# 2016-2017
# Mathematics Education
# Graduate Student & Faculty Handbook
# *Masters version*

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

https://ced.ncsu.edu/programs/mathematics-education-master/

Also see the college level Graduate Student Services website for answers and links to commonly needed information
for College of Education master's students

https://ced.ncsu.edu/graduate/graduate-student-services/masters-resources/

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 8/15/2014.

**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 (19th) 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 8th in production since 1990, and 4th since 2000. Also in 2007, the Chronicle of Higher Education reported NCSU's Mathematics Education faculty as ranked 5th in the nation on the Chronicle's computed Faculty Scholarly Productivity Index (http://chronicle.com/stats/productivity/page.php).

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 in improving schooling is a defining characteristic of our graduate programs. **Master's students** take some courses in the Departments of Mathematics, Statistics, Computer Science, and occasionally Operations Research. Two degrees are offered at the master's' level, a Master of Education (M.Ed.) and a Master of Science (M.S.).

The mission of the various options offered in Mathematics Education at the **Master's level** is to prepare Master's Degree-seeking students for positions of instructional leadership in Mathematics Education and as master teachers of mathematics in either middle grades (6-9), high school (9-12) or post-secondary institutions such as community colleges.

The Master's program offers two degrees, a Masters of Education (M.Ed.) and Masters of Science (M.S.).**\*** Through the master's program, students will further develop their instructional expertise, extend their knowledge of learners, deepen their subject matter knowledge, use educational research methods and engage in professional leadership activities. In particular, they will develop:

1. A greater understanding of K-12 school mathematics and how to teach it;
2. A foundation in the teaching and learning of mathematics to a range of age groups with diverse populations;
3. A broader foundation in advanced mathematical sciences;
4. An ability to interpret and critique research related to the teaching and learning of mathematics; and
5. An ability to apply theoretical knowledge and research results in practical settings such as: mathematics instruction, mathematics teacher professional development, evaluation and assessment, supervision of teachers, curricula development and technology development.

ADMISSIONS PROCEDURES

Applicants to both the Master's and Ph.D. degree programs are 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 and are REQUIRED; verbal scores at or above the 50th percentile and quantitative scores at the 75th percentile are preferred. 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 (both Phd and Master's) 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 (53rd percentile), and mean score in GRE Quantitative of 159.1 (82nd percentile). There is not an absolute minimum for GREs; rather these are scores that are strongly encouraged.

Applications are reviewed twice per year, with all documents submitted for review with deadlines of October 1 and February 15. 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, the 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.

A current master's student who wishes to continue to our PhD program will be required to submit a new application. The two programs are considered in different processes and one does not necessarily lead to the other.

IMPORTANT PLACES & PEOPLE

**Department of Science, Technology, Engineering, & Mathematics Education**
Poe Hall Suites 326, 502, and 510
Main Telephone: **(919)** 515-2238                **919** is the area code for all campus numbers.
http://ced.ncsu.edu/stem

**Department Head** Dr. Kathy Trundle        kctrundl@ncsu.edu

**Aaron Clark**
Director of Graduate Programs [DGP] in department
Poe 510
Phone: 515-1771        Fax: 515-6892            Aaron_clark@ncsu.edu
The DGP is the department's liaison to the College of Education and the University Graduate School and helps coordinate flow of information among faculty, students and administration. The DGP corresponds with all potential applicants and oversees the application and admittance process. Dr. Clark has to approve and sign all official paperwork related to a student's education (e.g., Plan of Work, Request for Preliminary or Final Examination, Termination of a Students' Program).

**Karen Allen Keene**
Graduate Program Coordinator for Mathematics Education
Poe 502
Phone: 513-3374        Fax: 515-6892            kakeene@ncsu.edu

Dr. Keene is responsible for the organizational leadership of graduate programs in mathematics education. She works with faculty and students in mathematics education to ensure all understand the policies and

program guidelines so that every student has a positive educational experience. Dr. Keene oversees the review of applications and works with the DGP and Graduate Secretary to process all applications. She is the program liaison to the College of Education (e.g. teacher education, accreditation, and licensure)

**Christy Buck**
Graduate Administrative Assistant
Poe 510
Phone: 515-1740        Fax: 515-6892              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.

**Anne Reese**
Fiscal Manager, Department of STEM Education and TELS
Poe 225D
Phone: 515-5910                                    email  amreese2@ncsu.edu

Anne Reese oversees the financial administration of the department. She handles all other financial requests (e.g., reimbursement for travel, forms for part-time work students). Ayelon Valeton works with Anne to handle travel requests and reimbursements connected to the Department.

**Amanda (Mandy) Petty**
Human Resources officer for STEM Education
Poe Hall 225A
Phone: 515-5904                                    email: akpetty@ncsu.edu

Related to graduate education, Ms. Petty initiates all assistantship offers from departmental funds.  She handles any other areas related to human resources.

**??????**
**Departmental Administrative Assistant**
This person works with Dr. Trundle on department level issues including graduate student education and
        employment.

**Tim Goodale**
Program Coordinator for Mathematics Education in Masters of Arts in Teaching (MAT) program
Poe 510
Phone:  515-XXXX                                    tagoodal@ncsu.edu
Dr. Goodale coordinates all the M.A.T. programs in the STEM Ed department. Thus, he serves as the advisor for M.A.T. students pursuing high school licensure in mathematics. If you are interested in teaching licensure, please discuss this program with Dr. Goodale.

