Education - Middle and Secondary Education - Fifth Year Format (M.A.T.)

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Print Version of Catalog

Middle, Secondary and Mathematics Education

Mission

The mission of the James Madison University professional education unit is to prepare caring, knowledgeable, skilled and reflective educators who believe that all students can learn and succeed. Our candidates and faculty are committed to lifelong learning and aspire to meet educational needs in a changing, pluralistic and democratic society. The personal and professional development of candidates is accomplished by emphasizing excellence and continuous innovation in quality undergraduate, graduate and professional programs.
James Madison University's College of Education is distinguished through faculty and candidate achievements, academic rigor, excellence in teaching, candidate and faculty interactions and relationships, technological innovations, and national recognitions. The college maintains relevance through active and growing interactions with other colleges within the university and with local, state, regional, national and international communities.

The college is committed to providing:

- Graduate programs that emphasize advanced knowledge in a specialty area and the development of effective leadership and professional skills for addressing the needs of a changing society.
- Continuing professional development and service programs in cooperation with public and private schools and agencies, other colleges, institutions, and businesses.

The undergraduate and graduate teacher education programs are accredited by the Council for the Accreditation of Educator Preparation and approved by the Virginia State Board of Education.

The basic philosophy of the college is reflected in the following goals:

- To educate men and women for the multiple professions included in the college at both the undergraduate and graduate levels, not merely by developing skills and knowledge but by stimulating creativity, developing cognitive abilities, and encouraging the testing of hypotheses and reinterpretation of the human experience.
- To encourage a balanced faculty orientation toward teaching, research, scholarship, community service and professionalism that recognizes individual strengths and preferences of the college's faculty.
- To create an environment that fosters an atmosphere of open communication among candidates, faculty members and community.
- To anticipate societal needs and provide necessary resources for implementing effective on- and off-campus programs now and in the future.

**Programs of Study**

Middle, Secondary, and Mathematics Education offers the following programs:

- **Master of Arts in Teaching (M.A.T.) with a concentration in middle school education**, a fifth-year continuation initial licensure program designed to allow candidates to meet requirements for a license to teach students of grades 6-8 in Virginia's public schools.
- **Master of Education (M.Ed.) in Education with a concentration in K-8 mathematics specialization**. This program is offered in conjunction with the Department of Mathematics and Statistics.
- **Master of Arts in Teaching (M.A.T) with a concentration in secondary education**, a fifth year continuation initial licensure program designed to allow candidates to meet requirements for a license to teach students of grades 6-12 in Virginia's public schools.
Middle School Education

M.A.T. with a Concentration in Middle School Education (Grades 6-8)

Admission Criteria

To be considered for admission to the Middle Education M.A.T. degree program, candidates must have:

• Satisfied all requirements for admission to teacher education.
• Submitted passing Praxis Subject Assessment scores for at least one content area to the JMU Education Support Center prior to beginning more than six hours of M.A.T. graduate coursework;
• Submitted passing Praxis Subject Assessment scores in two content areas to the JMU Education Support Center prior to beginning more than 12 hours of M.A.T. graduate coursework.
• Exhibited and demonstrated personal qualities and dispositions that reflect effective development as a professional educator.
• Satisfied all requirements for admission to The Graduate School, including:
  • Completion of a baccalaureate degree in IDLS from JMU or its equivalent
  • An undergraduate cumulative GPA of 2.7 or higher (on a 4.0 scale)
  • Taken the Graduate Record Examination and scored at the 25th percentile or above. Exception: Students who complete their undergraduate degree and the appropriate teacher education pre-professional programs (majors and minors) at JMU are not required to take the Graduate Record Exam for admission to the M.A.T. program.

All candidates in the middle school education M.A.T. program must have an undergraduate major or its equivalent in interdisciplinary liberal studies (IDLS) from JMU. The IDLS program, with its expanded approach to the general education core, and its dual concentrations in English, social sciences, the natural sciences or mathematics, meets the licensure requirements for a two-subject endorsement for teachers licensed in middle school education.

Program Mission and Outcomes

The mission of the middle school education M.A.T. program is to prepare highly qualified professionals for educational roles in middle schools through advanced coursework and field experiences.

