliminary Examination**

The purpose of the preliminary examinations for candidacy is to evaluate the extent to which a candidate appears well-qualified and ready to transition from the coursework phase of study to more independent work in their doctoral dissertation research. While doctoral students will have already demonstrated much of the necessary competencies in the program goals, through the combination of course work and internships, there are additional skills and proficiencies necessary to assess before undertaking their final doctoral study.

Among the skills to be assessed in the preliminary exam are:

- The ability to examine a broad issue in mathematics education to develop well-delineated arguments both in terms of supporting and conflicting points of view.

- The ability to synthesize literature in a well-defined topic area that demonstrates depth of understanding about the critical issues in that topic and ability to bring together multiple perspectives.
- The ability to conduct a critical analysis and review of the work of others, as one does when writing journal reviews, reviewing grants, or evaluating the work of future students.

A student should take the preliminary exam during or shortly after the final semester of course work. *However, exceptions may be granted, with approval of the Graduate Advisory Committee, for those with 1-2 remaining courses that their schedule does not permit taking until a later semester.* The examining committee shall be made up of the Graduate Advisory Committee (GAC) as noted on a student's filed and approved Graduate Plan of Work. The GAC must include at least 2 members of the Mathematics Education graduate faculty, one of which serves as Chair (or two serving as co-chairs) and one faculty member representing the minor area.

#### **Steps in completing the preliminary exam:**

1. The student and Chair(s) meet to discuss potential foci for the written exam questions.
2. The Chair(s) constructs the Written Exam questions within the guidelines below with consultation from GAC members. The final questions must be approved by all members of the students' GAC.
3. The student is given the Written Exam questions in electronic and hard copy. Once received, the student has up to six weeks to submit the written responses. Each question should require approximately one week of full-time work to complete. **Thus, upon agreement between a student and their GAC, the exams may be completed in either three weeks of full-time work, or up to six weeks of part-time work.**
4. The student works independently to prepare the responses to the Written Exam questions and submits these responses in hard copy and electronic copy to the Chair(s) by the designated due date and time.
5. The GAC faculty will grade the responses and prepare a Preliminary Exam Grade Report. The GAC members must come to consensus on the scores given on the Preliminary Exam Grade Report. **Exact grading timeline must be agreed upon by all members of the GAC.**
6. The student schedules an Oral Exam date and time that is agreeable to all members of GAC and the student. The Oral Exam **should occur within 6 weeks** of the submission date of the Written Exams, **and only occurs after all three questions have earned a PASS.** GAC members must complete a Preliminary Exam Grade Report, and the student and chair(s) complete the Request to Schedule Doctoral Oral Examination (<http://www.ncsu.edu/grad/faculty-and-staff/docs/forms/doc-or-exam.pdf>). Both documents must be submitted to the Graduate Secretary and Director of Graduate Programs **at least 15 business days** prior to Oral Exam date.
7. All members of GAC and the student meet for the Oral Exam. Other faculty members are welcome to attend and engage in the examining process after questioning by the GAC. At the completion of the Oral Exam with a score of PASS, the GAC will sign and submit the Doctoral Preliminary Exam Report Form (sample shown at <http://www.ncsu.edu/grad/faculty-and-staff/docs/forms/doc-prelim-report.pdf>).

### Structure of Written Exams

The written exam will consist of 3 questions designed by the chair(s) and approved by the committee to assess the three skills listed above. The three questions will be referred to as:

1. BREADTH OF KNOWLEDGE
2. DEPTH OF KNOWLEDGE, and
3. CRITIQUE OF RESEARCH

### Evaluation of Written Responses:

The documents submitted for evaluation will be submitted in hard (to chair only) and electronic copy to each member of a students' Graduate Advisory Committee. Each of the 3 responses will be assessed as either PASS or FAIL and will include helpful comments. **See form in Appendix.**

Each grader will initially send the graded papers with comments and outcomes to the Chair(s). The Chair(s) will prepare a memorandum summarizing the outcomes and general comments. This will first be given to GAC faculty members for further comment and suggested changes. *The GAC members must come to consensus on the final scores given on Preliminary Written Exam Report. (See Appendix)* Once finalized, the memorandum will be given to the student and Director of Graduate Program indicating the outcomes and comments on all 3 questions. **To pass the written portion of the preliminary exam, a student must earn a PASS on all 3 questions.**

### In the Event of a Fail on a Written Response

If a student earns a Fail on any of the 3 questions, they will have *one* retake opportunity per failed question. For each question failed, the student will be given one new question designed by the Chair(s) and approved by the GAC to meet the competencies in the area(s) failed. The student will have 2 weeks per new question to complete the written response. Thus, for one failed question, the student will have 2 weeks to respond to one new question. For two failed questions, the student will have 4 continuous weeks to respond to the two new questions. For three failed questions, the student will have 6 continuous weeks to respond to the three new questions.

The scheduling of the retake questions must be agreed upon between the students and Chair(s). This process must be completed within one calendar year of the submission date of the original exam questions. Failure to earn a PASS on all new questions within that calendar year will result in failure of the preliminary exam and termination of a students' Ph.D. program in Mathematics Education.

### The Oral Exam

All members of GAC and the student meet for the Oral Exam. Other faculty members are welcome to attend and engage in the examining process after the GAC has queried the student. During the Oral Exam, the student may be asked questions on any of the written responses or on any other issue related to mathematics, statistics, research methodology, or mathematics education appropriate to the candidate's coursework and preparation.

