# STUDENT HANDBOOK FOR THE DOCTORAL PROGRAMS IN MATHEMATICS EDUCATION, UNIVERSITY OF WYOMING

This Handbook provides detailed information about the doctoral programs in mathematics education at the University of Wyoming. Students have the option of pursuing either a Ph.D. or an Ed.D. in Curriculum & Instruction with a concentration in mathematics education (EMAT). A Doctor of Philosophy (Ph.D.) is a terminal degree that best positions an educator who wishes to pursue a career as a professor or researcher in higher education. Candidates focus on conducting original theoretical research to add unique findings to advance the body of knowledge in their field. A Doctor of Education (Ed.D.) is an applied, or professional doctorate, that allows experienced individuals to advance in their careers to become leaders in their districts or other organizations. Moreover, graduates of Ed.D. degree programs are well-qualified for positions as mathematics teacher educators in departments of teacher education. A distinguishing element of our Ed.D. degree program is that students in the program apply their knowledge to solve a complex Problem of Practice (PoP) with the goal of positively affecting practice in their place of work.

Students in the two programs enroll in many of the same courses. While both the EMAT doctoral degree programs can be completed online, the EMAT Ed.D. degree program is officially recognized at UW as an online program. As such, students in the program receive a discount on all courses in which they enroll. This is not the case for students in the EMAT PhD degree program. Students in this program do not receive a discount on their courses.

Please review all the information contained here. The doctoral programs in mathematics education at UW are housed in the School of Teacher Education (STE). School of Graduate Education staff will use the course requirements outlined for your specific program in this Handbook to confirm that you have completed all of the requirements needed to graduate. Therefore, you will want to work closely with your program advisor to ensure that you meet all your program’s requirements. It is important for you to be aware, though, that you are ultimately responsible for the contents of this Handbook.

# This Handbook is organized in the following manner:

# General information is given about the doctoral programs in mathematics education at the University of Wyoming (pp. 2-6),

# Information about the EMAT Ph.D. degree program is provided (pp. 7-9), and

# Information about the EMAT Ed.D. degree program is given (pp. 10-14).

# References (p. 15).

# Ph.D. Program of Study Worksheet (pp. 16-20).

# Ed.D. Program of Study Worksheet (pp. 21-24).

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School of Teacher Education

University of Wyoming

1000 E. University Ave.

Laramie, WY 82071 USA

General Information about the Ph.D. and Ed.D. Degree Programs in Mathematics Education--Curriculum & Instruction

# Application Process

All program applicants must complete an [online application to the University of Wyoming](http://www.uwyo.edu/admissions/graduate/) and submit an application fee of $50.

**Application Review Timeline**

Complete applications for Fall start MUST be received by February 1st. International students are encouraged to apply at least one semester in advance of starting classes to allow sufficient time for processing visa and other related paperwork.

**Admission Requirements**

**Domestic Students**

* Undergraduate GPA: 3.3 or above.
* Completed GRE examination: minimum 151 in verbal, 144 quantitative; 4.0 in analytical writing.

**International Students**

* Undergraduate GPA: 3.3 or above.
* TOEFL: 550 minimum written or 76 minimum online, OR IELTS: 6.5 minimum overall score
* Completed GRE examination.

**Additional Requirements**

* Master's degree from an accredited institute of higher education.
* Three (3) years of P-12 teaching experience or its equivalent.

## Application Materials

All supporting materials should be submitted through the online application system.

Required materials for consideration for the EMAT Ph.D. program include:

* Writing sample (an article, master's thesis, or well done project/course paper).
* A letter of intent, in which the applicant describes their professional goals, relevant experiences, and potential research interests. Applicants to the Ed.D. program should articulate their initial Problem of Practice (PoP) that they intend to solve with the understanding that one’s PoP may change. More information about the PoP is provided in the EMAT Ed.D. degree program section below.
* A resume or curriculum vita.
* Three recommendation letters from those who are knowledgeable of the applicant’s intellect, scholarly abilities, teaching ability, or other qualifications for doctoral study. These letters typically are from former professors, supervisors, or administrators. The application portal will send a request to each of them after the applicants enter their email addresses.
* Transcripts from all universities attended. Unofficial transcripts can be loaded to the online application system, but if admitted to the University, official transcripts will need to be sent prior to beginning the program.
* Copy of GRE scores.
* International students must submit scores for a language proficiency exam, such as TOEFL or IELTS.
* An Application for a Graduate Assistantship (G.A.) should the student wish to seek one. Few G.A. positions are allocated to the College of Education (COE) annually. For this reason, obtaining a G.A. position is extremely competitive in the COE.

# If you are admitted into the program, you will want to follow the steps outlined by the Office of Graduate Studies at: <https://www.uwyo.edu/uwgrad/prospective/applying/next-steps.html>

# Program Cost

# For information about the cost of attending UW, go to:

# <http://www.uwyo.edu/sfa/cost-of-attendance/>

**Residency Requirement**

In the Ph.D. program, there is a residency requirement. Some students complete their residency requirement by working on a research project with a UW professor. Depending on the project, it may be the case that this work can be completed at distance.

**Advising**

When accepted into a program, students are assigned an initial faculty advisor. Students should contact their faculty advisor prior to taking courses to start creating a coursework plan. Students may elect to have a new faculty advisor at the time that they select their doctoral committee.