**Michael Maher**
Director of Professional Education
Poe 204
Phone: 515-5524        Fax: 515-5901              Michael_maher@ncsu.edu
Dr. Maher, and his administrative assistant (Bonita Apperson bonita_apperson@ncsu.edu) can assist students and faculty in arranging school-based field experiences related to licensure and the completion of all requirements and paperwork to apply for NC licensure, including, initial, advanced, specialist, and doctoral level licenses)

**Caroline Ortiz-Deaton**
Manager, Student Financial Support Services for Graduate School
2310H COT
        Phone: 515-4229                                        acortiz@ncsu.edu
Ms. Ortiz-Deaton administers the Graduate Student Support Plan. She can answer specific questions related to this plan. Also refer to the GSSP handbook at https://grad.ncsu.edu/faculty-and-staff/student-funding/gssp/


**Cashier's Office & Student Accounts:** Hours 8am-5pm M-F
Student Accounts: (919) 515-2986
Fax: (919) 515-1164  See http://www.fis.ncsu.edu/cashier/  for more information.

**James B. Hunt Jr. Library:** Centennial Campus
**Phone:** (919) 515-7710              See http://www.lib.ncsu.edu/ for hours and services

**D. H. Hill Library:** North campus
Phone: (919) 515-3364              See http://www.lib.ncsu.edu/ for hours and services

**College of Education Media and Educational Technology Resource Center:** Poe 400
Phone: (919) 515-3191              See http://ced.ncsu.edu/metrc for hours and services

**Office of International Services (OIS) -** 320 Daniels Hall
Phone: (919) 515-2961      Fax: (919) 515-1402
Website: http://internationalservices.ncsu.edu/
Email: ois@ncsu.edu

## MATHEMATICS EDUCATION GRADUATE FACULTY PROFILES

**Jere Confrey, Ph.D.** (Cornell University)
jere_confrey@ncsu.edu                          Poe 502


Dr. Confrey is the Joseph D. Moore Distinguished University Professor. She teaches in the graduate program in mathematics education, and offers courses on learning sciences, curriculum development and evaluation, and related topics in mathematics education. Her current research interests focus on analyzing national policy, synthesizing research on rational number, designing diagnostic assessments in mathematics focused on student thinking, building innovative software linking animation and mathematics, and studying school improvement for under-served youth at the high school level in rural and urban settings. She holds multiple grants from the National Science Foundation and currently serves on the Research Council for NCTM.


**Cyndi Edgington, Ph.D.** (NC State University)
cpeding@ncsu.edu                          Poe 502         515-1754

Dr. Edgington is a Teaching Assistant Professor in Mathematics Education. She works closely with the Undergraduate Program and coordinates the field placements and university supervisors for student teaching. Her interests include preparing teacher candidates to implement student-centered mathematics instruction.


**Jayne Fleener, Ph.D.** (Indiana University)
fleener@ncsu.edu

Dr. Fleener is a Professor in Mathematics Education and past Dean of the College of Education.  Her research areas involve teacher education and policy.


**Karen Hollebrands, Ph.D.** (The Pennsylvania State University)

karen_hollebrands@ncsu.edu                 Poe 502         513-0505

Dr. Hollebrands is a Professor in Mathematics Education. Her research interests include understanding students' mathematical understandings in technological contexts, as well as preparing prospective and practicing teachers to incorporate technology into mathematics instruction.


**Karen A. Keene, Ph.D.** (Purdue University)

karen_keene@ncsu.edu                       Poe 502         513-3374

Dr. Keene is an Associate Professor in Mathematics Education. Her work is focused in two primary areas. She conducts research on the teaching and learning of differential equations at the undergraduate level. She is particularly interested in how students learn in inquiry oriented tertiary classrooms. She also is interested in high school mathematics teaching, including knowledge of mathematics needed for teaching at the high school level and developing a new fourth year high school math course based in operations research.


**Hollylynne S. Lee, Ph.D.** (University of Virginia)

hollylynne@ncsu.edu                        Poe 502         513-3544

Dr. Lee is a Professor in Mathematics Education. Her current research interests include teaching and learning of probability and statistics, especially incorporating technology use; designing technology tools that facilitate students' learning of mathematics (e.g., Probability Explorer, applets); and preparing preservice and inservice teachers to use technology in 6-12 mathematics (e.g., PTMT: Preparing to Teach Mathematics with

Technology project). She also is a faculty leader on the Noyce Mathematics Education Teaching Scholars program, which prepares highly qualified secondary mathematics teachers to work in high-needs schools.

**Allison McCulloch, Ph.D.** (Rutgers University)
allison_mcculloch@ncsu.edu                Poe 502        513-2803

Dr. McCulloch is an Associate Professor in Mathematics Education. Her current research interests include understanding the role of the affective domain with respect to teaching and learning in technological contexts; mathematical play; and preparing prospective and practicing teachers to teach in culturally diverse classrooms. Dr. McCulloch also writes curriculum and conducts research around the preparation of teachers to use technology.

**Karen Norwood, Ed.D.** (Temple University)

karen_norwood@ncsu.edu                Poe 326        513-8051

Dr. Norwood is an Associate Professor in the mathematics education program. Her current research endeavors focus on multiple representations and their effect on students' conceptual understanding of the function concept.

**Lee Stiff, Ph.D.** (NC State University)
         lee_stiff@ncsu.edu                        Poe 326        515-6909

Dr. Stiff is a Professor of mathematics education and an associate member of the math department. As such, he has taught courses in mathematics and mathematics education, including uses of technology in teaching mathematics, and the mathematics education of African-American children. Dr. Stiff's research and other professional activities have focused on teaching strategies, problem solving, the mathematics education of African-American children, and uses of instructional technologies in mathematics teaching. His research methodologies include experimental design, surveys and interviews, and classroom-based investigations.

