IUP Graduate Handbook

Master of Education in Mathematics Education

Specialization in Elementary & Middle Level Mathematics and
Specialization in Secondary Level Mathematics

Department of Mathematical and Computer Sciences

Handbook Updated 2025-2027

Master of Education in Mathematics Education

Specialization in Elementary & Middle Level Mathematics and Specialization in Secondary Level Mathematics

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Introduction

Welcome to the Department of Mathematical and Computer Sciences!

The Master of Education in Mathematics Education is an acclaimed online, 30-credit graduate program. Our program has been ranked among the top 15 schools in Best Value Schools for graduate mathematics education in 2023, 2022 and 2021, and recognized by US News and World Report as one of the best schools for online programs in 2025, 2024, 2023, 2022, 2021, and 2020.

The program was designed for teachers to help you develop innovative, research-based teaching practices that deepen your mathematical content knowledge at the elementary, middle, and secondary levels which in turns develops your students' ability to reason, problem solve, connect, justify, and communicate mathematical ideas.

This handbook contains essential information about this graduate program whether you are considering enrolling or you are a current student. This information is necessary for registration, advising, and fulfilling all requirements. Please have this handbook with you each time you meet with your advisor. Whether you take the time to review this Handbook in depth or not, you will be held accountable to the Program's governing principles.

Indiana University of Pennsylvania

Founded in 1875 as a normal school, IUP is a world renowned, affordable, student-centered university. IUP combines the academic opportunities of a large university with the highly personalized and intimate learning-centered environment of a small college. Over 9,000 undergraduate and graduate students are enrolled in our accredited and nationally recognized programs, enjoying innovative learning experiences, engaging in research and service activities with their faculty mentors, becoming lifelong learners, preparing for rewarding careers and productive lives, and developing leadership skills for effective citizenship.

IUP's Civility Statement

As a university of different peoples and perspectives, IUP aspires to promote the growth of all people in their academic, professional, social, and personal lives. Students, faculty, and staff join together to create a community where people exchange ideas, listen to one another with consideration and respect, and are committed to fostering civility through university structures, policies, and procedures. We, as members of the university, strive to achieve the following individual commitments:

To strengthen the university for academic success, I will act honestly, take responsibility for my behavior and continuous learning, and respect the freedom of others to express their views.

To foster an environment for personal growth, I will honor and take care of my body, mind, and character. I will be helpful to others and respect their rights. I will discourage intolerance, hatred, and injustice, and promote constructive resolution of conflict.

To contribute to the future, I will strive for the betterment of the community, myself, my university, the nation, and the world.

Affirmative Action

Affirmative Action

Title IX Reporting Requirements

Title IX Reporting

Student Conduct and Student Rights

Community Standards Policy and Procedures
Student Rights and Responsibilities
Students Rights under the Family Educational Rights and Privacy Act (FERPA)

Department of Mathematical and Computer Sciences

The IUP Department of Mathematical and Computer Sciences gives students the tools necessary to organize and analyze data while also providing the theoretical background of the topics that will help students better understand them.

The department offers classes in a friendly and supportive environment that will both challenge and engage students who have an interest in the fields of mathematics and/or computer science.

The valuable skills learned in the Department of Mathematical and Computer Sciences will translate well to the working world, as graduates have the ability to work in myriad of occupations in both the public and private sector, including engineering, economics, information technology, and education. Students will also gain the knowledge and information background to help them continue on in graduate school, toward master's and doctoral degrees.

Notably, the Department of Mathematical and Computer Sciences has a strong history for preparing mathematics teachers. IUP's reputation in Mathematics Education is recognized in Pennsylvania and nationally for excellence in preparing teachers for today's classrooms, for future graduate studies, and for a lifelong professional career.

The MEd in Mathematics Education has been ranked by the US News and World Report as one of the best schools for online programs in 2025, 2024 2023, 2022, 2021, and 2020, and among the top 15 schools in Best Value Schools for graduate mathematics education 2023, 2022, and 2021. Our undergraduate Bachelor of

Science in Mathematics Education is nationally accredited by the Council for the Accreditation of Educator Preparation and has been recognized for having high standards.

Mission Statement and Program Objectives

The mission of the Master of Education in Mathematics Education is to provide a quality graduate education that prepares educators to implement innovative, research-based, and high-quality mathematics instruction to support the learning of each and every student.

The program learning outcomes for students of this program include:

- Applying their conceptual understanding of mathematics content to the content they teach by teaching through a problem solving approach.
- Analyzing relevant research in the field of mathematics education and use that research to improve the teaching of mathematics in their own classrooms and in their schools.
- Analyzing issues related to curriculum, instruction, and assessment in mathematics education and apply knowledge of these issues to the teaching of mathematics in their own classrooms and in their schools.
- Applying their pedagogical content knowledge of mathematics to the content they teach by providing inquiry-based learning opportunities for their students.