**Course Descriptions**

The UW Course Catalog contains current course descriptions and can be accessed at: <https://www.uwyo.edu/registrar/university_catalog/index.html>

**The Coursework Plan**

During the first quarter of study, students will develop with the assistance of the advisor a plan of study consistent with program requirements to ensure the student understands the sequence of required courses. The coursework plans for both the EMAT Ph.D. and Ed.D. degree programs can be found in the appendices of this handbook. Although the initial semesters of enrollment may consist of required courses, students will also confer with the advisor to select electives when appropriate. Course work plans can be modified when deemed necessary by the student and advisor. Prior to the preliminary examination, students need to submit and have approved, the Committee Assignment Form and the Program of Study Worksheet. Both these forms and all UW student forms can be found at: <https://www.uwyo.edu/registrar/graduate-students/graduate-student-forms.html>

**Registering for Classes**

Students can find information about registering for classes at UW at: <https://www.uwyo.edu/aces/academic-advising/registering-for-class/index.html>

To find courses being offered during any one term, go to:

<https://wyossb.uwyo.edu/StudentRegistrationSsb/ssb/term/termSelection?mode=registration>

**Transfer of Credit**

Students may request to apply up to 30 credit hours from an accredited Master’s degree program and/or graduate-level coursework toward their EMAT doctoral degree. These credit hours must be relevant to mathematics education. For example, students who have completed a Master’s degree in mathematics could apply 30 credit hours from this degree toward their doctoral degree in mathematics education. After acceptance into the program, students’ post-baccalaureate coursework will be evaluated by a UW faculty member in mathematics education. Students will then be informed about whether post-baccalaureate course credit hours can be applied toward one of the EMAT doctoral degrees. This is done with the caveat that the final determination of whether post-baccalaureate coursework can be applied toward an EMAT doctoral degree is done when the student’s official UW Program of Study Worksheet is evaluated prior to the preliminary examination (see below for additional information about the preliminary exam). If the coursework completed that the student wishes to apply toward their doctoral degree in mathematics education was completed more than 8 years ago at the time the coursework plan is submitted, then the student will need to complete the Eight Year Rule Petition. Plan on submitting this petition directly after your Program of Study Worksheet is approved, typically during your second or third year in the program. This form can be found at: <https://www.uwyo.edu/registrar/graduate-students/graduate-student-forms.html>

**Examinations:**

For all examinations in the EMAT doctoral programs, students orally defend their work. For example, students orally defend their preliminary examination. For all examinations, a distinguishing element of the EMAT doctoral degree programs is that students work solely with their lead faculty advisor to prepare for each examination. Alternatively put, committee members are not engaged until the actual oral examination takes place. This is by design so that each student has the support of their faculty advisor to develop their work, while respecting the time and commitments of committee members. In addition, any examination that a student takes is only scheduled AFTER the student has received permission from their faculty advisor to schedule the examination. In other words, an examination only proceeds if the student’s faculty advisor has found the quality of the student’s work to be sufficiently developed to ensure success on the examination. Given this policy, it is not advised that students schedule any examination until their faculty advisor has approved doing so.

In the EMAT Ph.D. degree program in mathematics education, there are three examinations. The first examination, the preliminary examination, involves only three members of your doctoral committee (generally, three mathematics education faculty). The remaining two examinations involve your entire five member doctoral committee.

(1). In the preliminary examination, students defend the first 2 chapters of their dissertation.

(2). In the proposal defense, students defend the first 3 chapters of their dissertation. A particular focus is placed on the third chapter of the dissertation during this defense since students have already defended the first 2 chapters of their dissertations during the preliminary examination. In addition, for dissertation studies that require an IRB, students will need to submit the IRB for their study only AFTER they successfully defend their proposal.

(3). The dissertation defense.

In the EMAT Ed.D. degree program in mathematics education, there are two examinations involving your three member doctoral committee:

(1). The preliminary examination in which students will defend the first 2 chapters of their DiP (see information about the DiP below in the Ed.D. degree program section). In addition, for DiP studies that require an IRB, the student will need to submit the IRB for their study only AFTER they successfully defend their preliminary examination.

(2). The DiP defense.

For all students in both the EMAT Ph.D. program and the EMAT Ed.D. program, the preliminary examination must be passed by the end of the student’s fifth complete year in the program. In addition, for students in both the EMAT doctoral programs, failure to pass the preliminary examination after two attempts will result in termination. While students cannot appeal their termination from the program, they can reapply to the EMAT doctoral program of their choice.

**Assistance with Paperwork Submission**

On many occasions, students will be submitting paperwork that will need to be processed to support their progress in their program. For example, after passing the preliminary examination, the completed “Report on Preliminary Examination for Admission to Candidacy” form will need to be submitted. UW student forms can be found at: <https://www.uwyo.edu/registrar/graduate-students/graduate-student-forms.html>. For assistance with submitting completed paperwork, please contact Alexis Ontiveroz at [aontive2@uwyo.edu](mailto:aontive2@uwyo.edu) or Alyssa Janzen at [ajanzen@uwyo.edu](mailto:ajanzen@uwyo.edu).

**Time to Degree**

UW faculty are committed to working closely with students to facilitate their academic progress. As part of this process, faculty regularly review students’ progress toward their degree. Assessment is based on a review of coursework, independent work, and other relevant criteria such as demonstrated competence in writing and critical thinking. In addition, in order for students’ knowledge to be current, and to pursue research on timely problems that will advance the field, it is expected that all students will make steady progress toward completion of degree requirements.