These school professionals will:

• design and deliver curricula that effectively impact student learning;
• integrate technology in learning settings;
• value diversity of faculty and students in the school;
• collaborate with colleagues, parents and others;
• be reflective practitioners who continually evaluate their actions; and
• value lifelong learning, engage in professional development and conduct educational research.

The Master of Arts in Teaching in middle school education is designed to lead to initial teacher licensure with endorsements in two content areas. The fifth-year format forms the last phase of the five-year teacher licensure programs. This format is designed to serve candidates who have completed the appropriate prerequisite requirements in an undergraduate education program at JMU. Candidates should check with their adviser frequently to be apprised of changes in the offerings and requirements listed that may affect them.

Degree Requirements

As undergraduates, candidates must first complete 37 credit hours of middle education pre-professional course work along with the IDLS major. All middle education pre-professional course work must be completed with grades of "B-" or better with the exception of PSYC 160 which must be completed with a grade of "C" or better. Candidates must apply to and be admitted to graduate school for the Middle Education M.A.T. program (see Admission Criteria). Finally, candidates must complete 32 hours of graduate course work which includes student teaching and a final research project.

Master of Arts in Teaching with a Concentration in Middle School Education (Grades 6-8)

Undergraduate Degree Requirements

<table>
<thead>
<tr>
<th>Credit Hours</th>
<th>First and/or Second Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>EDUC 300, Foundations of American Education (must be completed with a grade of &quot;B-&quot; or higher)</td>
</tr>
<tr>
<td>1</td>
<td>MSSE 101, Orientation to the Profession</td>
</tr>
<tr>
<td>3</td>
<td>PSYC 160, Life Span Human Development</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Credit Hours</th>
<th>Third Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>EDUC 310, Teaching in a Diverse Society</td>
</tr>
<tr>
<td>2</td>
<td>MIED 311, Field Experience in Middle Education</td>
</tr>
<tr>
<td>3</td>
<td>READ 312, Reading and Writing across the Curriculum in the Middle Grades</td>
</tr>
</tbody>
</table>

(EDUC 310, MIED 311, and READ 312 are corequisites for middle education pre-professional students)

<table>
<thead>
<tr>
<th>Credit Hours</th>
<th>Fourth Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>MSSE 370, General Instructional Methods for Grades 6-12</td>
</tr>
<tr>
<td>1</td>
<td>MSSE 371, Clinical Experience in Adolescent Education</td>
</tr>
</tbody>
</table>

(MSSE 370 and MSSE 371 are corequisites for middle education pre-professional students)

<table>
<thead>
<tr>
<th>Credit Hours</th>
<th>Fourth Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>READ 472, Literacy, Assessment, and Instruction in Content Areas for the Middle Grades</td>
</tr>
<tr>
<td>3</td>
<td>EXED 460, Differentiation of Instruction</td>
</tr>
</tbody>
</table>

Students complete two of the courses below based on their IDLS concentration areas (36 credits each):

<table>
<thead>
<tr>
<th>Credit Hours</th>
<th>Fourth Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSSE 470E</td>
<td>Methods in English/Language Arts for the Middle School</td>
</tr>
<tr>
<td>MSSE 470H</td>
<td>Methods in Social Studies for the Middle School</td>
</tr>
</tbody>
</table>
**Graduate Course Requirements**

The following courses must be completed with grades of "B-" or higher:

- **EDUC 540.** Educational Technology  
  Credit Hours: 3

- **EXED 512.** Behavior Management in the Classroom  
  Credit Hours: 3

- **MSSE 630.** Inquiry in the Classroom  
  Credit Hours: 3

- **MIED 620.** Assessment in Middle Education  
  Credit Hours: 3

- **MSSE 650.** Internship Seminar  
  Credit Hours: 3

- **MSSE 690.** Internship in Middle and Secondary Education  
  Credit Hours: 8

- **MIED 610.** Collaborative Leadership in School  
  Credit Hours: 3

- **MIED 656.** Seminar in Middle Education  
  Credit Hours: 3

- Approved Graduate Level Elective  
  Credit Hours: 3

**Total Credit Hours:** 32

**The Post-Baccalaureate Entry Option**

This program is for candidates who hold a bachelor's and/or master's degree in an appropriate academic content area and wish to be licensed to teach in that area.