**Paola Sztajn, Ph.D.** (Indiana University)
         paola_sztajn@ncsu.edu                Poe 602        513-4631

Dr. Sztajn is a Professor of mathematics education and department head of the Department of Teacher Education and Learning Sciences (TELS) and member of the graduate faculty in mathematics education. Her research program focuses on practicing elementary teachers' mathematics knowledge and professional development. The overarching question that guides Dr. Sztajn's research agenda is: in which ways do practicing elementary mathematics teachers acquire and continue to develop the knowledge needed to teach all students high quality mathematics? She is interested in collaborative studies that allow multi-faceted, in-depth investigations of this complex question.

**Temple Walkowiak, Ph. D.** (University of Virginia)
tawalkow@ncsu.edu                Poe 317        513-0918

Dr. Walkowiak is an Assistant Professor of mathematics education in the TELS Department and a member of the graduate faculty in mathematics education.  Her research focuses on measuring the quality of mathematics teaching, preservice elementary teacher mathematics education and professional development for practicing elementary mathematics teachers.

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. Part-time Opportunities

   **Work-study** – Work-study jobs are available through the University for qualifying students. The University also maintains a listing of student job opportunities that do not require work-study.  See the University's work page (https://financialaid.ncsu.edu/types-of-aid/work/) for more information.

   **Hourly RA appointment** – University professors may have hourly RA appointments available for short durations. These are generally sent out via email and Dr. Keene often has a list of these opportunities. **Students are encouraged to ask faculty directly about such opportunities**. These are great opportunities for becoming involved with research projects on a limited basis.

2. 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/undergraduate/undergraduate-scholarships-and-financial-aid/ You can also call or email questions at 515-3325 or CED_Scholarships@ncsu.edu.

3. 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.  For more information, please contact: Margaret R. Blanchard
   Email: Meg_Blanchard@ncsu.edu
   Deadline: typically early March for the following year. See application at
   https://ced.ncsu.edu/undergraduate/undergraduate-scholarships-and-financial-aid/

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 $4000 for the

academic year, with an option of $500 in additional support for study in the summer. Priority deadlines are typically in early April. See http://www.ncsu.edu/grad/diversity/grants.html.

5.  Agnes and Garfield Stiff Endowment for Graduate Travel

    Annual proceeds from the endowment shall be used to support 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.) No award shall be given for a presentation at any meeting held in Raleigh, Durham, Chapel Hill, or otherwise "locally-held" meetings. For more information, please contact: Dr. Margaret R. Blanchard meg_blanchard@ncsu.edu

6.  UGSA Travel Grants

    The University Graduate Student Association (UGSA) offers travel subsidy to fund graduate student conference travel. To find more about the grant see http://ugsa.ncsu.edu.

## External

1.  Scholarships for full-time teachers from

    - National Council of Teachers of Mathematics offers Mathematics Graduate Course Work Scholarships for Teachers. The purpose of this grant is to provide financial support for improving teachers' understanding of mathematics by completing graduate course work in mathematics. For 2016-2017, scholarships with a maximum of $3,200 each will be awarded to persons currently teaching. **Primary emphasis is placed on appropriate mathematics content courses.** Mathematics education courses may also qualify if a suitable rationale is provided by the applicant. Proposals must address the following: rationale for the coursework, anticipated instructional improvements, and expected impact on student learning outcomes. The applicant must (1) be a current Full Individual or E-Member of NCTM; (2) have taught school mathematics at least three years; and (3) intend to remain in teaching. Application due in mid-November. Please see http://www.nctm.org/Search/?ky=scholarships for details.

    - North Carolina Council of Teachers of Mathematics offers Graduate Scholarships to support practicing teachers. The NCCTM Trust Fund Committee semiannually accepts applications from 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 $600 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://secure.ncctm.org/grants_scholarships.cfm.

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 $6,500 per year (master's) and $8,500 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.

3. Knowles Science Teaching Foundation

   KSTF annually funds science and mathematics Teaching Fellows. Knowles Fellows are young men and women who have received a bachelor's or advanced degree in science, engineering or mathematics and are committed to teaching high school science and/or mathematics in U.S. schools. The fellowship supports them professionally and financially for up to five years through a teacher preparation program to eligibility for tenure. Fellows who were full-time students received up to $10,000 in annual tuition assistance and a monthly stipend while they were working toward a teaching credential. Full-time teachers are eligible for small materials grants and support for a mentor-teacher relationship. All fellows receive funding for summer professional development and summer living stipends. KSTF also supports membership in a professional organization and travel to professional meetings. Application deadline is typically mid-January for awards that will begin in the summer. See website for details http://www.kstf.org/fellowships/

## 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. In our department, it is rare for a master's student to be hired and receive this, but it does happen in rare situation. 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 https://grad.ncsu.edu/faculty-and-staff/student-funding/gssp/. 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: https://grad.ncsu.edu/faculty-and-staff/student-funding/gssp/. 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 14th | Closes: 10th day of class, spring semester |
| For First Summer Session | Opens: March 1st | Closes: 3rd day of class, summer session I |
| For Second Summer Session | Opens: March 1st | Closes: 3rd day of class, summer session II |
| For Fall Semester | Opens: March 1st | Closes: 10th 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 sponsors many activities for international students. Finally, the University maintains a listing of international student programs https://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* that can be accessed at http://www.ncsu.edu/grad/current-students/survival-guide.html. 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. The following is a link to 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. 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 contact Allison McCulloch at allison_mcculloch@ncsu.edu or see the club's facebook page (NCCTM-NC State).