EMAT doctoral students generally complete degree requirements within the following number of years from the beginning their program until graduation:

* EMAT Ed.D. candidates: 3-5 years.
* EMAT Ph.D. candidates: 4-6 years.

## EMAT Doctoral Program Values and Goals

The fundamental programmatic development of each Mathematics Education doctoral student aligns with the universal need to improve the mathematical education of all citizens. Core values promoted within the EMAT doctoral programs align with the premises upon which modern reforms in mathematics education are based and include the following goals:

* Construction of deep conceptual understandings of fundamental ideas,
* Development of useful proficiencies for applying powerful technological tools to support new learning and solve significant problems, and
* Building positive perspectives on the nature and utility of mathematics in human intellective development and in society in general.

Students may enter the doctoral program with a variety of mathematical backgrounds, but are expected to further their depth and breadth of content knowledge through mathematics courses chosen to fit the individual's needs and interests.

## EMAT Program Identities for Scholarship and Leadership

Beyond the above basic domains of doctoral knowledge, four specific program identities foster specializations for scholarship and leadership in our field:

* Quantitative reasoning --- Based upon a growing societal necessity for all citizens to possess numerical and quantitative literacy, this focus addresses the explicit development of our understandings of the mathematical, psychological, pedagogical, and curricular applications of reasoning with, and about, conceptual quantities experienced and used in the world.
* Mathematical modeling --- Reflective of the power of mathematics to provide frameworks and conceptual tools for building, using, and refining abstracted representations of many real world phenomena and problems, this emphasis provides a context for shifting many important aspects of a sound mathematical education toward constructive, dynamic, relevant problem-solving experiences.
* Technological tools and applications --- Increasingly powerful computing, computational science, and informational technologies have changed how mathematics is developed and used in many domains. In this emphasis, UW faculty and students will explore and investigate the potentials and impacts of new tools upon mathematical learning, teaching, curriculum, and assessment.
* Mathematics Teacher Education --- This emphasis recognize that MTEs prepare prospective P-12 teachers of mathematics and work as professional development (PD) facilitators for practicing teachers of mathematics. This emphasis focuses on mathematics teacher preparation, practice and enhancement, and professional life.
* Student and teacher mathematical experiences --- Current mathematics education reforms emphasize fundamental shifts in both content and process, with significant attention to promoting higher quality mathematical experiences that develop student sense making, thinking and reasoning, and motivation and engagement. UW faculty and students will focus explicit attention to understanding deeply the nature of such experiences.

Each of these focal identities is addressed throughout program courses and experiences as inherent points of emphasis in the overall Mathematics Education culture at UW.

# Ph.D. in Mathematics Education--Curriculum & Instruction

The Doctor of Philosophy in Curriculum and Instruction with a concentration in Mathematics Education at the University of Wyoming offers advanced coursework for educational professionals interested in pursuing a degree whose advanced study might someday lead them to research-oriented careers, primarily working in university settings.

Courses in the program are offered online, allowing you to pursue the Ph.D. in mathematics education while you continue in your current professional role. Candidates in this program aim to be scholar-leaders for the field of mathematics education at colleges and universities worldwide. As a student in the program, you will begin developing your research agenda under the mentorship of experienced academic researchers.

**Ph.D. Degree Program Requirements**

Overall, the doctoral program requires at least 81 semester hours completed within a coherent program of study developed and approved by the candidate's Major Professor and Doctoral Committee (which may include transferring up to 30 approved graduate semester hours). The overall program structure includes:

|  |  |
| --- | --- |
| Program Knowledge Base | 9 hours |
| Mathematics | 9 hours |
| Mathematics Education | 18 hours |
| Electives | 21 hours |
| Research Methods | 12 hours |
| Dissertation  Total | 12 hours  81 hours |

To satisfy Mathematics Education hours (18), the following EMAT courses are offered:

EMAT 5100: Theory and Research in Mathematical Learning and Development (3)

EMAT 5150: Elementary and Middle School Mathematics from an Advanced Perspective (3)

EMAT 5160: High School Mathematics from an Advanced Perspective (3)

EMAT 5200: Advanced Study of Mathematics Curriculum, Assessment and Evaluation (3)  
EMAT 5300: Theory and Practice in Mathematics Teaching & Teacher Education (3)

EMAT 5400: Analysis & Critique of Research in Mathematics Education (3)  
EMAT 5500: Colloquium in Mathematics Education (1-3)

EMAT 5600: Quantitative Reasoning and Modeling in Mathematics and Science Education (3)  
EMAT 5800: Culture, Power & Identity in Mathematics Education (3)

These advanced Mathematics Education courses along with graduate study in Mathematics and Statistics, and Quantitative and Qualitative Research Methodologies, collectively build knowledge of theoretical and empirical perspectives to lead to a solid competence for engaging in both scholarly and practical work in the field at all levels. One program goal is to stimulate and guide each student to develop their dissertation research as a first step within a well-defined research program that can encompass the initial years of their post-doctoral scholarship.

# Annual Review of Progress/Program Timeline

The following provides a framework to specify general expectations and be suggestive of the scope and sequence of the program, while realizing that all specific courses will be selected in consultation with the Major Professor and approved by the Doctoral Committee to satisfy the individual goals and needs of the student. An overall GPA of 3.0 must be maintained.