At the completion of the Oral Exam with a score of PASS, the GAC will sign the Doctoral Preliminary Exam Report Form (sample shown at <http://www.ncsu.edu/grad/faculty-and-staff/docs/forms/doc-prelim-report.pdf>). This form should be given to the department's Graduate Secretary for processing.

If a student earns a FAIL at the Oral Exam, they may have *one* retake opportunity, to be scheduled within 2 weeks of the prior date. If a student does not earn a PASS at the retake Oral Exam, they will have failed the Preliminary Examination, resulting in termination of a students' Ph.D. program in Mathematics Education.

### **Dissertation**

A student is admitted to candidacy by passing the written and oral preliminary examination. Once a student is admitted to candidacy, they should be advancing their dissertation research. Students must enroll in EMS 895 for the first 9 credits of Doctoral Dissertation Research. If the student is still working on a dissertation after 9 credits, they can register for either EMS 895 or EMS 899 (Doctoral Dissertation Preparation). EMS 899 is to be used for students who have completed all credit hour requirements for their degree (including research credits and the oral preliminary examination) but need to maintain continuous registration to complete their research and/or write and defend their dissertation. The dissertation research has two formal components:

1) **Proposal Defense.** The dissertation proposal typically includes a literature review, framework, and details about methodology, including proposed methods of analysis.

The public defense of the proposal must be attended by all committee members and is open to all Graduate faculty and students. The proposal defense is typically held within 6 months of admission to candidacy after approval is obtained by the committee chair(s) that the candidate is ready for such a defense. A copy of the written proposal must be submitted to committee members at least 2 weeks in advance of the scheduled defense. The earliest date for the public proposal defense is the same day in which the oral preliminary examination meeting is held. **The chair and doctoral candidate are responsible for announcing the date and time of the proposal defense to the community of Graduate faculty and students in the department (e.g., flyers, email) at least 1 week in advance of the date of the defense.**

Successful completion of the Proposal Defense is granted upon final approval by the entire committee on the reasonableness and soundness of the proposed study. This approval indicates that the student is ready to proceed with the study as planned or modified based on committee suggestions and approval. *If successful, the title page of the proposal should be signed by all committee members and the student, with modifications needed noted on the back of the page. A copy of this is filed in the students' official record folder. The members of the GAC also need to complete the Proposal Defense Rubric and submit to the Director of Graduate Programs for program evaluation purposes. See form in Appendix.*



*If the defense is not successful, as deemed by the committee members, then the student should make needed improvements to the proposal document and reschedule another defense.*

2) **Research and Writing of a Dissertation** occur over an extended period of time and should include frequent discussions with the committee chair(s). Students will draft chapters of their dissertation and review them with their chair(s). Typically, a dissertation includes an introduction and problem statement, a literature review, methodology chapter including the research design, a results chapter (sometimes two or more), and conclusions and future directions. Modifications of this format occur based on the topic and type of the dissertation in consultation with the chair(s) and the other committee members. Once the chair(s) has approved it, the students should share their drafts with other members and keep all membership updated on progress.

3) **Final Doctoral Oral Examination** is scheduled after the dissertation study is complete and well written with approval by the committee chair(s), except for such revisions as may be necessary as a result of the examination.

The Final Doctoral Oral Examination must be attended by all committee members and is open to the University Community.

The Final Doctoral Oral Examination may not occur earlier than one semester or its equivalent (**4 months**) after successful completion of the Proposal Defense.

After approval by the committee chair(s) and **at least 15 business days** in advanced of the requested date, the student, through the Graduate Secretary and DGP, submits a Request to Schedule the Doctoral Oral Examination, indicating that he/she wishes to schedule the final oral examination. The student must submit a copy of the dissertation to all committee members within 2 weeks of the scheduled date. See below for format of this examination. **The chair and doctoral candidate are responsible for announcing the date and time of the proposal defense to the community of Graduate faculty and students in the department (e.g., flyers, email) at least 1 week in advance of the date of the defense.**

**From the Graduate Administrative Handbook (Ch 3.6C):**

[http://www.ncsu.edu/grad/handbook/section3\\_6.php](http://www.ncsu.edu/grad/handbook/section3_6.php)

**Format of Final Doctoral Examination.** Though the format of the doctoral examination may vary according to the culture of individual graduate programs, all examinations include three elements.

- i. **Presentation by the candidate.** The candidate typically presents the methodology used, the data collected, and the conclusions reached as reported in the dissertation. For the purpose of dissemination of research, it is required that the presentation of the dissertation be open to the university community.
- ii. **Questioning of the candidate.** Any member of the university community is allowed to ask questions of the candidate. If the need arises, graduate

faculty members not on the advisory committee may meet in a restricted session after the presentation to ask additional questions of the student and express any concerns they have to the committee and student. The questioning phase may continue with a closed session in which the advisory committee questions the candidate.

iii. **Deliberation and decision.** Only the advisory committee and the Graduate School representative, if one has been appointed, are present. Throughout the process, the chair of the candidate's advisory committee has the obligation to maintain a scholarly atmosphere and to keep academic integrity and the student's best interest foremost.

### **Outcome of final examination**

**Passing the final oral examination.** A unanimous vote of approval of the advisory committee is required for passing the final oral examination. Approval may be conditioned, however, on the student's meeting specific requirements prescribed by the student's advisory committee.