Faculty and Staff

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Admission

Admissions Information for MEd in Mathematics Education

Graduate admission applications for the MEd in Mathematics Education are reviewed for acceptance fall, spring, and summer semesters. There is no deadline to submit your admissions application. Admission decisions are based on the qualifications of applicants, the strength of the admissions application materials, and a thorough review of all application materials. This includes:

- Qualifications.
  - Minimum cumulative undergraduate grade-point average (GPA) of 3.0 (on a 4.0 scale).
  - Undergraduate degree must be earned from a regionally accredited institution.
  - Undergraduate degrees in education, in mathematics, or in a mathematics related field are preferred. However, other degree programs are considered as well.
- Admissions application materials.
  - Goals statement.
    - A minimum of a two-page essay about why you are considering this graduate degree program and how the program will help you achieve your career goals.
  - Official transcripts for previous colleges attended, undergraduate and graduate. Unofficial transcripts may be submitted for admission purposes.
  - Two letters of recommendation.
    - The letters of recommendation should be recent (not older than one year) and should be from individuals who are familiar with your academic ability and potential. Letters of recommendation that are specific and detailed tend to be the strongest.
  - A resume or vita (optional but recommended).
- Thorough review of all application materials.
  - The admissions committee for the MEd in Mathematics Education will conduct a thorough review for each applicant. Additional course work may be required.

To apply to the Master of Education in Mathematics Education, applicants should create an admissions profile and complete the online application at Graduate Admissions www.iup.edu/admissions/graduate/. There will an application fee as part of the admissions process. Once your application file is received by Graduate Admissions in the Graduate School, they will make sure it is complete. If not, they will hold it until all items have been received. Then they will forward it to the program coordinator where your application will be reviewed, and a decision made about acceptance. The decision will be relayed to the Graduate School and the Graduate School will send you a letter informing you of the decision.

Certification to Teach Mathematics

IUP has a Certificate in Mathematics Education, a 24-credit post-baccalaureate certificate program for secondary mathematics, leading to certification for grades 7-12 and middle level mathematics, leading to certification for grades 4-8th. The program is meant for individuals who did not earn teacher

certification as undergraduates and who wish to earn Level 1 Pennsylvania state certification. Many of the program requirements for the certificate program are part of the Master of Education in Mathematics Education program. If you are interested in earning certification to teach mathematics for grades 7-12 or grades 4 -8, then reach out to the program coordinator.

International Applicants

International applicants are welcome to submit admissions applications to the MEd in Mathematics Education. The program is completely online, allowing international applicants to complete the program from their home country. For more information regarding Admission Classification and Provisional Admission for International Graduate Application, view the Graduate Catalog: www.iup.edu/gradcatalog

For further information about graduate admissions, then please visit the following website: www.iup.edu/admissions/graduate/

Financial Assistance

Graduate Assistantships and Scholarships

To express your interest in a graduate assistantship or scholarship students indicate so in your admissions application and reach out to the program coordinator. Applications can be obtained directly from the graduate coordinator and are accepted from January 15 through March 15 for the next academic year. Late applications are accepted on a case-by-case basis. Applications are reviewed by a scholarship committee and award decisions are generally communicated by April 1.

Grants, Other Scholarships, and Loan Forgiveness

The National Council of Teachers of Mathematics has scholarship and grant opportunities for educators. May 1 and Nov 1 are the deadlines to submit applications. Please visit the following link for more information: https://www.nctm.org/Grants/

Information about teacher loan forgiveness is available at https://studentaid.gov/manage-loans/forgiveness-cancellation#teacher.

Office of Financial Aid

The Office of Financial Aid assists new and continuing students to secure funding as they obtain their advanced degree. Please visit the following links for more information:

- Office of Financial Aid: www.iup.edu/financialaid/
- https://www.iup.edu/admissions/graduate/financialaid/index.html

Advisement

Upon acceptance into the Master of Education in Mathematics Education program, you will be assigned an academic advisor and a navigator, a student success advisor. Your advisors will be your main contact throughout the program. The academic advisor will share with you a program of study, suggest courses to take for each semester, and answer academic questions you might have.

Your navigator is meant to provide support for non-academic items, for example question about your student bill.

As a graduate advisee you are expected to be in touch with your academic advisor for scheduling classes or with other concerns. You should also take the initiative to be aware of your options in the program. Thoroughly reviewing this handbook and asking questions is a part of becoming aware of your options.

Students are to follow the Master of Education in Mathematics Education Program Handbook. Students are responsible for meeting regularly with their academic advisor, taking the proper coursework, and meeting all requirements for the program (see the Program and Degree section for requirements).

See Appendix A for an advisement sheet related to the Secondary Specialization, Appendix B for an advisement sheet related to the Elementary/Middle Level Specialization.