### Year 1 (minimum 12 hours)

* Complete two mathematics education courses.
* Complete at least one Program Knowledge Base course.
* Complete at least one appropriate graduate-level mathematics course.
* At year-end, submit preliminary proposal of research interests and ideas, and an annual self-evaluation. Also, begin developing a Reading List that’s pertinent to your potential dissertation topic.

### Year 2 (minimum 12 hours)

* Complete two mathematics education courses.
* Complete at least one appropriate graduate mathematics course.
* Complete one research methodology course.
* Identify and establish the choice of Major Professor; in consultation develop a program of study.
* Maintain and extend the Reading List.

### Year 3 (minimum 12 hours)

* Complete two mathematics education courses.
* Complete at least one appropriate graduate mathematics course.
* Complete one research methodology course.
* By Fall, establish the Doctoral Committee.
* Submit both the Committee Assignment Form and the Program of Study Worksheet. Both these forms and all UW student forms can be found at: <https://www.uwyo.edu/registrar/graduate-students/graduate-student-forms.html>
* Maintain and extend the Reading List.
* Submit a proposal to write and present a scholarly paper to a recognized mathematics education research conference (typically in collaboration with other graduate students and/or one or more faculty members).

### Year 4 (minimum 12 hours)

* Complete all additional courses on the approved Program of Study.
* By Spring, enroll in at least 6 hours of dissertation research to conceptualize and develop the dissertation research proposal (which may include a pilot or preliminary study).
* By Spring, successfully pass the preliminary examination.
* Begin dissertation research project: complete detailed plans, collect data, engage analyses, begin writing as appropriate.
* Submit a scholarly manuscript to a recognized mathematics education research journal (typically in collaboration with other graduate students and/or one or more faculty members).

### Year 5/Year 6 (as needed)

* Enroll in at least 6 hours of dissertation research (e.g., 3 hours each semester).
* Successfully defend your dissertation research proposal; obtain IRB approvals as needed.
* Carry out and write up your dissertation research.
* Finish writing, and defend the dissertation research.
* As feasible, begin developing one or more scholarly manuscripts based upon the dissertation.
* Conduct search and interviews for seeking a post-doctoral position.

**Structure and Content of the Dissertation:**

The doctoral dissertation typically includes the following five chapters:

**Chapter 1, Introduction**: This introduction serves to set the stage for the main body of the paper. Begin by describing the problem that you will be addressing. Continue by providing an overview of research questions that you plan to address and the research that you plan to undertake to answer your research questions. Before proceeding to chapter 2, provide a paragraph outlining the remaining content of your paper. Also, include a glossary at the end of the chapter of terms that you are using in your dissertation (e.g., alternative assessment).

**Chapter 2, Research Literature Review**: In this section of the paper, you review the existing research literature relevant to addressing your research questions and identify gaps in this literature. When possible, use examples to clarify points that you are making.

**Chapter 3, Research Methodology**: In this chapter, describe the research methodology that you plan to use to carry out your study. It is in this part of the paper that you tell the reader exactly how you carried out your study (e.g., you gave participating teachers a survey to complete in which they provided information about how they incorporate alternative assessment formats in their classes). Be sure to describe how data will be collected and analyzed.

**Chapter 4, Research Findings**: In this chapter, you summarize your research findings in some detail.

**Chapter 5, Interpretation, Conclusions, and Recommendations**: In this section, you analyze your findings and discuss their implication. If you haven’t already done so in chapter 4, start this chapter by providing a summary of your research findings and how these findings contribute to the field. Continue by explicitly comparing and contrasting your research findings to the research literature previously reviewed in your literature review. What unique contributions do your findings make to the research literature? How do your findings contrast with previous studies? If applicable, you could also discuss any limitations of your study and provide potential topics in need of additional study.

In the culture of our program, we seek to function as faculty and students in a dynamic community of active scholars. As such, we acknowledge that many significant developmental experiences for doctoral students must and will take place outside formal course venues. Therefore, all students and faculty are expected to be vitally involved in ongoing research, development, and outreach projects and activities in which continuous interaction and collaboration occurs, within Mathematics Education and other disciplines.

Faculty research and development activities will incorporate one or more of these programmatic identities, and doctoral students will be expected to gain further developmental experiences within these opportunities.

# Ed.D. in Mathematics Education--Curriculum & Instruction

The Doctor of Education in Education with a concentration in Mathematics Education (EMAT) at the University of Wyoming will shape practitioners, like math instructors, into leaders and innovators in mathematics education. Graduates of the program are equipped with cutting-edge applied research skills and mathematics pedagogy expertise. A primary goal of the program is to ensure that all of its graduates are capable of providing leadership in mathematics education to people of all backgrounds.

Aligned with the Carnegie Project on the Education Doctorate (CPED), students in the program explore questions about contemporary educational issues within a research context. They learn how to combine theory with systematic inquiry to solve problems of practice and support meaningful learning experiences for all students, particularly those in historically marginalized groups (e.g., economically disadvantaged people).

Applicants to the EMAT Concentration will identify a preliminary problem of practice that they examine and solve as a candidate in the program. You will work in cooperation with educational organizations to apply your creative and innovative solutions to address the problem of practice.

Courses in the program are offered online, allowing you to pursue the Ed.D. in mathematics education while you continue in your current position. Learn and bond with the same group of students during the course of your Ed.D. studies– our program is cohort-based.