**Additional Admission Criteria**

Candidates admitted to this program of study are expected to have completed an arts and sciences undergraduate major from an accredited college or university with a 2.7 grade-point average or above (on a 4.0 scale). Candidates are required to provide transcript evidence that they have completed liberal studies and specialty area courses comparable in content and total hours to those expected of an undergraduate major. Candidates in the middle education program must have the requisite content coursework in two areas (mathematics, sciences, language arts, social science). Those applicants not having such coursework will be required to complete any specifically required undergraduate-level general education and/or subject matter content courses under terms of provisional admission to graduate study as a non-degree-seeking candidate.

Candidates must take the Graduate Record Exam (GRE) and meet all requirements for admission to The Graduate School. Candidates must submit passing Praxis Subject Assessment scores to the Education Support Center and complete all undergraduate middle education and content area prerequisite coursework prior to enrolling in M.A.T. graduate coursework.

Candidates must also apply to and be admitted to teacher education at JMU. Candidates must initiate their application by contacting the Department of Middle, Secondary and Mathematics Education. Criteria for admission to teacher education are described in the Undergraduate Catalog.
M.Ed. with a Concentration in Middle School Education (Grades 4-8)
The M.Ed. program in middle education is not accepting students at this time.

Secondary Education

M.A.T. with a Concentration in Secondary Education (Grades 6-12)

Admission Criteria

To be considered for admission to the secondary education M.A.T. degree program, candidates must have:

- Satisfied all requirements for admission to teacher education.
- Submitted passing Praxis Subject Assessment scores to the JMU Education Support Center prior to beginning more than 12 hours of MAT graduate course work.
- Exhibited and demonstrated personal qualities and dispositions that reflect effective development as a professional educator.
- Satisfied all requirements for admission to The Graduate School, including:
  - Completed requirements for a baccalaureate degree from an accredited college/university,
  - Achieved an undergraduate cumulative GPA of 2.7 or higher (on a 4.0 scale), and
  - Taken the Graduate Record Examination and scored at the 25th percentile or above. Exception: Students who complete their undergraduate degree and the appropriate teacher education pre-professional programs (majors and minors) at JMU are not required to take the Graduate Record Exam for admission to the M.A.T. program.

Master of Arts in Teaching with a Concentration in Secondary Education (Grades 6-12)

This program is intended for JMU candidates continuing from the undergraduate pre-professional secondary education program. The secondary education Master of Arts in Teaching degree is designed to enable candidates to develop a strong professional education on a foundation of undergraduate preparation in General Education, an appropriate major and introductory professional education experiences.

Program Mission

The secondary education Master of Arts in Teaching degree emphasizes the preparation of effective and reflective teachers who are knowledgeable in the content they are preparing to teach and cognizant of the characteristics of adolescents, ages 12-18. The licensure areas for which individuals are prepared include English, mathematics, natural sciences (biology, chemistry, earth and space science, physics), and history and social sciences (includes licensure to teach history, economics, geography and political science).
Undergraduate candidates and post-baccalaureate candidates planning to teach at the secondary level (grades 6-12) should consult with a secondary education adviser to ensure completion of the required prerequisites. Candidates should visit the departmental office in 3200 Memorial Hall to be assigned a secondary education adviser. A specific arts and sciences major or equivalent course work and experiences may be required for admission to some programs of the M.A.T. and for licensure to teach in certain disciplines and grade levels. Candidates should check with their adviser frequently to be apprised of changes in the offerings and requirements listed that may affect them.

The fifth-year licensure programs build on the extensive foundational course work and experiences candidates have completed in their undergraduate programs. Candidates will have completed the prescribed course work to develop the knowledge, skills, attitudes and behaviors needed for successful completion of the M.A.T.

Candidates interested in the requirements for the M.A.T. program in physical and health education (PreK-12) should refer to the description for that program in the Department of Kinesiology. Candidates interested in the requirements for the secondary licensure program in foreign languages should refer to the description for that program in Department of Foreign Languages, Literatures and Cultures in the undergraduate catalog.

**Degree Requirements**

Although individual candidate's programs of study will vary depending upon major and licensure area, the following represents the breakdown of the required credits in a typical program of study. The program of study for secondary education is as follows.