Campus Resources & Student Support

The Office of Graduate Education and Academic Planning (formally the School of Graduate Studies and Research): www.iup.edu/graduatestudies/
Graduate Catalog: https://catalog.iup.edu/index.php
Office of Student Billing: https://www.iup.edu/student-billing/
Office of the Registrar: www.iup.edu/registrar/
Department for Disability Access and Advising: https://www.iup.edu/disabilitysupport/
Office of Social Equity: www.iup.edu/socialequity/
IUP Libraries: www.iup.edu/library/
MyIUP: www.iup.edu/myiup/
IUP Navigators: https://www.iup.edu/life-at-iup/support/navigators.html
IT Support: www.iup.edu/itsupportcenter/
Veterans and Service Members: www.iup.edu/veterans/resource-center/
IUP Writing Center: www.iup.edu/writingcenter/
IUP Scholarly Editing and Writing Service: https://www.iup.edu/scholarlycommunication/index.html
Applied Research Lab: https://www.iup.edu/arl/index.html
IUP Career and Professional Development Center: www.iup.edu/career/
Parking Services: www.iup.edu/parking/
University Police: www.iup.edu/police/ 724-357-2141
Crisis Intervention 24/7 Hotline: 1-877-333-2470
Registration Resources: www.iup.edu/registrar/students/registration-resources/index.html

IUP Email

IUP offers an email account to all active students. **Your IUP email address is the primary means by with the university will contact you with official information and you should use for all IUP official communications. It is your responsibility to check your IUP email regularly.**

Visit https://www.iup.edu/itsupportcenter/get-support/e-mail-and-calendar/index.html to learn more about setting up this account. For more information regarding university policy on email communications, view the Graduate Catalog: https://catalog.iup.edu/index.php

Graduate Student Assembly

The Graduate Student Assembly (GSA) represents the graduate student body's interests at IUP and within the Indiana community. The GSA makes recommendations related University-wide and graduate-specific policies and in areas of concern in the cultural, intellectual, and social life of the part- and full-time graduate student. Visit www.iup.edu/graduatestudies/gsa for more information.

Programs and Degrees

Program Requirements for Master of Education in Mathematics Education

The Master of Education in Mathematics Education is ideal for elementary, middle, secondary, and special education teachers. Its purpose is to provide an opportunity for graduate students to increase their knowledge of mathematics and pedagogy, as well as to become aware of research and innovations in mathematics education. Upon completion of the program, graduate students will be prepared to serve as leaders of mathematics education in their school districts or to pursue a doctoral degree in mathematics education. Completion of this degree meets the requirements for Level II certification. The program consists of 30 credits in two broad areas: Mathematics Education Content Specialization (12 credits), and Mathematics Education Electives (18 credits). The program consists of two specializations – one specialization in Secondary Mathematics Education and one specialization in Elementary and Middle School Mathematics Education.

I. Mathematics Education Content (12 cr.) Choose a Specialization.

Secondary Mathematics Education Specialization **(All courses online)**

- MAED 611 Algebra for Secondary Teachers
- MAED 612 Geometry for Secondary Teachers
- MAED 613 Probability and Statistics for Secondary Teachers
- MAED 614 Precalculus and Discrete Math for Secondary Teachers
- MAED 617 Teaching Proportional Reasoning
- MATH 650 Themes in the History of Mathematics

Elementary and Middle School Mathematics Education Specialization **(All courses online)**

- MAED 517 Probability and Statistics for Elementary/Middle Level Teachers
- MAED 520 Patterns and Functions for Elementary/Middle Level Teachers
- MAED 556 Geom for Elem/Middle Level Tchrs
- MAED 557 Introduction to Number Theory
- MAED 558 Introd to Logic and Logical Games
- MAED 561 Discrete Mathematics for Elementary/Middle Level Teachers
- MAED 571 Algebra for Elementary/Middle Level Teachers
- MAED 617 Teaching Proportional Reasoning

II. Mathematics Education Electives (18 cr.) (All courses online)

- MAED 559 Technology-Related Topics in Mathematics Education
- MAED 616 Writing in Mathematics Education
- MAED 618 Mathematics and Cognition
- MAED 650 Curriculum and Instruction in Mathematics Education
- MAED 652 Differentiated Instruction in Mathematics Education
- MAED 654 Teaching Problem Solving in Mathematics Education
- MAED 660 Survey of Research in Mathematics Education
- MAED 681 Special Topics in Mathematics Education
- MAED 698 Supervised Internship in Mathematics Education[1]
- MAED 795 Thesis in Mathematics Education[1]
- A course from Category I
- A course from: SPED 569/578/650/750/751/752 SPSY 577/746/747/748

Additional Program Requirements and Information:

1. The internship may be used to do preliminary work related to a thesis. This is by permission from the graduate coordinator.
2. At least 50% of total credits must be 600 or 700 level.
3. There is a six-year time limit to complete the program. Your time limit starts the term you start taking courses or when you transfer credit, whichever comes first.
4. Special credits are limited to nine including transfer credits, workshop credits, and special topics.
5. Transfer credits should be pre-approved. You must complete the "Request for Graduate Transfer Credit Review iform" requesting the transfer. See transfer credit policy in the Graduate Catalog.
6. You must earn a C or better in all coursework.
7. You must maintain a GPA of at least 3.0 ("B" average).
8. Certain substitutions can be made with written approval of your advisor and the department.
9. You will automatically come up for candidacy the semester after completing 12 credit hours at IUP.
10. Keep in contact with your advisor especially for substitutions, transfers, and electives.

See Appendix A for an advisement sheet related to the Secondary Specialization and Appendix B for an advisement sheet related to the Elementary/Middle Level Specialization.

Course Descriptions

The prerequisite for MAED courses is enrollment in the Master of Education in Mathematics Education program.