**Executive Summary of EMAT Ed.D. Degree Program:**

The Ed.D. Concentration in Mathematics Education is designed to develop leaders and researchers in mathematics education with strong theoretical and historical backgrounds. The aim is to produce graduates who are leaders and innovators in mathematics education (broadly defined), equipped with cutting-edge applied research skills, creative and innovative visions for mathematics education, mathematics curricular expertise, and a commitment to issues of equity and social responsibility. The EMAT Concentration aligns with the framework for the Professional Doctorate in education specified by the Carnegie Project on the Education Doctorate (CPED), of which the College of Education at the University of Wyoming, is a member.

**Defining Goal of EMAT Ed.D. Degree Program:**

One of the defining goals of the EMAT Concentration is to develop Scholarly Practitioners who can blend practical wisdom with professional skills and knowledge to name, frame, and solve problems of practice. Scholarly Practitioners use practical research and applied theories as tools for change. They disseminate their work in multiple ways, and they have an obligation to resolve problems of practice by collaborating with key stakeholders, including the university, educational organizations, the community, and/or individuals. Applicants to the EMAT Concentration are asked to identify a preliminary problem of practice (PoP) that they hope to examine and/or solve as a candidate in the program. As defined by CPED (see <https://www.cpedinitiative.org/>), a problem of practice is “a persistent, contextualized, and specific issue embedded in the work of a professional practitioner, the addressing of which has the potential to result in improved understanding, experience, and outcomes.”

**Engaging in Inquiry as Practice:**

Throughout the EMAT Ed.D. degree program, candidates engage in what CPED refers to as “inquiry as practice;” a cyclical process that involves studying, refining, studying some more, refining again, etc. their original PoP. As defined by CPED, inquiry as practice is the process of posing significant questions that focus on complex problems of practice. By using various research, theories, and professional wisdom, scholarly practitioners design innovative solutions to address problems of practice. At the center of inquiry of practice is the ability to use data to understand the effects of innovation. As such, inquiry of practice requires the ability to gather, organize, judge, aggregate, and analyze situations, literature, and data with a critical lens.

**Ed.D. Degree Program Requirements**

Overall, the doctoral program requires at least 80 semester hours completed within a coherent program of study developed and approved by the candidate's Major Professor and Doctoral Committee (which may include transferring up to 30 approved graduate semester hours). The overall program structure includes:

|  |  |
| --- | --- |
| Program Knowledge Base | 15 hours |
| Mathematics Education | 18 hours |
| Practicum  Electives | 2 hours  30 hours |
| Research methods | 9 hours |
| Dissertation in Practice  Total | 6 hours  80 hours |
|  |  |

To satisfy Mathematics Education hours (18), the following EMAT courses are offered:

EMAT 5100: Theory and Research in Mathematical Learning and Development (3)

EMAT 5150: Elementary and Middle School Mathematics from an Advanced Perspective (3)

EMAT 5160: High School Mathematics from an Advanced Perspective (3)

EMAT 5200: Advanced Study of Mathematics Curriculum, Assessment and Evaluation (3)  
EMAT 5300: Theory and Practice in Mathematics Teaching & Teacher Education (3)

EMAT 5400: Analysis & Critique of Research in Mathematics Education (3)  
EMAT 5500: Colloquium in Mathematics Education (1-3)

EMAT 5600: Quantitative Reasoning and Modeling in Mathematics and Science Education (3)  
EMAT 5800: Culture, Power & Identity in Mathematics Education (3)

# Annual Review of Progress/Program Timeline

The following provides a framework to specify general expectations and be suggestive of the scope and sequence of the program, while realizing that all specific courses will be selected in consultation with the Major Professor and approved by the Doctoral Committee to satisfy the individual goals and needs of the student. An overall GPA of 3.0 must be maintained.

### Year 1 (minimum 12 hours)

* Complete two mathematics education courses.
* Complete two Program Knowledge Base courses.
* At year-end, begin developing a Reading List that’s pertinent to your potential DiP topic.

### Year 2 (minimum 12 hours)

* Complete two mathematics education courses.
* Complete one Program Knowledge Base course.
* Complete one research methodology course.
* Identify and establish the choice of Major Professor; in consultation develop a program of study.
* By Spring, establish the Doctoral Committee.
* Submit both the Committee Assignment Form and the Program of Study Worksheet. Both these forms and all UW student forms can be found at: <https://www.uwyo.edu/registrar/graduate-students/graduate-student-forms.html>
* Maintain and extend the Reading List.

### Year 3 (minimum 12 hours)

* Complete two mathematics education courses.
* Complete one Program Knowledge Base course.
* Complete one research methodology course.
* By Spring, successfully pass the preliminary examination.

### Year 4 (minimum 12 hours)

* Complete all additional courses on the approved Program of Study.
* In Fall, successfully defend your dissertation research proposal; obtain IRB approvals as needed.
* By Spring, enroll in at least 3 hours of dissertation research.
* Begin DiP project: collect data, engage analyses, begin writing as appropriate

### Year 5

* Enroll in at least 3 hours of dissertation research.
* Successfully defend your DiP.
* As feasible, begin developing one or more scholarly manuscripts based upon the DiP.
* Conduct search and interviews for seeking a post-doctoral position.