**Undergraduate Requirements**

Undergraduate candidates in the secondary education pre-professional program must complete an arts and sciences major or equivalent in a specific discipline related to the teacher licensure area of intent. Majors related to approved licensure areas at JMU include biology, chemistry, English, foreign languages, geology, history or political science, mathematics and physics. Candidates with majors in history or political science must also complete course work in the interdisciplinary social science minor. Students must earn grades of "C-" or better in all academic major content courses.

**Secondary Education Master of Arts in Teaching Undergraduate Program of Study**

<table>
<thead>
<tr>
<th>Undergraduate Prerequisites</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>41-44</td>
</tr>
<tr>
<td>Major field of study</td>
<td>36-60</td>
</tr>
<tr>
<td>Undergraduate pre-professional studies</td>
<td>23</td>
</tr>
</tbody>
</table>

Minimum requirement is 120 credit hours.
Secondary Education Master of Arts in Teaching Degree Requirements

Undergraduate Prerequisites – First and/or Second Year

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYC 160</td>
<td>Life Span Human Development</td>
<td>3</td>
</tr>
<tr>
<td>MSSE 101</td>
<td>Introduction to the Profession</td>
<td>1</td>
</tr>
<tr>
<td>EDUC 300</td>
<td>Foundations of American Education (must be completed with a grade of &quot;B-&quot; or higher)</td>
<td>3</td>
</tr>
</tbody>
</table>

Undergraduate Prerequisites – Third and Fourth Years

The following courses must be completed with grades of "B-" or higher:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDUC 310</td>
<td>Teaching in a Diverse Society</td>
<td>3</td>
</tr>
<tr>
<td>MSSE 370</td>
<td>General Instructional Methods for Grades 6-12</td>
<td>3</td>
</tr>
<tr>
<td>MSSE 371</td>
<td>Clinical Experience in Adolescent Education</td>
<td>1</td>
</tr>
<tr>
<td>MSSE 470</td>
<td>Content Methods for the Middle School</td>
<td>3</td>
</tr>
<tr>
<td>MSSE 471</td>
<td>Field Experience in the Middle School</td>
<td>3</td>
</tr>
<tr>
<td>READ 440</td>
<td>Literacy-Based Learning in Secondary Education</td>
<td>3</td>
</tr>
</tbody>
</table>

Graduate Course Requirements

The following courses must be completed with grades of "B-" or higher:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDUC 540</td>
<td>Educational Technology</td>
<td>3</td>
</tr>
<tr>
<td>EXED 512</td>
<td>Behavior Management in the Classroom</td>
<td>3</td>
</tr>
<tr>
<td>EXED 520</td>
<td>Differentiation of Instruction and Academic Collaboration</td>
<td>3</td>
</tr>
<tr>
<td>MSSE 570</td>
<td>Content Methods Course for High School</td>
<td>3</td>
</tr>
<tr>
<td>MSSE 571</td>
<td>Content Area Field Experience in High School</td>
<td>3</td>
</tr>
<tr>
<td>MSSE 607</td>
<td>Middle and Secondary School Curriculum and Co-curriculum</td>
<td>3</td>
</tr>
<tr>
<td>MSSE 625</td>
<td>Assessment in Secondary Education</td>
<td>3</td>
</tr>
<tr>
<td>MSSE 630</td>
<td>Inquiry in the Classroom</td>
<td>3</td>
</tr>
<tr>
<td>MSSE 650</td>
<td>Internship Seminar</td>
<td>3</td>
</tr>
<tr>
<td>MSSE 675</td>
<td>Internship in Middle and Secondary Education</td>
<td>8</td>
</tr>
</tbody>
</table>

The Post-Baccalaureate Entry Option

This program is for candidates who hold a bachelor's and/or master's degree in an appropriate academic content area and wish to be licensed to teach in that area.

Additional Admission Criteria

Candidates admitted to this program of study are expected to have completed an arts and sciences undergraduate major from an accredited college or university with
provide transcript evidence that they have completed liberal studies and specialty area courses comparable in content and total hours to those expected of an undergraduate major. Those applicants not having such course work will be required to complete any specifically required undergraduate-level general education and/or subject matter content courses under terms of provisional admission to graduate study as a non-degree-seeking candidate.