## ELECTRONIC THESIS AND DISSERTATION (ETD)

If you are pursuing a Master's of Science in Mathematics, you will be creating a master's thesis. If so, this section is important to you.

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 https://grad.ncsu.edu/students/etd/ .

One of the most important documents at this website, the ETD Guide (link on the main page), walks graduate students through the exact process and formatting requirements for a thesis or dissertation. Please see

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/etdwk.asp

There are helpful templates for MS Word documents or LaTeX documents for creating your thesis or dissertation in the proper format. See the link to Templates on the ETD webpage.

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 clicking the link for deadlines on the ETD webpage.

## 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.

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.

## 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: https://www.ncsu.edu/grad/catalog/interinstitutional.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.

## MATHEMATICS EDUCATION GRADUATE COURSE ROTATION SCHEDULE

Use the following rotation schedules to aid in advising and creating plans of work. This schedule was created and adopted May 8, 2013 will remain in effect until faculty or resources deem it necessary to change the schedule. Other masters level special topics (EMS 592) and PhD Special Topics (EMS 792) courses may be offered as needed. PhD level courses are indicated in bold. THIS MOST LIKELY WILL CHANGE DURING 2016-2017 so be aware.

| Calendar Year | Spring | Fall |
|---|---|---|
| Even years (2014, 2016, 2018,...) | *EMS/ST 519*<br>*EMS 581*<br><br><br>*EMS 572/472*<br>*EMS 570/470*<br><br>**EMS 711**<br>**EMS 712 (starting in 2016)**<br>**EMS 802** (for experienced doc students) | *EMS 514*<br>*EMS 512*<br>*EMS 580/480*<br><br>*EMS 572/472*<br>*EMS 570/470*<br><br>**EMS 704**<br>**EMS 802** (for early doc students) |
| Odd years (2015, 2017, 2019,...) | *EMS 510*<br>*EMS 581*<br><br><br>*EMS 572/472*<br>*EMS 570/470*<br><br>**EMS 705**<br>**EMS 802** (for experienced doc students) | *EMS 513*<br>*EMS 512*<br>*EMS 580/480*<br><br>*EMS 572/472*<br>*EMS 570/470*<br><br>**EMS 770**<br>**EMS 802** (for early doc students) |

## TEACHER LICENSURE

Many students pursuing graduate degrees in Mathematics Education are also interested in gaining teaching experience in K-12 settings and/or fulfilling requirements for a NC teaching license. Students can pursue a license in our mathematics education program, or move to the Master of Arts in Teaching Mathematics program, which grants initial licensure (A license) and a masters). For those interested, they can look at this

website: https://ced.ncsu.edu/programs/mat-mathematics-education/ or contact Tim Goodale goodal@ncsu.edu

For those in our Mathematics Education program, four levels of licenses are possible: 1) "A" initial license for those becoming initially certified to teach mathematics, 2) "M" advanced licensure for those fulfilling master's level advanced competencies, 3) "S" specialist licensure for those with coursework beyond the M license, and 4) a "D' doctoral level licensure for those with doctoral degrees. Only students holding a previous level of license are eligible for the next higher level. **Students are not required to pursue licensure as part of their graduate program, it is a personal choice, but one that may have financial benefits if one chooses to teach in public schools in other states.** In addition, many universities desire to hire mathematics education faculty that are fully licensed and have teaching experience in K-12 settings.

A student should indicate to their advisor within 9 hrs of taking coursework if they intend to pursue a license at any of the four levels. At the end of the program and once all evidences are complete (for A and M), the student should submit a licensure application and graduate transcripts to the office of teacher licensure.

- For an A level license, a student must meet all requirements and submit evidences that are also required by undergraduate initial licensure candidates.
- For an M level license, a student must already hold an A level license in either 6-9 or 9-12 mathematics and must meet all degree requirements in a master's program in mathematics education and submit the evidences required for an M license.
- For an S level license, **a student must have a** minimum of 60 semester hours of coursework beyond the Bachelor's Degree, with **at least 24 semester hours** beyond the Master's Degree. At least 9 of the hours must be in mathematics or mathematics education. Must already hold an "M" license in either 6-9 or 9-12 Mathematics.
- For a D level license, a student must complete a doctoral degree program. Upon graduation, submit a licensure application and transcript to the office of teacher licensure.


## FORMS

A link to all (University level) Graduate School forms can be found at http://www.ncsu.edu/grad/faculty-and-staff/forms-list.html.
A comprehensive timeline for forms can be seen at the Graduate School at http://www.ncsu.edu/grad/handbook/section3_24.php. Note that forms should be turned into 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.

1. Request to Schedule Oral Examination-*filed by Ph.D. student at least 12 working days before exam date. (All can be accessed at* http://www.ncsu.edu/grad/faculty-and-staff/forms-list.html. **)**
Master's Students:
   *Request to schedule Final Oral Exam*

2. Oral Exam Reports-completed by *M.S. and Ph.D.* committee members at oral exam.


**Optional Forms (ALL STUDENTS)** http://www.ncsu.edu/grad/faculty-and-staff/forms-list.html.

1. Leave of Absence Request Form-*MUST BE SUBMITTED 1 month before semester of leave.*
2. Request to Transfer Credit from Another Institution
3. Change of Degree Status or Curriculum

## EXPECTATIONS FOR MASTER'S STUDENTS

Upon acceptance into the program, the master's student will:
- Maintain continuous enrollment (at least 1 credit) every Fall and Spring until graduation. Failure to do so will result in termination of one's program. If a student requires a leave of absence, a request must be filed at least one month before the affected term. A maximum of two semesters of leave is allowed.
- Become knowledgeable and competent in the following areas:
  - Using a computer (for word processing, coding data, statistical packages, presentations)
  - Using appropriate techniques for literature searches, periodicals
  - Using APA writing style for professional articles
  - Delivering clear, concise oral and written presentations of reviews and research
- Complete all degree requirements within 6 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 before being formally admitted. (Special circumstances will allow longer- see Dr. Keene)
- A Master of Science Degree requires a thesis (at least 3 hrs of EMS 695). A Master of Education Degree (Option B) does not have a thesis requirement and can be earned by taking course work and completing a masters-level evidence, only if needed for licensure.
- All students fulfill the requirements for a common core of coursework. Then each of the four options (9-12, 6-9, post-secondary, 9-12 A+M) have additional specific requirements. See curriculum display.