**Completing an Internship as part of the Ed.D. program in EMAT**

As part of the Ed.D. program in Mathematics Education, students complete EDCI 5580 – Internship. The two credit hour internship is an opportunity for students to develop as Scholarly Practitioners who can blend practical wisdom with professional skills and knowledge to name, frame, and solve problems of practice (PoP). Scholarly Practitioners use practical research and applied theories as tools for change. They disseminate their work in multiple ways, and they have an obligation to resolve PoPs by collaborating with key stakeholders, including the university, educational organizations, the community, and/or individuals.

The internship should be linked in some manner to a student’s (PoP). The internship should help students engage in what CPED refers to as “inquiry as practice” to engage in a cyclical process that involves studying, refining, studying some more, refining again, etc. their PoP. At the center of inquiry of practice is the ability to use data to understand the effects of innovation. As such, inquiry of practice requires the ability to gather, organize, judge, aggregate, and analyze situations, literature, and data with a critical lens. Ideally, an internship would support students in their ability to use and analyze data (broadly speaking). The internship could also provide students with important experiences that would benefit them in their professional careers.

Prior to engaging in an internship, students write a short proposal (~1-2 pages in length) about how their proposed internship would support them in their development as Scholarly Practitioners. In their proposals, students need to provide information about what they will be doing as part of their internship, who the sponsor organization would be for the internship, and give contact information for the person who will oversee the internship at the sponsor organization. In their proposals, students need to explicitly address how the work they’ll be doing as part of their proposed internship will benefit them in their development as Scholarly Practitioners. They also need to explicitly address how the internship is linked to their PoP and will benefit the further development of some aspect of their PoP. A student’s proposal must be approved by their primary advisor before the internship begins. Students register for EDCI 5580 as an independent study course with their primary advisor as instructor. It can be completed any semester, but students should only plan to formally register for the class in either a fall or spring semester.

Students should plan to devote a minimum of 30 hours of actual time to the internship itself. As part of the internship, students need to document all aspects of work completed. This could be done in a journal, blog, video progression, however you’d like. At the conclusion of the internship, students will need to submit a paper (minimum of 6-8 pages in length, excluding References) to their primary advisor, which includes detailed information about the work they completed as part of the internship and how that work contributed to the student’s development as a Scholarly Practitioner particularly with regards to their PoP. Moreover, students will need to provide a signed letter from their primary internship contact person that indicates that they successfully completed the internship requirements as outlined in the internship proposal. This letter should be written by the student to assist the contact person, but should be submitted on the letterhead of the sponsor organization and signed by the sponsor.

**Completing a Dissertation in Practice:**

Candidates in the EMAT Ed.D. degree program do not complete a traditional dissertation, but instead conduct doctoral‐level research called the “dissertation in practice” (DiP) that focuses on their problem of practice with the intention of improving practice in schools, community settings, and educational organizations. This research may be facilitated through cooperation with a variety of educational organizations, including public or private schools, community‐based organizations, informal learning environments, or other areas, as determined by the candidate in cooperation with the advisor.

**Types of Dissertations in Practice:**

There are three types of Dissertations in Practice (DiP) that candidates in the EdD degree program in mathematics education at the University of Wyoming can pursue. They are:

(1). Intervention DiP,

(2). Problem Analysis DiP,

(3). Program Evaluation DiP, and

(4). Other by approval of committee.

In an Intervention DiP, the student first proposes a research-based solution to a Problem-of-Practice (PoP). Then, the student leads an intervention in which the proposed solution to the PoP is implemented. In the process, the student engages in research that is focused on examining the efficacy of the proposed solution to the PoP. In a Problem Analysis DiP, the student’s focus is only on proposing research-based solutions to their PoP, an actual intervention is not implemented. The problem analysis option is structured to ensure the work is positioned to influence educational environments firsthand. In a Program Evaluation DiP, the student first proposes a programmatic approach (e.g., a math curriculum) to resolve their PoP. Then, the student evaluates the programmatic approach proposed. In the process, the student engages in research that is focused on evaluating the efficacy of the programmatic solution to the PoP. Generally, UW faculty will promote that students pursue either an Intervention DiP or a Program Evaluation DiP. These two types of DiPs have much in common and do not need to be viewed as mutually exclusive. A Problem Analysis DiP should only be pursued when the student, for some reason, is unable to either conduct the proposed intervention or cannot conduct the program evaluation proposed with regards to their PoP. In all DiPs regardless of type, the student should initially introduce their PoP in great detail, including the context of where the PoP occurs (e.g., in their actual classroom).

**Structure and Content of the DiP:**

The DiP should include the following three chapters:

**Chapter 1**: Introduce and define the PoP, explain why it is a problem that is worth addressing, refer to relevant professional literature that helps you to understand the problem, and introduce potential solutions to your PoP. Which solution to you plan to pursue to resolve your PoP and why you have chosen this particular solution strategy. Next, describe an action plan that you plan to pursue to solve your PoP or to evaluate your programmatic approach to resolve your PoP. You should also describe how you plan to make sense of the data you collect in the process.

**Chapter 2**: Explain what you learned from the research literature about your PoP. This is a traditional literature review also found in PhD dissertations.

**Chapter 3**: Give the findings of your study and reflect upon these findings vis-à-vis the research literature included in chapter 2. What is unique about your findings? How are your findings similar to and/or different from what others have found? What are the implications of what you have learned for various individuals and groups who are affected by and/or could influence the problem? Based on the results of your DiP, what are your recommendations for practice? Can your recommendations be scaled or transferred? How does what you have learned contribute to the field in an innovative way? As Auerbach (2011) asked, “How [will you] change your corner of the world?”