SPED 569 – Education of Persons with Emotional/Behavioral Disorders, Learning Disabilities, or Brain Injury (3 credits) Focuses on major theoretical positions regarding etiology of emotional/behavioral disorders, learning disabilities, and brain injury; definition and identification of the populations; and educational approaches. The course will review research in the field, including current issues, trends, educational practices, and services. Throughout the course, a variety of instructional approaches (e.g., cooperative learning, simulations, role-playing) will be used to facilitate acquisition of new knowledge and skills. Students are expected to develop presentations using Internet resources and PowerPoint format.

SPED 578 - Education of Persons with Intellectual/Developmental Disabilities and Physical/Multiple Disabilities (3 credits) Focus on major theoretical positions regarding etiology of mental retardation, developmental disabilities, a wide and diverse range of physical/multiple disabilities, and other health impairments. Definitions, population characteristics, and educational approaches are discussed. Reviews research in the field, including current issues, trends, practices, and services.

SPED 650 - Exceptional Children and Youth (3 credits) Surveys characteristics, definition/identification, and service delivery models for children and youth with disabilities or who are gifted/talented. Considers state and federal policies governing special education program service delivery, as well as the legal rights of individuals with disabilities.

SPED 750 - Assessment for Instructional Planning for Students with Autism Spectrum Disorders (3 credits) Particular attention will be given to the identification of the range of assessment domains and the valid use of the functional behavior assessment process. Practical strategies for teaching skills in the

domain areas based on assessment results will be addressed. An overview of curricula, approaches, strategies, and materials used with students with Autism Spectrum Disorder will also be provided.

SPED 751 - Instructional Interventions and Methods for Students with Autism Spectrum Disorder (3 credits) Focuses on evidence-based educational interventions for students with autism spectrum disorder. Examines practical strategies for assessing and structuring the environmental supports needed for students to participate and progress in all environments. Special attention will be given to instructional planning to accommodate and modify specific instructional programs and materials, behavioral interventions, and organizing and supervising classroom teams. Examines the necessary considerations for organizing and supervising classroom teams.

SPED 752 - Assessment of Persons with Disabilities (3 credits) Provides students with an understanding of the diagnostic tools and techniques used to evaluate students with disabilities. Examines formal and informal assessment measures used in the diagnosis and remediation of educational problems. Emphasizes those skills expected of a special education teacher as a member of a multi/interdisciplinary team.

SPSY 577 - Assessment of Student Learning (3 credits) Acquaints students with major methods and techniques of evaluation used to assess and report growth, development, and academic achievement of learners in elementary and secondary schools, including interpretation of standardized test information.

SPSY 746 - Learning and Instruction (3 credits) Provides an in-depth examination of developmental, cognitive, and interactionist learning theories as they apply to classroom instruction. Emphasis is on direct application of theory to the improvement of classroom instruction and the relationship of learning and motivation.

SPSY 747 - Psychology of Human Development (3 credits) Students will explore human development from conception through adulthood and include a survey of growth, adaptation, and developmental patterns with implications for academic, emotional, social, and social learning. Cognitive, emotional, social, and physical development are explored, emphasizing the interactive effects of the person's environment, developmental level, and psychological state. The course will be organized in a topical manner and include basic concepts and theories of development, research in development, biological foundations of development, prenatal development, physical growth as well as cognitive and language development.

SPSY 748 - Advanced Studies in Behavioral Problems (3 credits) Explores behavior problems encountered in classroom situations and gives cause, characteristics, and some preventative and remedial techniques, including those appropriate for managing students with learning and behavioral exceptionalities.

MAED 517 - Probability and Statistics for Elementary/Middle Level Teachers (3 credits) Explores the concepts of teaching of probability and statistics to elementary and middle level students. Explores curricular materials, resources, and activities relevant to teaching diverse groups at the elementary and middle level.

MAED 520 – Patterns and Functions for Elementary/Middle Level Teachers (3 credits) Examines the function concept as applied to elementary and middle level real-number functions and graphing

techniques for these functions. Topics include real-number functions, such as absolute value, step, linear, quadratic and other polynomial functions, trigonometric and other periodic functions, exponential, logarithmic functions, and all other inverse functions. Introduces beginning calculus concepts. Explores curricular materials that develop function concepts in grades Pre-K-8.

MAED 556 – Geometry for Elementary/Middle Level Teachers (3 credits) Explores an informal, intuitive approach to teaching geometry to elementary and middle level students. Activities and materials for teaching geometrical concepts to Pre-K-8 are an integral part of the course.

MAED 557 - Introduction to Number Theory (3 credits) Introduces topics in number theory, including basic operations and properties of integers; divisibility properties of integers; modular arithmetic and congruence's; diophantine equations; interesting relationships among numbers; applications of number theory in elementary and middle school mathematics.

MAED 558 Introduction to Logic and Logical Games (3 credits) Introduces the basic ideas, terminology, and notation of logic as it appears in the elementary and middle level mathematics curriculum. Considers topics including symbolic logic, with special emphasis on algebra of propositions; applications of Boolean algebra, such as algebra of sets and switching circuits; introduction to quantification theory and its value in determining validity of mathematical arguments, inference schemes, and logical puzzles; and consideration of other topics in logic suitable for a K-8 mathematics curriculum.