## TIMELINE

The following timetable outlines the different aspects of the master's degree program. Each aspect is explained in more detail after the timeline.

[* 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 by Dr. Tim Goodale. See https://ced.ncsu.edu/programs/mat-mathematics-education/

| Timeline for Master's Studies | | | |
|---|---|---|---|
| **Phase** | **Coursework and Culminating Product** | | |
| **Program Requirements** | Complete all required coursework<br>M.Ed. students should complete work by submitting a special "evidence" project (in an EMS class)<br>M.S. students should complete their thesis<br>M.S. students present thesis at research symposium in final semester | | |
| **Advising/ Mentoring** | Meet with advisor and create initial Plan of Work | Select committee chair (everyone) and committee members (thesis only)<br><br>Finalize Plan of Work | Discuss topics of interest with advisor and select a topic for thesis | Meet and consult with committee chair and committee throughout the thesis or Scholarly Inquiry project |
| **Professional Development** | Attend conferences<br>Engage in Scholarly Outreach<br>Conduct professional development for colleagues<br>Become active in state and national organizations | | |
| **Planning for the Future** | Develop CV and update regularly<br>Identify professional goals and discuss with advisor/mentor | | |
| **Administrative** | Sign Patent Agreement M.S. Only<br><br>File Plan of Work in MyPack Portal | M.S. students should attend Electronic Thesis and Dissertation (ETD) Workshop | M.S. students request Permit to Schedule Master's Oral Examination<br>Complete Licensure Evidence | Apply for Graduation in MyPack<br>Apply for licensure (if desired)<br>Submit thesis to graduate school<br>Diploma Order Request Card |

## MASTER'S PROGRAM REQUIREMENTS

### Coursework

A Master's Degree in Mathematics Education requires that a student meet the course expectations as outlined below for a total of 36 hours. This is 6 hours more than the Graduate School, which requires every student to have a minimum of 30 semester hours of coursework in their Plan of Work. At least 20 semester hours must be at or above the 500-level. A Master of Science Degree requires a thesis (at least 3 hrs of EMS 695). A Master of Education Degree (Option B) does not have a thesis requirement and can be earned by taking course work and completing a masters-level evidence, only if needed for licensure. All students fulfill the requirements for a common core of coursework. Then each of the four options (9-12, 6-9, post-secondary, 9-12 A+M) have additional specific requirements.

### *Core Courses (12 Hours)*

**All students must take one of the following technology courses:**

**EMS 480/580 Teaching Mathematics with Technology**
This course prepares prospective mathematics teachers to use technology in their classrooms to assist students in formulating and solving math problems in the middle and high school mathematics curricula.

**EMS 581 Advanced Application of Technology in Math Education (EMS480/580 or equivalent prerequisite)**
This is a research-based course on applications of technology tools in secondary and middle school mathematics. Students are introduced to use of various technology tools for learning and teaching mathematics, including design of technology environments, appropriate investigation tasks, and professional development.

**Students then choose 3 courses from the following list:**
**EMS 512 Teaching Mathematics in Elementary and Middle School: Bridging Theories and Practice**
This course focuses on the theory, research, and methodology of teaching and learning mathematics in elementary and middle grades with an emphasis on the development of a foundation for understanding and assessing mathematical growth and learning through historical and psychological sources, research, and reflective practice. Students will also develop an understanding of how children come to learn elementary mathematics meaningfully and what this necessarily implies about the way mathematics is taught and how elementary and middle grades education can be improved.

**EMS 513 Teaching and Learning Algebra**
This course covers how students develop algebraic ideas from upper elementary grades through Algebra I from a developmental perspective. Students will learn research-based methods for developing algebraic thinking, structure and processes used in algebra.

**EMS 514 Teaching and Learning Geometry**
This course focuses on the development of geometric thinking in grades K-12 using multiple instructional approaches, including technology, and considered using different theories of learning and frameworks (e.g., Van Hiele, SOLO taxonomy). Topics may include: measurement,

similarity, congruence, properties of 2 and 3 dimensional figures, circles, non-Euclidean geometries. Synthetic, analytic and transformational, formal and informal approaches will be highlighted.

**EMS 519 Teaching and Learning Statistical Thinking**
This course focuses on how students develop statistical ideas from upper elementary grades through AP Statistics. Students will discuss the differences between mathematical and statistical thinking and learn research-based methods for developing statistical thinking.

**EMS 510 Interactions in Mathematics Classrooms**
This course focuses on successful instruction depends on the quality of the interactions among students and teacher engaged in meaningful mathematical problems. Forms of interactions will include whole class instruction, small group activity, and facilitating classroom discussion.

**EMS 592 Special Topics**
These courses are occasionally offered by faculty on various topics and can be used as an elective or as a substitution for other core courses upon approval by the committee.

Note: EMS 581 can be taken as an option in the choice of 3, if EMS 580 was used for the technology category.