**References**

Auerbach, S. (Ed). (2011). *School leadership for authentic family and community*

*partnerships: Research perspectives for transforming practice*. Routledge.

CPED. (n.d.). *The Carnegie Project on the Education Doctorate (CPED): A knowledge*

*forum on the Ed.D*. <https://www.cpedinitiative.org/>

**Appendix A**

# Mathematics Education Ph.D. Program of Study Worksheet

Student name: W number: Admit year:

|  |  |
| --- | --- |
| **Program Knowledge Base (9 hours)1**  PRST 5610 Intro to Doc Studies (**required course**) (fall) (3)  **Since PRST 5610 is a required course, you will also need to select with your advisor at least two of the following courses:**  EMAT 5150[[1]](#footnote-1) Elem & MS Math from an Adv Perspective (3)  EMAT 5160 HS Math from an Advanced Perspective (3)  PRST 5070 Intro to College Teaching (3)  EDCI 5000 Principles of Curriculum (3)  EDCI 5350 Introduction to Second Language Acquisition (3)  EDCI 5450 Issues in Multicultural Education (3)  EDCI 5500 Classroom Assessment (3)  EDCI 5600 Diversity in Education (spring) (3)  EDCI 5665 History and Philosophy of American Education (3)  EDCI 5730 Learning and Cognition (spring) (3)  EDCI 5790 Learning Theories and Instructional Principles (3)  EDCI 5800 Curriculum Development (3)  EDCI 5810 Writing for Professional Publications (spring) (3)  EDAD 5650 Educational Leader as Communicator (3)  EDAD 5720 Leader as Change Agent (3)  PRST 5900 Practicum in College Teaching (3)  EDRE 5660 Dissertation/Thesis Prospectus Writing (3)  HIED 5240 Teaching Adults (3)  HIED 5260 Educational Issues Race, Class, and Gender (3)  HIED 5640 Leadership Development (3)  HIED 5680 Issues in Higher Education (3)  ITEC 5070 Trends in Learning, Design, and Technology (3) | **Semester/Year Completed:** |
| **Mathematics (9 hours). Select with advisor, one of following options:**   * Choose 3 courses:   NASC 5140 Numbers and Operations  MATH 5170 Connecting Geometry NASC 5185 Analysis of Data  NASC 5190 Mathematics of Change  EMAT 5150 Elem & MS Math from an Adv Perspective (3)  EMAT 5160 HS Math from an Advanced Perspective (3)   * Choose 3 courses in the Department of Mathematics: MATH 5090 Topics in the Foundations of Mathematics MATH 5100 Seminar in Elementary School Mathematics MATH 5150 Seminar in Secondary School Mathematics MATH 5320 Mathematical Modeling Processes   MATH 5400, Methods of Applied Mathematics I   * Choose 3 courses in mathematics that meet your specific needs and interests. Courses must be graduate-level courses.   Course 1:  Course 2:  Course 3: | **Semester/Year Completed:** |

1 UW class schedules can be found at: <http://www.uwyo.edu/registrar/class_schedules/>

|  |  |
| --- | --- |
| **Mathematics Education (18 hours). Select with advisor, at least six of the following courses:**  EMAT 5100 Theory and Research in Mathematical Learning and Development (3)  EMAT 5150 Elem & MS Math from an Advanced Perspective (3)  EMAT 5160 HS Math from an Advanced Perspective (3)  EMAT 5200 Advanced Study of Mathematics Curriculum, Assessment and Evaluation (3)  EMAT 5300 Theory and Practice in Mathematics Teaching and Teacher Education (3)  EMAT 5400 Analysis and Critique of Research in Mathematics Education (3)  EMAT 5500 Colloquium in Mathematics Education (1-3)  EMAT 5600 Quantitative Reasoning & Modeling in Mathematics and Science Education (3)  EMAT 5800 Culture, Power & Identity in Mathematics Education (3) | **Semester/Year Completed:** |
| **Research2 (12 hours) Select with advisor, at least four of the following courses:**  EDRE 5550 Action Research (3)  EDRE 5600 Ed Research 1: Descriptive (3)  EDRE 5610 Ed Research: Group Comparison (3) EDRE 5620 Ed Research: Correlational Research (3)  EDRE 5630: Ed Research 4: Multivariate Research (3) | **Semester/Year Completed:** |

2 Educational Research course descriptions: <http://www.uwyo.edu/clad/edresearch/courses.html>

EDRE course rotation: <http://www.uwyo.edu/clad/_files/documents/edresearch/edresearchschedule.pdf>

|  |  |
| --- | --- |
| EDRE 5640: Intro to Qualitative Research (3)  EDRE 5645: Phenomenology, Case Study, & Grounded Theory in Qualitative Research (3)  EDRE 5655: Ethnography & Narrative Inquiry in Qualitative Research (3)  EDRE 5670: Mixed Methods Research (3) |  |
| **Electives (21 hours)** Note: Some or all of elective courses are courses completed as part of the master’s degree  Course 1: Course 2: Course 3: Course 4: Course 5: Course 6:  Course 7: | **Semester/Year Completed:** |
| **Dissertation (12 hours)**  EMAT 5980 Dissertation Research (1-12) | **Semester/Year Completed:** |