MAED 559 – Technology-Related Topics in Mathematics Education (3 credits) Provides teachers with skills that will enable them to use technology as a tool to support students' engagement in and learning of mathematics. Examines grade-level appropriate technologies and their effective uses in the mathematics classrooms such as dynamic geometry software, interactive web applications, calculators, and data collection probes.

MAED 561 – Discrete Mathematics for Elementary/Middle Level Teachers (3 credits) Examines topics in discrete mathematics, including systematic counting, graph coloring, networks, and their applications, as well as the historical background and the role of discrete mathematics in today's world. Uses a problem-solving, hands-on approach to content. Explores curricular materials, resources, and activities relevant to teaching discrete mathematics at the Elementary/Middle Level.

MAED 571 – Algebra for Elementary/Middle Level Teachers (3 credits) Includes multiple representations of sequences, integers, expressions, equations, systems of equations, inequalities, and matrices. Examines different representations of expressions and equations will be employed through the use of hand-on and visual aids and with appropriate technology. Makes connections with the teaching and learning of algebraic concepts at the Elementary and Middle Level.

MAED 611 - Algebra for Secondary Teachers (3 credits) In this advanced course, practicing teachers will explore essential components in algebra, attain a deep understanding of the content that they will teach, develop the habits of the mind of a mathematical thinker, identify effective ways to help secondary students to build mathematical understanding, and demonstrate flexible, interactive styles of teaching. Topics will include equations and systems of equations, inequalities, polynomials, structures, fitting lines to data, and matrices. Furthermore, students will examine real-world applications, standards and curricula, and when appropriate, incorporate technology to enhance learning.

MAED 612 - Geometry for Secondary Teachers (3 credits) Explores essential components of geometric reasoning; extends understanding of the underlying concepts of geometry taught at the secondary level; examines appropriate use of technology, innovative curricula and materials, and methods, research and standards related to teaching geometry concepts at the secondary level.

MAED 613 - Probability and Statistics for Secondary Teachers (3 credits) Explores essential components of statistical and probabilistic reasoning; extends understanding of underlying concepts of probability and statistics taught at the secondary level; examines appropriate use of technology, innovative curricula and materials, and methods, research and standards related to teaching probability and statistics concepts at the secondary level.

MAED 614 - Precalculus and Discrete Math for Secondary Teachers (3 credits) Explores essential components of pre-calculus and discrete mathematics; extends understanding of underlying concepts of pre-calculus and discrete mathematics taught at the secondary level; examines appropriate use of technology and methods, research, curricula and standards related to teaching pre-calculus and discrete mathematics at the secondary level.

MAED 616 - Writing in Mathematics Education (3 credits) Topics include using writing as a teaching tool, how to introduce writing into K-12 mathematics classes, and the types of writing that can be done. Both formal and informal mathematics writing will be explored. Rubrics and other forms of writing assessment will also be examined.

MAED 617 - Teaching Proportional Reasoning (3 credits) Explores essential components of proportional reasoning; extends understanding of the underlying concepts of proportional reasoning taught at the elementary, middle, and secondary levels; examines appropriate use of technology and manipulatives, innovative curricula and materials, and methods, research and standards related to teaching proportional reasoning at all levels.

MAED 618 - Mathematics and Cognition (3 credits) Familiarizes K-12 teachers with how the brain learns mathematics. Covers topics including cognitive mechanisms for learning mathematics, factors that contribute to learning and difficulties with learning, and instructional strategies for the preschool through adolescent brain.

MAED 650 - Curriculum and Instruction in Mathematics Education (3 credits) Familiarize the K-12 teacher with the philosophical and psychological issues that guide the development of mathematics curricula. Topics include a history of the development of mathematics curriculum; innovative curricula that have had impact on teaching and learning; state and national standards and their impact on mathematics curricula; methods of implementing a contemporary program; and analysis of current curricula.

MAED 652 - Differentiated Instruction in Mathematics Education (3 credits) Explores topics related to essential components of differentiated instruction in a mathematics classroom through the exploration of tools, simulations, discussions, and research. Provides opportunities to create original differentiated products and reflect on how differentiated instruction connects to the classroom. Differentiated strategies will be embedded and modeled.

MAED 654 - Teaching Problem Solving in Mathematics Education (3 credits) This course is intended to teach teachers how to become better problem solvers and teaches problem-solving pedagogy appropriate for the K-12 mathematics classroom.

MAED 660 – Survey of Research in Mathematics Education (3 credits) Provides students with an introduction to research issues and trends in mathematics education. Students will read, interpret, and synthesize research articles in mathematics education related to past and current issues and trends. Focus is on how research informs and has informed the practice of teaching mathematics.

MAED 681 - Special Topics in Mathematics Education (3 credits) Provides students with an introduction to research issues and trends in mathematics education. Students will read, interpret, and synthesize research articles in mathematics education related to past and current issues and trends. Focus is on how research informs and has informed the practice of teaching mathematics.

MAED 698 - Internship in Mathematics Education (3 credits) Provides a professional work experience in a cooperating school district under the supervision of designated public school personnel, subject to review and evaluation by a university faculty member.