### *Research Courses (3 Hours)*
Students choose between ST 507, ST 511. Other courses could be substituted here if approved by the committee. (e.g., ST 513, ST 515)

***Depending on a student's prior research background, it may be possible to count EMS 695 (thesis hrs) as a research course.***

### *Elective (3 Hours)*
Master's students may choose to take any 400-level or above course in education, psychology, or the mathematical sciences (e.g. MATH, STAT, CSC) for their elective.

***Those pursuing an M.S. degree must enroll for at least 3 hrs of EMS 695. These 3hrs could serve as their elective.***

### *Additional Requirements for Each Emphasis Option*
### *Middle School Emphasis*
Students concentrating in middle school choose to take either ECI 550 or 551. These courses prepare students for thinking about advanced instructional theories in middle school. Students take 15 semester hours of mathematical science courses beyond the requirements for admission. Only 6 of these hours may be 400-level classes. They also complete a master's level evidence if they intend to apply for an M license.

### *High School Emphasis*
Students concentrating in high school take 18 semester hours of mathematical science courses beyond the undergraduate requirements (only 6 of these hours may be 400-level classes). They also complete a master's level evidence if they intend to apply for an M license.

### *Post-Secondary Emphasis*
Students concentrating in post-secondary take 18-24 semester hours of mathematical science courses beyond the undergraduate requirements (only 6 of these hours may be 400-level classes). If the student intends to teach at the community college, it is important to know that in NC, only 500 level courses will count towards being able to teach at the CC. While only 18 hours are required, we encourage students to take up to 24 hours in mathematical sciences to better prepare them for collegiate level teaching. (these extra 6 hrs could be fulfilled by choosing a mathematics course as your elective and using a ST course for the research hrs.

### *"A+M" Licensure Emphasis*
The fourth option in the Master's program is an extended program (typically about 42-48 credit hours) in which students with a **degree in a mathematical science** can earn an M.Ed or M.S. degree and meet state requirements for both initial "A" and "M" advanced license. These students take the 18 hrs of Core Courses in the Master's program, 12 credit hours in mathematics or statistics (only 3 hrs can be at 400-level). The mathematics or statistics courses chosen should ensure that the student has meet the disciplinary content requirements for licensure (see below) and 18 hours of professional education courses to fulfill licensure requirements. The exact courses needed may vary per student depending on courses taken in their undergraduate degree or as a post-baccalaureate student.

**Professional Education Courses for A Licensure (18 hrs)**

| | | |
|---|---|---|
| ECI 416 | Teaching Exceptional Children in Mainstreamed Classrooms | |
| Or | | 3 hr |
| ECI 579 | Organizational and Behavioral Management of Diverse Classrooms | |
| | | |
| ED 508 | Exploring Diversity in Classroom and Community | |
| Or | | 3 hr |
| ELP 515 | Education and Social Diversity | |
| | | |
| ED 507 | Principles of Developing and Interpreting Assessments | 2 hr |
| | | |
| EMS 572 | Teaching Mathematics Topics in Senior High School | |
| (with field placement) | | 3 hr |
| EMS 570 | Methods and Materials for Teaching Math | 3 hr |
| ED 569 | Teaching Internship MAT | 4 hr |

| COURSE REQUIREMENTS   APPROVED MAY 2013<br>MATHEMATICS EDUCATION – MASTER'S |
|---|

**Core Courses (12 Hours)**

_____ EMS 580 Teaching Mathematics with Technology
   OR    EMS 581  Advanced Application of Technology in Math Ed
**Then choose 3 of the following courses:**
_____ EMS 512 Teaching Mathematics in Elementary and Middle School: Bridging Theories and Practice
_____ EMS 513 Teaching and Learning Algebra
_____ EMS 514 Teaching and Learning Geometry
_____ EMS 519 Teaching and Learning Statistics
_____ EMS 510  Interactions in Mathematics Classrooms *
_____ EMS 592 Special Topics in Mathematics Education (offerings vary)
_____EMS 581  Advanced Application of Technology in Math Ed  (if EMS 580 was taken above)

* For those pursuing the A licensure option, EMS510 should be used as a Core Course if possible

**Research Course (3 Hours)**

_____     ST 507    OR ST 511   OR    ST513    or other course approved by committee

**Elective (3 Hours)**

_____ Course 400-level or above in EMS, education, psych, sociology,  or mathematical sciences

| Middle School Focus<br>Choose one:<br>ECI 550 Foundations of Middle Years Education<br>ECI 551 (550 is prereq) Teaching/Learning Approaches for Emerging Adolescents<br><br>**Mathematics:** Minimum of 15 semester hours beyond undergraduate requirements in mathematical sciences (MA, STAT, CSC).  Only six hours may be at 400-level<br><br>_____1:_____ | High School Focus<br>**Mathematics:** 18 semester hours beyond undergraduate requirements in mathematical sciences (MA, STAT, CSC) at the 400 level or above. Only six hours may be at 400-level<br><br>_____1:_____<br>_____2:_____<br>_____3:_____<br>_____4:_____<br>_____5:_____<br>____6:_____ | Post-Secondary Focus<br>**Mathematics:** 18 semester hours beyond undergraduate requirements in mathematical sciences (MA, STAT, CSC) requirements.  Only six hours may be at 400-level<br><br>____1:_____<br>____2:_____<br>____3:_____<br>____4:_____<br>____5:_____ | A Licensure<br>**Professional Education**:<br>*(some may have been fulfilled in B.S. degree)*<br>**18** hours (9 of which must be at 500 level) see specific requirements on previous page*. *One course can be used as the Elective above.*<br><br>___1:ECI 416 or ECI 579<br>___ 2:_ ED 508  or ELP 515<br>___ 3.:ED 507 (2 hrs)<br>____ 4. EMS 572 ____<br>____ 5:_ EMS 570 ____ |