**Failure to pass the final oral examination.** Failure of a student to pass the examination terminates his or her work at this institution unless the advisory committee recommends a re-examination. No re-examination may be given until one full semester has elapsed and only one re-examination is permitted.

At the completion of the final oral exam, the GAC members must complete, sign, and submit the Final Exam Report form. The Dissertation Evaluation Rubric must also be completed and signed by all GAC members (**see form in Appendix**) and submitted to the Graduate Secretary.

## ADVISING/MENTORING

The goal of the College of Education PhD programs is to prepare scholar leaders to address the grand challenges of education. Toward that end, this document describes a process for the first-year review of doctoral students and expectations for formal reviews in following years.

### Initial Academic Advisor

After the Graduate School admits a student into a PhD program, the department will assign the student an Initial Academic Advisor (IAA). Students will meet regularly with their IAA to discuss program and career goals. The IAA will come from the Program Area of Study (PAS) to which the student was admitted and, when possible, will have research interests similar to the student's. The IAA is responsible for guiding the overall academic career of the student but may or may not continue to be the student's advisor for the duration of their program. If, due to a change in circumstances, the IAA is no longer able to advise the student or the student wishes to change his/her advisor (i.e. due to lack of common research interests), faculty in the PAS will guide the student in finding an appropriate replacement.

### Initial Review Process

At the end of the second semester (full-time students) or third semester (part-time students) (18 credit hours), PAS faculty will review the student's progress during an end-of-semester PAS meeting (see below for potential review process steps). In consultation with his/her IAA, the student is expected to outline via GSOARS areas of academic/professional interests, plans for cultivating research skills, and potential topics for the dissertation at the same time as submitting a draft of the Plan of Work (SIS). Some PAS may require additional material (e.g. writing sample) from each student.

The purpose of this review is for faculty to provide advice about credit-earning research, teaching, and extension experiences, in addition to courses, that will help prepare the student for dissertation research and meet the student's career goals. For students engaged in interdisciplinary research, faculty members involved in the review may come from inside or outside the student's PAS and should be prepared for the meeting with the information provided by the student from GSOARS and SIS.

#### *Review Process Steps:*

- *Step 1:* Students submit an outline (areas of academic/professional interests, plans for cultivating research skills, potential topics for the dissertation, and a draft Plan of Work (POW)) to their advisor through GSOARS/SIS two weeks prior to the end-of-the-semester PAS meeting.
- *Step 2:* During an end-of-semester program meeting, representative members of the primary PAS faculty (and other faculty from inside or outside the college if deemed appropriate) summarize as a group the progress of the student, followed by a brief meeting (15-30 minutes) between the PAS and individual students to discuss any comments in further detail. Feedback obtained during these conferences is documented by the advisor and provided to the student online via

GSOARS. As well, a record of the conference will be sent to the PAS's DGP. It is recommended that PAS meetings be held across an afternoon so that faculty are available to evaluate students as a cohort.

- *Step 3 (optional):* Advisor and student meet face to face for further discussion of faculty feedback. A student with interests spanning diverse fields may benefit from a meeting with an additional faculty member from a different PAS or from another department, depending upon interests. Feedback generated during this meeting will be documented and entered into GSOARS.
- The expectation is that by the end of the second semester (full-time), or third semester (part-time), students will have participated in the review. The DGP will submit a list of those students who participated in the review process to the Associate Dean for Academic Affairs. This process will support students to meet the requirement that students complete an online POW in consultation with their advisory committee by the time they complete 18 hours of coursework.

### **Post Initial Review**

Each faculty advisor is expected to meet with his/her advisees each semester to assess their progress toward completion<sup>9</sup>. The goals and expectations of the meeting will be similar to those of the first-year review with adjustments made corresponding to students' progress in meeting milestones and addressing their individual needs. The student and advisor are expected to document this meeting in GSOARS.

In addition to this, at the end of the fourth semester (full time) and sixth (part-time) (36 credit hours), a student's doctoral committee will review the student's progress during an end-of-semester meeting. It is recommended that this meeting follow a similar structure/process as the initial review. In consultation with his/her IAA, the student is expected to build upon the outline prepared for the initial via GSOARS as well as submit a revised draft of the Plan of Work (SIS), if needed. Committees may require additional material (e.g. writing sample) from each student.