MAED 795 - Thesis in Mathematics Education (3 credits)

MATH 650 - Themes in the History of Mathematics (3 credits) Traces the historical development of major themes in mathematics from their origins to their modern forms. Themes include mathematics of the heavens and earth (trigonometry), solving algebraic equations, areas and volumes (calculus), and optimization.

Evaluation of Students

For information regarding graduate policies on grading, view the Graduate Catalog: https://catalog.iup.edu/index.php

Students are expected to earn a C or better in all course work and maintain an overall GPA of a B or better. Not maintaining a 3.0 places graduate students in jeopardy of not being able to complete the MEd in Mathematics Education.

Degree Completion

Completing Program.

Approval for degree completion is managed by the program coordinator. Graduate students must complete 30 credit hours of graduate coursework that aligns with the four broad areas from the MEd in Mathematics Education program outline. See the section Programs and Degrees for degree expectations.

Applying for Graduation.

Master of Education in Mathematics Education candidates apply to graduate through MyIUP in the term preceding the one in which they expect to graduate. Please note, if you have questions about your eligibility for graduation, you should contact your academic advisor. Any deficiency discovered during the final advising session should be corrected by the student before the end of the add/drop period in the student's final term.

- If the student plans to complete all degree requirements by the end of the **fall term,** applicants should apply for December graduation by April 15
- If the student plans to complete all degree requirements by the end of the **winter term,** applicants should apply for January graduation by April 15.
- If the student plans to complete all degree requirements by the end of the **spring term,** applicants should apply for May graduation by November 15
- If the student plans to complete all degree requirements by the end of the **summer term,** applicants should apply for August graduation by November 15

Students who have not completed the online application for graduation by the deadline may need to submit a paper application, which can cause a delay in diploma processing.

- **May** and **August** graduates are invited to participate in the May ceremony.
- **December** and **January** graduates are invited to participate in the December ceremony.

Students who wish to participate in the commencement ceremony – which is different from applying to graduate – will find important information through the following link.

https://www.iup.edu/commencement/university-ceremony/index.html

Thesis Completion (Optional)

The Thesis and Dissertation Manual (TDM) is the governing document and provides detailed information regarding the thesis process. You are responsible for knowing and understanding the contents of this manual should you decide to do a thesis.

The TDM is available at the School of Graduate Studies and Research Web site. Here is the link: https://www.iup.edu/graduatestudies/resources-for-current-students/research/thesis-dissertation-information/thesis-dissertation-manual.html.

Students planning to complete a thesis should allow a minimum of two semesters to do so. The following are meant to serve as a general guide as you immerse yourself in the thesis process. Succinctly, the topics contained in the TDM can be broadly divided into four major categories:

1. **Deadlines, Forms, Checklists, and Instructions** – You must know and be aware of all deadlines associated with the thesis process. You must complete and submit all necessary forms on time. Be

absolutely certain that you have addressed all items on all checklists contained in the TDM and that you have carefully followed all of the instructions for the various processes addressed in the TDM.

2. **Thesis Committee** – Choose your thesis advisor carefully. Your advisor should be eligible to be the chair of your thesis committee, and be knowledgeable in the area related to your thesis. For instance, if you are writing a Master's Thesis in the field of statistics, then you should select a statistician as your advisor. The other members of your thesis committee also should be knowledgeable in the area related to your thesis. You should communicate frequently with the members of your thesis committee.

3. **Responsibilities** – Acclimate yourself not only with your responsibilities but also with the responsibilities of all of those individuals involved in the thesis process.

4. **Format and Style** – There are several formatting and style rules that your thesis is required to follow. These rules are specific and failure to follow them will result in your thesis not being accepted by the School of Graduate Studies and Research.

5. **Thesis Defense** – The thesis defense will be open to other faculty and students.

With regard to the actual writing of your thesis, it is important to write intelligently, both in a grammatically and mathematically correct fashion. A poorly written thesis is unacceptable. An effective way to improve your writing skills is to carefully observe how mathematics is written in textbooks and published research papers. Upon request, the Department of Mathematical and Computer Sciences may provide resources which you may use to facilitate a properly written thesis.

In addition to any requirements contained within the TDM, the Department of Mathematical and Computer Sciences strongly suggests that your thesis be typeset using a LaTeX compatible typesetting software package. Packages such as Scientific Notebook and MiKTeX are also recommended and freely available. There are sample style files available for you to use in each of the recommended software packages. These files will include sample shells in which you can insert the contents of your thesis.

Evaluation Outcome for Thesis

The thesis will be scored pass, pass with minor revisions, pass with major revisions, or fail. Students who score pass with major or minor revisions, will be asked to revise and resubmit to the committee. Revisions to the thesis need to be completed by the end of the following semester. If students do not meet this deadline, the result is a fail.

For students admitted <u>after</u> Fall 2017 – Dissertation and thesis credits will be assigned Pass or Fail as the final evaluation outcome for the taken credits and carry no quality points weighted towards a student's CGPA.

For students admitted <u>prior</u> to Fall 2017 – Dissertation and thesis credits will be assigned a letter grade as the final evaluation outcome for the credits taken and carry quality points weighted towards a

student's CGPA for the number of dissertation credits required for the program. "Extended" dissertation credits are not calculated into a student's CGPA.