| | | | |
|---|---|---|---|
| ___2:_____<br>__3:_____<br>__4:_____<br>__5:_____ | | ___6:_____<br><br>*STRONGLY suggest student take an additional 6 hrs of a mathematics sequence at the 500-level or above if they desire to teach at a community college or small liberal arts college.* | ___6:ED 569 (4 hrs)_____<br>**Mathematics:** 12 hours beyond undergraduate requirements in mathematical sciences (MA, STAT, and CSC) at 400 level or above, 9 hours of which MUST be in mathematics. Only 3 hours may be at 400-level<br>_____1:_____<br>_<br>_____2:_____<br>__ __3:_____ _____<br>____4.<br>_____<br><br>**Evidence for Licensure** Evidences required for an "M" license as well as all needed for "A". See page 51 |

## Advising/Mentoring

Each student will be assigned a faculty member in Mathematics Education to help him or her develop a preliminary plan of course work and to organize a graduate advisory committee (if M.S.). The advisor helps the student develop a plan of graduate study that meets the requirements of the graduate program and ensures that no student is left without a faculty member to chair his or her thesis (for M.S.) or serve as his/her advisor for the course of his study (Med).

However, as students progress through the program and their research interests become more refined and focused, they are welcome to switch advisors/chairs and build a committee (if doing a thesis) appropriate to their research interests. At times, students switch advisors/chairs because of their TA or RA positions and the opportunity to complete a thesis/dissertation focused around their assistantship work.

**Students should meet with their advisor/chair *at least* once a semester. *Initiating these meetings and conversations is the responsibility of the graduate student.* In these meetings you should:**

- discuss plans for courses, (see Rotation Schedule, p.18)
- help with the Student Information System for registration,
- develop/revise a plan of work in SIS and timeline for completion of the degree,
- discuss funding opportunities,
- discuss progress towards the degree
- discuss professional goals and opportunities for gaining experiences to be competitive for the job market.
- discuss licensure options for public school teaching

### 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. degree or prior post-baccalaureate coursework. The initial advisor does not necessarily need to become a student's Chair of their Graduate Advisory Committee. If the student is pursuing an M.S., the student should identify candidates **for a Graduate Advisory Committee** as soon as possible after one begins taking course work and *before completing 18 hours of graduate work* toward the Master's. Failure to do so may result in work previously taken not counting toward the degree. The Graduate Advisory Committee and the student meet formally to develop and agree upon the final Plan of Work for Graduate Study.

**Students pursuing a M.Ed. only need a single faculty member in Mathematics Education to serve as the chair of the Graduate Advisory Committee.** Students pursuing an M.S. degree must have 3 members on their Graduate Advisory Committee. Two of these members must be Mathematics Education graduate faculty and the third should represent their Minor area. When designating a committee and chairperson, the student should consider the nature of the student's proposed research and the number of committees already being chaired by various departmental faculty members.

- The worksheet on page 22 should be used to make sure all requirements in the program are fulfilled, either from courses taken at NCSU, during a different master's degree at NCSU or another institution, or as a PBS student.

- Master's students may only transfer in 12 credits of courses towards fulfilling program requirements and meeting the degree requirements in the Master's degree program. These 12 hours can be a combination of courses taken at a different institution and those taken as a Post Baccalaureate Student (PBS). Additional info can be found here: http://www.ncsu.edu/grad/handbook/sections/3.1-minimum-degree-requirements.html#transferother
- All master's students must take a minimum of 24 hours at NCSU.
- M.S. students must have at least 3 hrs of EMS 695 in their Plan of Work
- Some courses taken at NCSU may fulfill two requirements. For example, ST 511 can fulfill a Research course requirement and a Mathematical Science requirement; however, the ST 511 course only contributes 3 hrs to the minimum required (36 hrs) in the Plan of Work.

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 C- or better may count towards graduate credit in the Plan of Work.** Please see http://www.ncsu.edu/grad/handbook/section3_18.php and http://www.ncsu.edu/grad/handbook/section3_19.php in the Graduate Administrative Handbook.

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. See http://www.ncsu.edu/grad/faculty-and-staff/docs/GRAD-SIS-training-manual-students.pdf for help in using the system.

SIS Plan of Work (POW) questions should be sent to Christy_buck@ncsu.edu.

**Major** courses consist of courses taken at NCSU to meet requirements in Mathematics Education, Research, and an Elective on the Master's Program worksheet. **Minor** Courses consist of all courses counting towards a student's minor in a mathematical science. Thus, courses that are being counted as Mathematical Sciences should be listed as a minor course only if the student is declaring a minor (M.S. students must do this, most M.Ed. students do not declare a minor).

A student should meet with the Graduate Advisory Committee to discuss the Plan of Work and have them sign on their agreement with the plan, using the Master's Program Worksheet should as a guide. This will facilitate discussions on how the student is meeting all requirements in the program.

## PROFESSIONAL DEVELOPMENT

Students enrolled in the Master's program are encouraged to gain professional development experiences outside of typical coursework at the university. Early in the master's program, students are encouraged to attend local and national conferences, if possible. It is also recommended that students become active members of local or national organizations that are of interest to you. Not only will membership in these organizations give you access to their journals and current research in the field, it also provides a venue for professional networking.

Students should seek opportunities to attend a variety of professional development outside of school and to also conduct professional development workshops for their colleagues.