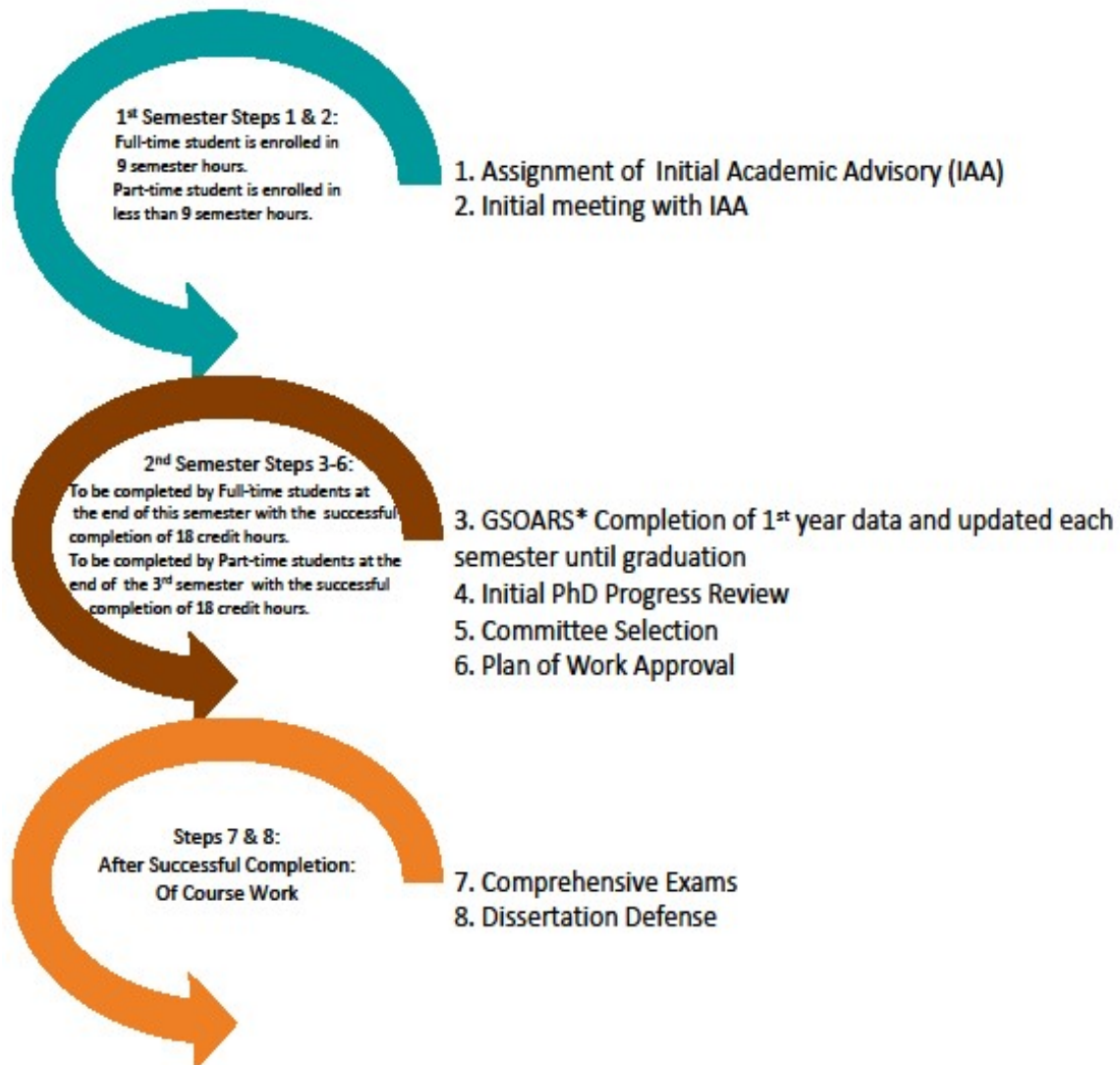
In the years following the review, students will meet with members of their committee once or twice a year (either individually or as a group). Meetings will not require formal documentation and will be aimed at discussing progress towards degree completion and preparing students for their future career.

### **Doctoral Committee**

Doctoral committees should be organized around two key elements—the PAS and thematic or disciplinary threads that ensure commitment to research and individuality. Students should select a minimum of four committee members who are particularly well qualified to provide guidance on the student's advanced coursework, scholarly professional interests, and dissertation topic. Committee members can be drawn from graduate faculty members across the University. The College recommends that at least two of the members of the Dissertation Committee, the chair and another member, come from the student's PAS and no more than three members may come from the PAS itself. Associate faculty members or those from outside the PAS may co-chair the

Committee. Through the DGP and the approval of the Graduate School, a faculty member from another university (who is not an interinstitutional graduate faculty member) or a professional from industry or government with credentials comparable to those required for membership on the graduate faculty, may serve as an external member, in addition to the number of committee members normally required. The expectation is that students meet with his/her advisor as they near completion of coursework in order to discuss committee membership. Committees are responsible for guiding students to successful degree completion. Specifically, they are responsible for making sure students have completed the necessary coursework, outlined and administered comprehensive exams, preliminary proposals, and dissertations. As part of this, the expectation is that the doctoral committee will monitor the student's progress toward degree completion, and provide guidance that will support the student to achieve his/her future career goals.

**Graphic: Student and Advisor Processes for Progress toward Successful PhD Completion**



\* Graduate Student Online Academic Reporting System (GSOARS)

## General Timeline for Doctoral Studies

*Note: This timeline is provided only as an example. Each student's timeline will differ.*

Graduate School Timeline: <http://www.ncsu.edu/grad/dss/index.php>

	Coursework	Preliminary Exams	Dissertation			
			Proposal	Research	Writing	Defense
<b>Program Requirements</b>	Complete required coursework & internships Present at Math Ed Research Symposium Annually submit Progress Towards Degree information Participate in EMS seminars	Prepare responses to written exams in 3-6 weeks.	Register for at least 12 hours of EMS 895			
<b>Advising/ Mentoring</b>	Meet with initial advisor and create initial POW  Select committee chair and committee members  Finalize and Submit Plan of Work (POW) Meet with committee to schedule written and oral preliminary exams		Meet and consult with committee chair and committee throughout the dissertation process			
<b>Scholarship</b>	Explore topics of interest Engage in scholarly reading outside of coursework Attend Seminars Attend Proposal and Final Exams of other graduate students Select dissertation topic		Engage in dissertation scholarship			
<b>Research Experience</b>	Find out about current research in department Apply/volunteer to be a research assistant (RA) on a project Seek opportunities to publish with faculty and other graduate students		Focus on dissertation proposal and research			