For more information ,view the Graduate Catalog: https://catalog.iup.edu/index.php

Internship (Optional)

The internship experience can be a valuable for a mathematics education graduate student. Real world or research experience gives graduates advantages in job applications. **You should contact the program coordinator for more detailed information.**

Graduate internships for this program carry 3 credit hours. All interns are assigned a faculty supervisor by the program coordinator. In an internship, students usually work for 6-15 weeks and complete other requirements dependent on the position.

Finding a good internship requires considerable effort. It is very important that the interested student meet with the *program coordinator* at least one semester prior to the internship in order to craft a resume and start a search in a timely manner. The student will be assisted in the search by the program coordinator, but it is ultimately the student's responsibility to find an internship. Working teachers have the option of having their internship completed within their school. A thorough discussion of this option will be needed with the program coordinator.

Intern Responsibility:
Interns are expected to complete the following requirements:
a) Record daily activity logs.
b) Provide weekly updates to the faculty supervisor.
c) Write a final written report.
d) Give a final oral presentation.

The log should list the tasks that are performed each day. It should also mention skills and tools that are learned or used and how coursework in the program has contributed to your learning. It may include personal impressions and feelings about the job.

The final written report should be typed and should summarize the internship project(s). It should contain a description of the work assigned as well as a description of the actual work accomplished. It should also contain a statement concerning the professional and personal benefits derived from the internship.

The final oral presentation is a summary of the final written report and will be followed by a question/answer session. The presentation will be opened to interested students, faculty, and appropriate personnel from the internship site. The intern should meet with the faculty supervisor and the site internship supervisor before the proposed presentation to discuss content of the oral presentation.

All requirements of the internship must be completed before a grade is assigned. Grading will be based on the evaluation of the above requirements, on the site supervisor's midterm and final evaluations, and on other feedbacks about the intern gained from on-site visits by the faculty supervisor and from communications between personnel at the internship site and the faculty supervisor.

University Policies and Procedures

University policy is the baseline policy. Programs may have policy that is more stringent than the University baseline policy; however, not less stringent than the University baseline policy. For questions regarding this statement, please contact [Program Coordinator] or the Office of Graduate Education and Academic Planning.

Academic Calendar
View the IUP Academic Calendar: www.iup.edu/news-events/calendar/academic/

The following university and graduate policies can be found at https://catalog.iup.edu/index.php
Academic Good Standing
Academic Integrity
Bereavement-Related Class Absences
Continuous Graduate Registration for Dissertation and Thesis
Grade Appeal Policy
Graduate Fresh Start Policy
Graduate Residency Requirement
Leave of Absence Policy
Time Limitations
Time-to-Degree Masters/Doctoral Dismissal Appeal Policy
Time-to-Degree Extensions for Master's Thesis and Doctoral Dissertation
Transfer of Credits Policy

Research

Graduate students in the Master of Education in Mathematics Education have the opportunity to engage in scholarly endeavors while a student at IUP. Participating in these endeavors takes on many forms. This could include:

- Working with faculty members to author articles to scholarly journals.
- Presenting an innovative mathematics lesson or research at local, national, or international conferences with a faculty mentor.

Recent graduates have worked with faculty members to:

- Write an article for teaching fraction operations for middle-school students using hands-on materials.
- Author an article and present a lesson at the School Science and Mathematics Convention for teaching high school algebra students how to factor quadratics using the innovative technology Nearpod.
- Present about an internship experience that made a difference in performance for her fourth grade students at the National Council of Teachers of Mathematics conference.

The Applied Research Lab (ARL) is a resource for anyone at IUP that is looking to conduct research. To reach out and discuss your research idea, then go to the following website: https://www.iup.edu/arl/index.html

For more information, about research opportunities reach out to the program coordinator and/or visit the following website www.iup.edu/research/.

Appendices

Appendix A – Advising Sheet Secondary Specialization

Category	Course	Semester Offered[b]	Semester Taken	Done?
I	**Mathematics Education Content (12 credits; select 4 classes)**			
	MAED 611 Algebra for Secondary Teachers	Fall Odd Yr		
	MAED 612 Geometry for Secondary Teachers	Spr Even Yr		
	MAED 613 Probability and Statistics for Secondary Teachers	Spr Odd Yr		
	MAED 614 Precalculus and Discrete Mathematics Secondary Teachers	Fall Even Yr		
	MAED 617 Teaching Proportional Reasoning	Spr Odd Yr		
	MATH 650 Themes in the History of Mathematics[c]	Spr Even Yr		
II	**Mathematics Education Electives (18 credits; select 6 classes)**			
	MAED 559 Technology-Related Topics in Mathematics Education	Spr Even Yr		
	MAED 616 Writing in Mathematics Education	Fall Odd Yr		
	MAED 618 Mathematics and Cognition	Fall Even Yr		
	MAED 650 Curriculum and Instruction in Mathematics Education	Sum Odd Yr		
	MAED 652 Differentiated Instruction in Mathematics Education	Sum Odd Yr		
	MAED 654 Teaching Problem Solving in Mathematics Education	Sum Even Yr		
	MAED 660 Survey of Research in Mathematics Education	Sum Even Yr		
	MAED 681 Special Topics in Mathematics Education	See Note 8		
	MAED 698 Internship in Mathematics Education[a]	See Note 8		
	MAED 795 Thesis in Mathematics Education	See Note 8		
	Any Course from Category I	Varies		
	A course from: SPED 569/578/650/750/751/752 or SPSY 577/746/747/748	Varies		

[a] The internship may be used to do preliminary work related to a thesis, with permission by the graduate coordinator.
[b] Semesters when courses are offered is subject to change.
[c] Course may not be offered.