# Key Events

|  |  |
| --- | --- |
| Committee Formation Paperwork Completed | **DATE:** |
| Program Of Study On File |  |
| Human Subjects Certification (CITI) Completed |  |
| Present Dissertation Research Idea to Committee |  |
| Written Comprehensive Qualifying Exam |  |
| Oral Exam/Prospectus Presentation To Committee |  |
| Dissertation Defense |  |

**Additional Achievements – To Be Determined with Advisor**

|  |  |
| --- | --- |
| Manuscript Submission, judged publishable by committee | **DATE:** |
| State, National, or International Conference Presentation |  |
| Teaching in UW Teacher Education Program |  |
| Additional Expectations – Determined with Advisor |  |

**Appendix B**

# Mathematics Education Ed.D. Program of Study Worksheet

Student name: W number: Admit year:

|  |  |
| --- | --- |
| **Program Knowledge Base (15 credit hours).**[[2]](#footnote-2) **Select with advisor, at least five of the following courses:**  EMAT 5150 Elem & MS Math from an Advanced Perspective (3)  EMAT 5160 HS Math from an Advanced Perspective (3)  PRST 5070 Intro to College Teaching (3)  EDCI 5000 Principles of Curriculum (3)  EDCI 5350 Introduction to Second Language Acquisition (3)  EDCI 5450 Issues in Multicultural Education (3)    EDCI 5500 Classroom Assessment (3)  EDCI 5600 Diversity in Education (3)  EDCI 5665 History and Philosophy of American Education (3)  EDCI 5730 Learning and Cognition (3)  EDCI 5790 Learning Theories and Instructional Principles (3)  EDCI 5800 Curriculum Development (3)  EDCI 5810 Writing for Professional Publications (spring) (3)  EDAD 5650 Educational Leader as Communicator (3)  EDAD 5720 Educational Leader as Change Agent (3)  EDRE 5660 Proposal Writing (3)  HIED 5240 Teaching Adults (3)  HIED 5260 Educational Issues Race, Class, and Gender (3)  HIED 5640 Leadership Development (3)  HIED 5680 Issues in Higher Education (3)  ITEC 5070 Trends in Learning, Design, and Technology (3) | **Semester/Year Completed:** |
| **Advanced Research Courses (9 credit hours).**[[3]](#footnote-3) **Select with advisor, at least three of the following courses:**  EDRE 5600 Ed Research 1: Descriptive (3)  EDRE 5610 Ed Research 2: Group Comparison (3)  EDRE 5620 Ed Research 3: Correlational (3)  EDRE 5630 Ed Research 4: Multivariate (3)  EDRE 5550 Action Research (3)  EDRE 5640 Intro to Qualitative Research (3)  EDRE 5645 Phenomenology, Case Study, and Grounded Theory in Qualitative Research (3)  EDRE 5655 Ethnography & Narrative Inquiry in Qual Research (3)  EDRE 5670 Mixed Methods Research (3) | **Semester/Year Completed:** |
| **Practicum/Internship (2 credit hours)**  EDCI 5580 (2 hours) | **Semester/Year Completed:** |
| **Mathematics Education Specialization (18 credit hours). Select with advisor, at least six of the following courses:**  EMAT 5100 Theory & Research in Learning & Development (3)  EMAT 5150 Elem & MS Math from an Advanced Perspective (3)  EMAT 5160 HS Math from an Advanced Perspective (3)  EMAT 5200 Advanced Math Curriculum, Assessment & Evaluation (3)  EMAT 5300 Theory & Practice in Mathematics Teaching & Teacher Education (3)  EMAT 5400 Analysis & Critique of Research in Mathematics Education (3)  EMAT 5500 Colloquium in Mathematics Education (1-3)  EMAT 5600 Quantitative Reasoning & Modeling in Mathematics & Science Education (3)  EMAT 5800 - Culture, Power & Identity in Mathematics Education (3) | **Semester/Year Completed:** |
| **Electives (30 hours)** Note: Some or all of elective courses are courses completed as part of the master’s degree  Course1:  Course 2:  Course 3:  Course 4:  Course 5:  Course 6:  Course 7:  Course 8:  Course 9:  Course 10: | **Semester/Year Completed:** |
| **Dissertation in Practice (minimum of 6 credit hours)**  EMAT 5980 Dissertation Research | **Semester/Year Completed:** |

1. EMAT 5150 can be taken to satisfy ONLY the Program Knowledge Base requirement, the Mathematics requirement, OR the Mathematics Education requirement. The same is true for EMAT 5160. [↑](#footnote-ref-1)
2. It is highly recommended that students take either or both EMAT 5150 and EMAT 5160. Students should consult with their advisor to make this decision. In addition, EMAT 5150 can be taken to satisfy ONLY the Program Knowledge Base requirement **OR** the Mathematics Education requirement. The same is true for EMAT 5160. [↑](#footnote-ref-2)
3. Here is a link to the Ed Research Student Resources page: <http://www.uwyo.edu/clad/edresearch/student-resources.html>

   EDRE Long Term Class Schedule:

   <http://www.uwyo.edu/clad/_files/documents/edresearch/long-term-schedule-2020-2.pdf>

   EDRE Course List: <http://www.uwyo.edu/clad/edresearch/courses.html> [↑](#footnote-ref-3)