<b>Teaching</b>	<p>Serve as a Teaching Assistant (TA)  Volunteer to serve as a guest instructor for a course or teach a class/ professional development workshop on your own  Seek opportunities to supervise student teachers</p>			
<b>Professional Development</b>	<p>Attend conferences  Present at conferences  Submit papers for publication  Become active in state and national organization  Conduct professional development for teachers</p>			
<b>Job Search</b>	<p>Develop CV and update regularly  Identify professional goals and discuss with advisor/mentor</p>	Begin to develop dossier for job search	Conduct job search	
<b>Administrative</b>	<p>Sign Patent Agreement  File Plan of Work (POW)</p>	Attend Electronic Thesis and Dissertation (ETD) Workshop	Submit dissertation to graduate school File Intent to Graduate	

## Scholarship

Upon entering the program, students should start exploring and reading about topics in mathematics education of interest to them. Students should also work with course instructors to design final course projects that align with their research interests. Outside of coursework, students should engage in scholarly reading either on their own or as part of a reading group with other graduate students or faculty members. Participating as a research assistant (RA) is another excellent way to explore new topics and literature, and can be undertaken either as a paid position (competitive) or unpaid (with permission of the research director). As students approach the preliminary examination, they should communicate to their committee chair(s) possible dissertation topics so that examination questions can help them focus on this topic.

Throughout their program, doctoral students should attend proposal defenses and final oral exams (dissertation defense) made by other graduate students in mathematics education. Students should also engage in research talks and seminars that are offered by the University. The Friday Institute for Educational Innovation offers a series of brown bag lunches and Voices of Innovation lectures during the academic year that features renowned national scholars. A complete listing of brown bags and lectures can be found at the Friday Institute's website <https://www.fi.ncsu.edu/>. Other departments (e.g., Physics) offer regular seminar series, as well as the College of Education. Doctoral students are also strongly encouraged to attend job candidate presentations when they occur. These will help prepare you for your own job application process.

## RESEARCH EXPERIENCE

Unlike a master's or bachelor's degree, a Ph.D. is a research degree. Hence, learning to conduct research is an essential element of obtaining the doctoral degree. Students are encouraged to seek out opportunities to work as a research assistant (RA) on a project or grant as soon as possible. Not all graduate assistantships are within the mathematics education program, so students should check with other sources, such as the Department of Elementary Education, Friday Institute, and the Center for Research in Mathematics and Science Education and the Science House, among others. Besides providing funding via the graduate student support program, being part of a research project provides invaluable experience that cannot be gained in any other way. Students learn how faculty identify research problems, find sources of funding, write grant proposals, write proposals for talks and papers, form relationships with schools, get approval for data collection, collect, store and analyze data, work in a research team, negotiate preparation of annual reports, run advisory meetings and conferences, consult and collaborate with colleagues, analyze data and write findings and final reports. These are critical elements of professional practice as a researcher. Students with or without research assistantships should also constantly seek opportunities to publish conference papers and journal articles with faculty and other graduate students. These experiences will be invaluable as students move onto the proposal and dissertation phases of the doctoral program.



## TEACHING

Because teaching courses is an essential component of the professoriate, doctoral students are encouraged to seek out opportunities to teach. Early in the doctoral program, students should seek opportunities to serve as a teaching assistant (TA). Our department has a number of available positions annually for students to serve as a TA for undergraduate teacher education courses such as EMS 203, EMS 480, and EMS 470. Not only do TA positions allow for funding through GSSP, but they also will give you experience with planning lectures and engaging with students. Later in the doctoral program, students should seek opportunities to serve as a guest instructor for a course, undergraduate or master's level. This kind of experience will allow you to design and deliver instruction for a specified period of time under the supervision of a faculty member. Approach faculty members that are teaching courses with which you have some interest or previous experience. Students are also encouraged to spend time supervising student teachers. Because supervision of student teachers is a requirement for faculty that teach in teacher education programs, doing this as a part of your doctoral program will give you some initial experience in what is involved with this process. Note that although the doctoral program requires you to do a teaching internship, this one experience will be limited in what it can provide for your preparation as a future member of the academy.

The Graduate School offers the *Preparing for the Professoriate* program to give faculty and doctoral students the opportunity to engage in a significant mentoring activity over the course of an academic year. It is a central component of NC State's professional development programs for graduate students through providing students with a hands-on teaching opportunity under a distinguished faculty mentor who is recognized for his or her teaching skills. The program is open to doctoral students who plan to have careers as faculty members at colleges and universities. Students earn a \$1000 stipend and valuable teaching experience. See <http://www.ncsu.edu/grad/preparing-future-leaders/teaching-programs/ptp/>.

## PROFESSIONAL DEVELOPMENT

The following table summarizes the major mathematics education related professional organizations along with their publications and conferences. Students should familiarize themselves with the websites of these organizations. In the beginning stages of doctoral work, students should plan on attending local conferences or national conferences when close to Raleigh. As students progress in their work, they should consider submitting posters and individual papers to conferences of interest.