Candidates must also apply to and be admitted to teacher education at JMU. Candidates must initiate their application by contacting the Department of Middle, Secondary and Mathematics Education. Criteria for admission to Teacher Education are described in the undergraduate catalog, available online. Candidates must also take the Graduate Record Exam (GRE) and meet all requirements of admission to The Graduate School. Candidates must submit passing Praxis Subject Assessment scores to the Education Support Center and complete undergraduate secondary education and content area prerequisite course work prior to enrolling in MAT graduate course work.

**M.Ed. in Education with a Concentration in Secondary Education (6-12)**

The M.Ed. program in secondary education is not accepting new students at this time.

**M.Ed. with a Concentration in K-8 Mathematics Specialization**

The K-8 mathematics specialist concentration at James Madison University leads to a Masters of Education (M.Ed.) with a concentration in K-8 Mathematics Specialization and allows candidates to meet the competencies required for the K-8 Mathematics Specialists endorsement through the Virginia Department of Education. The program consists of 36 hours: 15 hours of course work in mathematics, 15 hours of course work in mathematics education and 6 hours of an externship.

The Mathematics Specialist concentration at James Madison University is a cohort program. We will accept 25 students into the program. Those interested in applying should complete the graduate admission application provided by The Graduate School (http://www.applyweb.com/apply/jmug). This program is offered jointly by the Department of Mathematics and Statistics and the Department of Middle, Secondary and Mathematics Education.

**Admission Criteria**

All criteria are considered when reviewing the candidates for admission to this Master of Education degree program. Criteria include:

- Satisfaction of all requirements for admission to The Graduate School.
- A minimum of three years of classroom teaching experience where mathematics instruction was a responsibility.
- Completion of a minimum of six hours of mathematics courses (graduate and/or undergraduate).
• Completion of the Praxis Subject Assessment for Middle School Math (code 5169; register at http://www.ets.org).
• Two letters of recommendation.
• A two- to three-page personal statement indicating the reasons for enrolling in the concentration.
• Applicants may also be asked to complete an interview with the mathematics education faculty.

Degree Requirements

Course Requirements

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 502</td>
<td>Number and Operations for K-8</td>
<td>3</td>
</tr>
<tr>
<td>MATH 503</td>
<td>Algebra and Functions for K-8</td>
<td>3</td>
</tr>
<tr>
<td>MATH 504</td>
<td>Rational Numbers for K-8</td>
<td>3</td>
</tr>
<tr>
<td>MATH 505</td>
<td>Probability and Statistics for K-8</td>
<td>3</td>
</tr>
<tr>
<td>MATH 506</td>
<td>Geometry for K-8</td>
<td>3</td>
</tr>
<tr>
<td>MAED 626</td>
<td>Advanced Mathematics Instruction for K-8</td>
<td>3</td>
</tr>
<tr>
<td>MAED 627</td>
<td>Assessment of Learners (Leadership I)</td>
<td>3</td>
</tr>
<tr>
<td>MAED 628</td>
<td>Diverse Learners in the Mathematics Classroom</td>
<td>3</td>
</tr>
<tr>
<td>MAED 629</td>
<td>Professional Development of Adult Learners (Leadership II)</td>
<td>3</td>
</tr>
<tr>
<td>MAED 630</td>
<td>Research in Mathematics Education (Leadership III)</td>
<td>3</td>
</tr>
<tr>
<td>MAED 631</td>
<td>Externship in Education I</td>
<td>3</td>
</tr>
<tr>
<td>MAED 632</td>
<td>Externship in Education II</td>
<td>3</td>
</tr>
</tbody>
</table>

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Master of Education in Mathematics Degree

For information on the Master of Education in mathematics, see Mathematics.

Graduation

All requirements for the degree must be completed by the course work completion deadline in the semester in which the degree is conferred to receive a diploma dated the day of graduation. Applications for graduation should be completed early in the term in which the candidate plans to graduate. Candidates who will satisfy all degree requirements in the summer may participate in the spring commencement ceremony if they have completed an Application for Graduation form signed by their adviser and program coordinator, and they must be pre-registered for summer classes prior to the May commencement ceremony. Candidates must be enrolled during the semester in which the degree is to be conferred. It should be noted that applicants actually graduate and receive their degrees only when all requirements are satisfied. Candidates who do not satisfy all requirements for graduation will be notified of deficiencies and must re-apply for a later graduation date.
Course Offerings

Mathematics Education

MAED 501. Special Topics in Mathematics Education. 1-3 credits.
Designed to allow students to explore selected topics in mathematics education.