Notes:

1. At least 50% of total credits must be 600 or 700 level.
2. There is a six-year time limit to complete the program. Your time limit starts the term you start taking courses or when you transfer credit, whichever comes first.
3. Special credits are limited to nine including transfer credits, workshop credits, and special topics.
4. Transfer credits should be pre-approved. You must complete the "Request for Graduate Transfer Credit Review iform" requesting the transfer. See Transfer credit policy in the Graduate Catalog. The School of Graduate Studies and Research will finalize transfers after candidacy has been granted[9].
5. You must earn a C or better in all coursework.
6. You must maintain a QPA of at least 3.0 ("B" average).
7. Certain substitutions can be made with written approval of your advisor and the department.
8. Discuss with your advisor about MAED 681 offerings. Reach out to the program coordinator about MAED 698 and your advisor for MAED 795.
9. You will automatically come up for candidacy the semester after completing 12 credit hours at IUP.
10. Keep in contact with your advisor especially for substitutions, transfers, and electives.

Appendix B – Advising Sheet Elementary/Middle Level Specialization

Category	Course	Semester Offered[b]	Semester Taken	Done?
I	**Mathematics Education Content (12 credits; select 4 classes)**			
	MAED 517 Probability & Statistics for Elementary & Middle Level Teachers	Fall Odd Yr		
	MAED 520 Patterns & Functions for Elementary & Middle Level Teachers[c]	Fall Even Yr		
	MAED 556 Geometry for Elementary & Middle Level Teachers	Spr Odd Yr		
	MAED 557 Introduction to Number Theory[c]	Fall Odd Yr		
	MAED 558 Introduction to Logic and Logical Games[c]	Spr Odd Yr		
	MAED 561 Discrete Mathematics for Elementary & Middle Level Teachers	Fall Even Yr		
	MAED 571 Algebra for Elementary & Middle Level Teachers	Spr Even Yr		
	MAED 617 Teaching Proportional Reasoning	Spr Odd Yr		
II	**Mathematics Education Electives (18 credits; select 6 classes)**			
	MAED 559 Technology-Related Topics in Mathematics Education	Spr Even Yr		
	MAED 616 Writing in Mathematics Education	Fall Odd Yr		
	MAED 618 Mathematics and Cognition	Fall Even Yr		
	MAED 650 Curriculum and Instruction in Mathematics Education	Sum Odd Yr		
	MAED 652 Differentiated Instruction in Mathematics Education	Sum Odd Yr		
	MAED 654 Teaching Problem Solving	Sum Even Yr		
	MAED 660 Survey of Research in Mathematics Education	Sum Even Yr		
	MAED 681 Special Topics in Mathematics Education	See Note 8		
	MAED 698 Internship in Mathematics Education[a]	See Note 8		
	MAED 795 Thesis in Mathematics Education	See Note 8		
	Any Course from Category I	Varies		
	A course from: SPED 569/578/650/750/751/752 or SPSY 577/746/747/748	Varies		

[a] The internship may be used to do preliminary work related to a thesis, with permission by the graduate coordinator.
[b] Semesters when courses are offered is subject to change.
[c] Course may not be offered.

Notes:

1. At least 50% of total credits must be 600 or 700 level.
2. There is a six-year time limit to complete the program. Your time limit starts the term you start taking courses or when you transfer credit, whichever comes first.
3. Special credits are limited to nine including transfer credits, workshop credits, and special topics.
4. Transfer credits should be pre-approved. You must complete the "Request for Graduate Transfer Credit Review iform" requesting the transfer. See Transfer credit policy in the Graduate Catalog. The School of Graduate Studies and Research will finalize transfers after candidacy has been granted[9].
5. You must earn a C or better in all coursework.
6. You must maintain a QPA of at least 3.0 ("B" average).
7. Certain substitutions can be made with written approval of your advisor and the department.
8. Discuss with your advisor about MAED 681 offerings. Reach out to the program coordinator about MAED 698 and your advisor for MAED 795.
9. You will automatically come up for candidacy the semester after completing 12 credit hours at IUP.
10. Keep in contact with your advisor especially for substitutions, transfers, and electives.

Signature Page

My signature below indicates that I am responsible for reading and understanding the information provided and referenced in this department/program student handbook.

_____[please initial] I understand my program coordinator may share this document with the School of Graduate Studies and Research.

_____
Print Name

_____
Signature

_____
Date

Submit to Program Coordinator by one week prior to your first semester in the program.

The coordinator for the Master of Education in Mathematics Education will keep this signed document on file.