<b>MATHEMATICS EDUCATION RELATED PROFESSIONAL ORGANIZATIONS</b>			
<b>Organization Name</b>	<b>Website</b>	<b>Affiliated Journals</b>	<b>Typical Timeframe of Annual Conference</b>
National Council of Teachers of Mathematics (NCTM)	<a href="http://www.nctm.com">www.nctm.com</a>	<ul style="list-style-type: none"> <li>• Teaching Children Mathematics</li> <li>• Mathematics Teaching in the Middle School</li> <li>• Mathematics Teacher</li> <li>• Journal for Research in Mathematics Education (JRME)</li> </ul>	April
North Carolina Council of Teachers of Mathematics (NCCTM)	<a href="http://www.ncctm.org">www.ncctm.org</a>	<ul style="list-style-type: none"> <li>• The Centroid</li> </ul>	October
Research in Undergraduate Mathematics Education (RUME)	<a href="http://www.rume.org">www.rume.org</a>	<ul style="list-style-type: none"> <li>• Online Proceedings</li> </ul>	February/March
Association of Mathematics Teacher Educators (AMTE)	<a href="http://www.amte.net">www.amte.net</a>	<ul style="list-style-type: none"> <li>• Contemporary Issues in Technology and Teacher Education (CITE)</li> <li>• Journal of Mathematics Teacher Education (JMTE)</li> </ul>	January/February
School Science and Mathematics Association (SSMA)	<a href="http://www.ssma.org">www.ssma.org</a>	<ul style="list-style-type: none"> <li>• School Science and Mathematics Journal</li> </ul>	October/November
Society for Information Technology and Teacher Education	<a href="http://site.aace.org">http://site.aace.org</a>	<ul style="list-style-type: none"> <li>• Journal of Technology and Teacher Education (JTATE)</li> <li>• Contemporary Issues in Technology and Teacher Education (CITE)</li> </ul>	March

American Educational Research Association (AERA)	<a href="http://www.aera.net">www.aera.net</a>	<ul style="list-style-type: none"> <li>American Educational Research Journal</li> <li>Educational Researcher</li> <li>Review of Educational Research</li> <li>Review of Research in Education</li> </ul>	
International Group for the Psychology of Mathematics Education (PME)	<a href="http://www.igpme.org">www.igpme.org</a>	<ul style="list-style-type: none"> <li>Online proceedings and archived in ERIC (<a href="http://www.eric.gov">www.eric.gov</a>)</li> </ul>	July
Psychology of Mathematics Education-North American Chapter (PME-NA)	<a href="http://www.pmena.org">www.pmena.org</a>	<ul style="list-style-type: none"> <li>Online Proceedings and archived in ERIC (<a href="http://www.eric.gov">www.eric.gov</a>)</li> </ul>	October/November
International Commission on Mathematical Instruction (ICMI) <ul style="list-style-type: none"> <li>International Congress on Mathematics Education (ICME)</li> <li>ICMI Studies</li> </ul>	<a href="http://www.mathunion.org/ICMI/">www.mathunion.org/ICMI/</a>	<ul style="list-style-type: none"> <li>ICMI Bulletin</li> <li>ICME online proceedings</li> <li>ICMI-studies online proceedings</li> <li>Kluwer Volumes</li> </ul>	<ul style="list-style-type: none"> <li>ICME held every 4 years</li> <li>ICMI studies held often</li> </ul>
International Society of the Learning Sciences	<a href="http://www.isls.org/icls.html">www.isls.org/icls.html</a>	<ul style="list-style-type: none"> <li>Journal of the Learning Sciences</li> <li>International Journal of Computer Supported Collaborative Learning</li> </ul>	International Conference of the Learning Sciences held every 2 years

## JOB SEARCH

As soon as possible, students should meet with their initial advisor to outline their professional goals, and develop and regularly update a curriculum vitae (CV). Regular meetings with the advisor will help students to develop a dossier for the job search. Although every job search will vary depending on type, it is important for students (especially those that intend to pursue a job in the academy) to attend and present at conferences, become involved in leadership activities both locally and nationally, submit papers for publication, and maintain professional contacts in the field.

Math education job postings are listed on many professional organization's websites including:

- Association of Mathematics Teacher Educators (<http://amte.net/resources/joblistings>)

- The Chronicle of Higher Education (<http://chronicle.com/>),
- AERA Research in Mathematics Education SIG (<http://sigrme.org/xopenpositions.html>)
- National Council of Teachers of Mathematics (<http://www.nctm.org/jobs.aspx>), and
- North Carolina Department of Public Instruction (<http://www.dpi.state.nc.us/work4ncschools/>).

Constantly consulting with faculty and advanced graduate students is perhaps the best way to learn about professional opportunities, preparing for interviews, and presenting work to search committees.

The Graduate School conducts professional development seminars, a listing of which can be found at <http://pfl.grad.ncsu.edu/>. The career center is also a good resource for exploring career possibilities, especially those outside the academy (<http://www.ncsu.edu/career/>).

## ADMINISTRATIVE

All new doctoral students must submit a patent agreement online via MyPack Portal. After an initial meeting with your advisor and committee, you are expected to obtain necessary signatures and submit a formal Plan of Work online in MyPack Portal, which then gets submitted to the graduate school.