MAED 600. Seminar in Mathematics Education. 3 credits.
This survey course is designed to familiarize teachers with current research topics related to mathematics teaching and learning. Research topics include teacher professional development, mathematical reasoning (e.g., algebraic, geometric, multiplicative, proportional, arithmetical); implementation of standards-based curriculum, assessment of student learning, the role of representations, teaching for problem solving and theories that frame research.

MAED 610. Curricular Trends in Mathematics Teaching and Learning. 3 credits.
This course offers opportunities for teachers to explore curricular goals and implementations for various mathematical topics addressed in middle and secondary mathematics classrooms. Teachers will consider different curricula and how those curricula might be implemented to effectively support student learning. Mathematics topics addressed include algebra, proportional reasoning, geometry and advanced mathematics.

MAED 620. Teaching Mathematics with Technology. 3 credits.
This course offers opportunities for teachers to explore research-based applications of technology tools in secondary and middle school mathematics. Teachers will engage in advanced use of various technology tools for learning and teaching mathematics, including designing technology environments, appropriate investigation tasks, and professional developmental activities.

MAED 626. Advanced Mathematics Instruction For K-8. 3 credits.
This course will prepare teachers to engage in student-centered mathematics instruction in grades K-8. Instruction will focus on number and operations, algebra, geometry, measurement, data analysis, and probability. The Principles and Standards for School Mathematics will provide foundational ideas for the topics in the course, including the use of the five process standards and the use of technology in the teaching and learning of mathematics. Prerequisites: MATH 502.

MAED 627. Assessment of Learners (Leadership I). 3 credits.
This course is designed to help teachers create, implement, and evaluate both formal and informal assessment techniques. Teachers will construct instruments ranging from formative learning checks to summative tests and projects and the corresponding rubrics for evaluation purposes. Teachers will also learn to analyze assessment results in order to gauge student understanding and knowledge, and to use this information to modify instruction accordingly. Prerequisites: MATH 502 and MAED 626.

MAED 628. Diverse Learners in The Mathematics Classroom. 3 credits.
This course is designed to help teachers understand the learning characteristics of struggling and diverse learners in mathematics classrooms and to use the research-based instructional strategies which target these learning characteristics. The focus of the course will be learning to work effectively with students with learning disabilities in mathematics as well as English language learners. Prerequisites: MATH 502, MATH 503, MAED 626 and MAED 627.
MAED 629. Professional Development of Adult Learners (Leadership II). 3 credits.
This course is designed to help teachers build those skills, understandings and
dispositions required to play optimal mathematics education leadership roles in
elementary/middle schools. In particular, this course will help mathematics specialists
create, implement, and evaluate a variety of professional development experiences
for classroom teachers. Prerequisites: MATH 502, MATH 503, MATH 504, MATH 505,
MAED 626, MAED 627, and MAED 628.

MAED 630. Research in Mathematics Education (Leadership III). 3 credits.
This course is designed to familiarize teachers with the body of research related
to selected topics in mathematics education and will help teachers further their
understanding of the relationships between research and practice. Teachers will use
this course to begin to develop ideas for a final project for the program. Prerequisites:
MATH 502, MATH 503, MATH 504, MATH 505, MAED 626, MAED 627, MAED 628,
and MAED 629.

MAED 631. Externship in Education I. 3 credits.
This course is designed to support teachers in developing a final project for the
mathematics specialists program. Projects should be developed in conjunction with the
teacher’s school or school division and should help prepare teachers for the role of a
mathematics specialists in an elementary/middle school setting. Prerequisites: MATH
502, MATH 503, MATH 504, MATH 505, MAED 626, MAED 627, MAED 628, MAED
629, and MAED 630.