## PLANNING FOR THE FUTURE

As soon as possible, students should meet with their initial advisor to outline their professional goals, and develop and regularly update a resume or 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, it is important for master's students to attend conferences, become involved in leadership activities both locally and nationally, and maintain professional contacts in the field. Master's students planning to enter doctoral study should also consider joining a research project as a research assistant (RA), presenting at conferences, and publishing papers with faculty members or other graduate students.

The career center is also a good resource for exploring career possibilities (https://cdc.dasa.ncsu.edu/). Math education job postings are listed on many professional organization's web pages including:
- The Chronicle of Higher Education (http://chronicle.com/),
- 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/).

Students seeking a teaching position in NC should explore specific county web pages.

## ADMINISTRATIVE—SCHEDULE OF REQUIRED DOCUMENTS

Please see the Graduate School page that describes when required documents should be completed http://www.ncsu.edu/grad/handbook/sections/3.25-required-documents.html. **Please remember that submitting a required form to the Graduate Administrative Assistant in our department should be done 5 working days BEFORE the document is required to be received by the Graduate School.**

MATHEMATICS EDUCATION
MASTERS INQUIRY PROJECT FOR STUDENTS PURSING AN MED IN MATHEMATICS
EDUCATION
## Details and Grading Rubric for
## *Evidence 1: Inquiry Project* and *Evidence 2: Dissemination of Inquiry Project*

In either **EMS 513, 514, or 519**, a graduate student will conduct an inquiry project to better understand an issue related to teaching and/or learning some aspect of mathematics. (e.g. Students' understanding of and ability to construct proofs, implementation of a new teaching strategy and its impact on students; a comparison of students' learning from two different instructional approaches; the introduction of a project and its effects on student learning; teacher's self-efficacy or knowledge for teaching algebra, trends in AP Stats enrollment, achievement in data and chance on large-scale assessments, students' understanding of variability,  etc).  Data may be in the form of quantitative data (scores from tests or surveys), or qualitative data (video of students' work on computer, students' work on a task, poster presentations from a task, class discussions, interviews with students or teachers). Student should submit a **13-17 page report** on the project (not including references and appendices). Student must also submit documentation of how they disseminated the inquiry project (e.g., final class presentation, poster session, round table discussion, conference presentation, journal article, etc).
**NOTE:  If a students' M.S. thesis involves the collection and analysis of data of learners, it can also be submitted to fulfill the Masters Inquiry Project.**

**Evidence 1: Inquiry project**

| Section of Paper | Points Possible | Comments and your points |
|---|---|---|
| **Introduction:**<br>Describe the topic(s) or issue(s) which are the focus of your analysis. Describe why you are interested in the topic/issue and use references from literature to describe the topic or issue and its importance, (e.g., include references to NCTM, GAISE, and Common Core). State the focus research question(s) that you are exploring.  2-3 pages | 15 | |
| **Methods**<br>Describe the context in which data was collected, participants, and tasks or instruments used.<br>Describe a way of framing your analysis that may help you in characterizing students' understanding of the topic or the issue you are investigating.  For example, if the focus topic is on students' understanding of proof, there may exist literature that describes "levels of understanding proof" that could be used to characterize students' work on a task on constructing a proof. You may need to develop your own framework based on the focus of your work and what you know from literature. Describe the analysis procedures used with references to appropriate citations to support techniques used. Techniques should be appropriate for the | 20 | |

| | | |
|---|---|---|
| type of data collected and may combine quantitative and qualitative techniques.   3-4 pages | | |
| **Analysis and Results**<br>Describe your analysis of data and important findings. When appropriate, use tables and graphs to illustrate your points and organize your work. This section should be organized around central themes or findings and not just a running record of what you did.<br>In what ways can/did the results from your project have positive impacts on student learning or teaching?  Support your findings/results with data to back your claims. Insert samples of work or quotes to support claims or illustrate your points.  6-7 pages | 40 | |
| **Discussion**<br>Answer your focus question(s) and discuss what you learned about the teaching or learning of the topic(s) or issue(s) of interest.<br>Connect your findings with findings from other research about the focus topic(s) or issue(s) of interest.<br>What new questions about the topic(s) or issue(s) have you formulated that you would like to explore?     2-3 pages | 20 | |
| **References and Grammar**<br> Provide a reference list of literature used in proper APA format.  Minimum of 6 research references should be used. Points in this section will also apply to the use of proper citations in APA format within the body of the paper. Your report should be organized, and of high quality.  Please include a table of contents and proper headings. Points in this section will also apply to the use of proper grammar and spelling within body of paper. | 5 | |

**Evidence 2: Dissemination of Inquiry Project--**Documentation Needed

| Artifact needed | Possible Points | Your Score and Comments |
|---|---|---|
| **Audience**—what is the nature of the group in which you presented your action research project?  Describe the meeting and its purposes.  (e.g., final class presentation, round table discussion, conference presentation, poster presentation, journal article, etc) (2-3 sentences) | 5 | |
| **Presentation format**—How did you present your inquiry project?  Presentation formats can include:  a power point presentation, web page/site, handouts, other audio or visual representations, etc. **Submit electronic versions of presentation format, if posted online, links to websites are allowed.**<br>(Note: The specifics of how these 75 points are graded depend on the instructor of the course) | 75 | |
| **What was the reaction to your inquiry project?**—You will need to collect feedback from your | 20 | |

| | | |
|---|---|---|
| presentation. Summarize the feedback and reaction(s) of your audience.  Was the reaction what you expected?  What about the audience's reaction surprised you?  What are some examples of comments you heard?  Be specific. (1 page) | | |