Annually, Ph.D. students are required to submit a Progress towards Degree report in the Graduate Student Online Annual Report System (GSOARS). This report allows you and your advisor to track your progress in coursework, and the various realms of graduate education such as teaching experiences, publications, presentations, work on research projects, etc. This report is filed in late Fall to report activities for a calendar year. Students are then able to use results from this report in discussions with their advisor and other faculty members on their experiences from the past year and any plans that should be made to work on deficient areas in the coming years.

As described earlier in the handbook, the university requires all theses and dissertations to be submitted and approved electronically. For this process to be completed accurately and efficiently, all students are encouraged to attend an ETD workshop early in their doctoral program. A schedule of workshops offered is posted each semester on the graduate school's website. Registration can be completed on line.

As doctoral students near the end of the dissertation process, there are a number of forms that must be completed and filed with the graduate school in order for your dissertation to be published and for you to be awarded your final degree. A list of all forms including links to each form is provided in this handbook. Be sure to review the requirements for each form in detail to ensure that all paperwork is completed and submitted on time. Please see website at the Graduate School that describes the process for each of the required forms. <http://www.ncsu.edu/grad/etd/doc-req-forms.html>.

It is important to note that doctoral students are required to initiate the filing of many of these forms. Although regular meetings and discussion with your advisor are critical as you reach this stage of the dissertation process, keep in mind that it is the responsibility of the student to keep track of all paperwork that needs to be filed, acquire necessary signatures in a timely manner and submit paperwork to The Graduate School.

## Appendices

Description and rubric for Masters Inquiry Project for M License 6-9 or 9-12

Forms useful for faculty and graduate students in PhD program

- APPLICATION FOR GRADUATE PROFESSIONAL INTERNSHIP IN NC K-12 SCHOOLS
- SAMPLE LETTER TO TEACHER AND ADMINISTRATOR - EMS 841 SCHOOL BASED PRACTICUM
- PRELIMINARY WRITTEN EXAMS EVALUATION REPORT
- EVALUATION RUBRIC: DISSERTATION PROPOSAL PRESENTATION
- EVALUATION RUBRIC: DISSERTATION FINAL ORAL EXAM

**APPLICATION FOR GRADUATE PROFESSIONAL INTERNSHIP  
Mathematics Education Graduate Program**

**A. PERSONAL DATA: COMPLETE ALL ITEMS**

<b>LAST NAME:</b>	<b>FIRST NAME:</b>	<b>MIDDLE/MAIDEN:</b>
<b>EMAIL:</b>		<b>PHONE NUMBER:</b>
<b>ADVISOR:</b>		<b>STUDENT ID:</b>
<b>ASSIGNMENT DATES :</b> _____ <b>TO</b> _____		<b>FIRST DAY TO REPORT TO SCHOOL:</b> _____
<b>ARE YOU A PUBLIC SCHOOL EMPLOYEE:</b> YES <input type="checkbox"/> NO <input type="checkbox"/>	<b>NAME OF SCHOOL AND SCHOOL SYSTEM WHERE EMPLOYED:</b>	
<b><u>Please indicate any transportation, health or other issue that should be taken into consideration when assigning your placement.</u></b>		

**B. ASSIGNMENT REQUEST: COMPLETE ALL ITEMS**

<b>REQUESTED DISTRICT, SCHOOL AND TEACHER (if known):</b>	<b>SUBJECT AND/OR GRADE(s):</b>
<b>PROVIDE DESCRIPTION OF APPROXIMATE SCHEDULE FOR CLASSROOM VISITS (e.g., once a week, two periods a day for 4 weeks, every day during math class for 9 weeks, etc) AND EXPECTATIONS OF CLASSROOM DUTIES, OBSERVATIONS, LESSON PLANNING AND INSTRUCTION (must be discussed and agreed upon with advisor) :</b>	<b>CHECK ONE:</b>  ___ EMS 841, 3 cr (45 hrs of contact time)  ___ EMS 841, 2 cr (30 hrs of contact time)  ___ OTHER (please describe)
<b>STUDENT SIGNATURE:</b> _____ <b>DATE:</b> _____	
<b>ADVISOR SIGNATURE:</b> _____ <b>DATE:</b> _____	

(Complete part C as well, next page)

## C. BACKGROUND QUESTIONS FOR PROSPECTIVE STUDENT INTERNS

Do you have the minimum 3.0 GPA <b>Yes</b> <input type="checkbox"/> <b>No</b> <input type="checkbox"/>
Have you ever had a certificate or license revoked or suspended by any state or other governing body? If yes, a statement giving full details and official documentation of the action taken must be provided. <b>Yes</b> <input type="checkbox"/> <b>No</b> <input type="checkbox"/>
Are you now involved in the use or sale of illegal drugs? <b>Yes</b> <input type="checkbox"/> <b>No</b> <input type="checkbox"/>
Have you ever been disciplined by NC State University or any other college or university, and/or are there no pending student misconduct charges against you? [If there has been discipline, please provide full details. A disciplinary history does not necessarily disqualify an applicant.] <b>Yes</b> <input type="checkbox"/> <b>No</b> <input type="checkbox"/>
Do you have any physical or emotional problems that would interfere with your role and duties as a teacher? <b>Yes</b> <input type="checkbox"/> <b>No</b> <input type="checkbox"/>
Do you have any attitudes that would interfere with your ability to work with any student, whatever his/her sex, race, or educational classification. <b>Yes</b> <input type="checkbox"/> <b>No</b> <input type="checkbox"/>
<b>Please name your supervisor if employed at a school, _____ and initial here ____ if we may contact that person for a reference check. For post-baccalaureate licensure only applicants, one of your letters of recommendation must be from the school or central administration of the school system.</b>
<b>I hereby grant consent for all educational institutions that I have attended to release all my transcripts and disciplinary records to the Director of Professional Education at North Carolina State University for purposes of reviewing my qualifications for admission into coursework, a licensure program, or an academic degree program.</b>
<b>I further affirm that I have provided full and truthful details on this document. Failure to do so may be grounds for dismissal from the program.</b>
Signed: _____ Printed Name: _____ Date: _____

**SAMPLE LETTER TO TEACHER AND ADMINISTRATOR**  
EMS 841 SCHOOL BASED PRACTICUM

To: <Teacher Name> and Administrators at <School Name>  
From: <Graduate Faculty Member in Math Education>  
Re: Volunteer Field Experience for <Graduate Student> in SEMESTER

<Graduate Student> is a Ph.D. candidate for a degree in Mathematics Education at NC State. As part of our doctoral program, students often complete a volunteer field-based experience in a classroom/school that is significantly different than their prior teaching experience. The purpose of this experience is to allow them a chance to make connections between theory they have learned in their advanced coursework and the practices of teaching and learning. Thus, we try to find classrooms situations that can aid in the doctoral student's development in this area. In the field-based experience we expect the student to be able to complete the following:

- About 40-45 hours of classroom contact with students. This can include such activities as aiding in classroom practices, helping individual students, teaching or co-teaching particular lessons, evaluating student assessment.
- Meet with the classroom teacher outside of class time with students to discuss practices, students' work, and to develop any lesson plans to be taught or assessments to be given.
- At a minimum, teach 2-5 lessons, 1 of which will be observed by a university faculty member. If a classroom visit is not possible, the class may be videotaped for a stimulated recall discussion to be held later with the university faculty.
- Engage in professional discussions with university faculty regarding the classroom experiences and connections to theories learned in their program as well comparisons and contrasts to their prior teaching experiences.

We leave the exact details of how and when the 40-45 hours of classroom time can be met to the student and the hosting teacher in which the volunteer work will be done.

We greatly appreciate the opportunity at your school and appreciate the teachers welcoming our doctoral student into a classroom for this volunteer experience. I am sure the partnership will be mutually beneficial. If you have any questions, please contact me with the information below.

Sincerely,

<Graduate Faculty Name and Contact Info>



**MATHEMATICS EDUCATION  
PRELIMINARY WRITTEN EXAMS  
EVALUATION REPORT**

Student: \_\_\_\_\_ ID#: \_\_\_\_\_

Date(s) of Exam: \_\_\_\_\_ to \_\_\_\_\_

	<b>Fail</b>	<b>Pass</b>
1. BREADTH		
Comments:		
2. DEPTH		
Comments:		
3. CRITIQUE		
Comments:		

The Committee Members listed below all agree with the decisions written above.

Chair: \_\_\_\_\_ Date: \_\_\_\_\_

Member: \_\_\_\_\_

Member: \_\_\_\_\_

Member: \_\_\_\_\_

Minor Representative Member: \_\_\_\_\_

This report needs to be sent to the DGP before or with the Request to Schedule Preliminary Oral Exam form.

**MATHEMATICS EDUCATION**  
**EVALUATION RUBRIC: DISSERTATION PROPOSAL PRESENTATION**

DATE: \_\_\_\_\_ Doctoral Candidate: \_\_\_\_\_

	DEVELOPING 1	ACCEPTABLE 2	TARGET 3
•reviews the literature in a way that demonstrates a comprehensive understanding of the research in the area of study			
•identifies research questions or problems pertinent to the field of study, providing a focus for making a significant contribution to the field			
•provides a plan for gathering, organizing, and analyzing data using a conceptual framework appropriate to research question and field of study			
•demonstrates a good understanding of how the research results may contribute to the field of study and to teaching and learning in mathematics			
•communicates proposal effectively and professionally, using language appropriate to the field of study			
•establishes a productive research agenda that could prepare student to extend his or her research beyond graduate school			

Committee Chair(s): \_\_\_\_\_

Committee Members: \_\_\_\_\_  
 \_\_\_\_\_

This form should be submitted to the Graduate Secretary or Director of Graduate Programs to be used for program evaluation.

**MATHEMATICS EDUCATION****EVALUATION RUBRIC: DISSERTATION FINAL ORAL EXAM**

DATE: \_\_\_\_\_ Doctoral Candidate: \_\_\_\_\_

	DEVELOPING 1	ACCEPTABLE 2	TARGET 3
•reviews the literature in a way that demonstrates a comprehensive understanding of the research in the area of study			
•identifies research questions or problems pertinent to the field of study, providing a focus for making a significant contribution to the field			
•gathers, organizes, analyzes, and reports data using a conceptual framework appropriate to the research question and the field of study			
•interprets research results in a way that adds to the understanding of field of study and relates findings to teaching and learning in mathematics			
•communicates research effectively in both written and oral forms using language appropriate to the field of study			
•has established a productive research agenda that prepares student to extend his or her research beyond graduate school			

Committee Chair(s): \_\_\_\_\_

Committee Members: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

This form should be submitted to the Graduate Secretary or Director of Graduate Programs to be used for program evaluation.