MAED 632. Externship in Education II. 3 credits.
This course is designed to support teachers in implementing a final project in
conjunction with their schools or school divisions which will help prepare them for the
role of a mathematics specialists in an elementary/middle school setting. Prerequisites:
MATH 502, MATH 503, MATH 504, MATH 505, MAED 626, MAED 627, MAED 628,
MAED 629, MAED 630, and MAED 631.

Mathematics

MATH 502. Numbers and Operations for K-8. 3 credits.
This course will explore topics important to the mathematical experiences of students
in K-8 classrooms including addition, subtraction, multiplication, division, place value,
and properties of whole numbers. Relevant connections to the history of mathematics
will also be included.

MATH 503. Algebra and Functions for K-8. 3 credits.
The course is designed to develop an understanding of topics from algebra: variables,
patterns, and functions; modeling and interpreting graphs; linear and non-linear
functions, connecting these ideas to underlying concepts in primary and middle grades
mathematics. Attention will be given to interpreting and assessing students' work and
learning. Relevant connections to the history of mathematics will also be included.
Prerequisites: MATH 502, MAED 626, MAED 627.

MATH 504. Rational Numbers for K-8. 3 credits.
This course is designed to help participants develop understanding in: theoretical
development of math and students' learning of math within content strands of rational
numbers and proportional reasoning; development of pedagogical knowledge of
rational numbers and proportional reasoning appropriate for K-8 Mathematics Teacher
Specialists; and assessment of K-8 students' mathematical conceptions through
interviews. Relevant connections to the history of mathematics will also be included. 
Prerequisites: MATH 502, MATH 503, MAED 626, MAED 627, MAED 628, MAED 629.

MATH 505. Probability and Statistics for K-8. 3 credits.
The course will develop students' understanding of probabilistic structures, reasoning, data analysis and exploration. These structures will be related to real world problem solving. Attention will also be given to children's thinking, how they learn this basic mathematics, their problem solving strategies, and how they construct their understanding of our number system and arithmetic. Relevant connections to the history of mathematics will also be included. Prerequisites: MATH 502, MATH 503, MATH 504, MAED 626, MAED 627, MAED 628, MAED 629.

MATH 506. Geometry for K-8. 3 credits.
Explorations of foundations of informal measurement and geometry in one, two, and three dimensions. The van Hiele model for geometric learning is used as a framework for how children understand measurement and geometric relationships. Visualization, spatial reasoning, and geometric modeling are stressed. Transformational geometry, congruence, similarity, and geometric constructions will be discussed and relevant connections to history of mathematics will be included. Prerequisites: MATH 502, MATH 503, MATH 504, MATH 505, MAED 626, MAED 627, MAED 628, MAED 629, MAED 630 and MAED 631.

MATH 510. Modern Analysis. 3 credits.
A course to update and broaden secondary teachers' capability and point-of-view with respect to topics in analysis. Applications of concepts such as limits, continuity, differentiation and integration. May be taken for graduate credit and for certificate renewal by secondary school teachers. Prerequisite: Undergraduate analysis or permission of instructor.

MATH 512. Discrete Mathematics. 3 credits.
A course to update and broaden secondary teachers' capability and point-of-view with respect to topics in discrete mathematics. May be taken for graduate credit for certificate renewal by secondary school teachers. Prerequisite: Undergraduate mathematics through linear algebra.

MATH 514. Modern Algebra. 3 credits.
From an advanced viewpoint, an investigation of topics in algebra from high school curriculum. Theory of equations, polynomial rings, rational functions and elementary number theory. Course may be taken for graduate credit and for certificate renewal by secondary school teachers. Prerequisite: Undergraduate algebra or permission of instructor.

MATH 517. Probability and Statistics I. 3 credits.
Topics in probability, modeling, and connections to the high school curriculum. Course may be taken for graduate credit and for certificate renewal by secondary school teachers. Prerequisites: Undergraduate mathematics through linear algebra.

MATH 520. Modern Geometry. 3 credits.
Topics in geometry of concern to secondary teachers in their work and provision for background and enrichment. Various approaches to study of geometry, including vector geometry, transformational geometry and axiomatics. Course may be taken for graduate credit and for certificate renewal by secondary teachers. Prerequisite: Undergraduate mathematics through linear algebra or undergraduate geometry.

MATH 615. History of Mathematics. 3 credits.
Topics in the history of mathematics of particular concern to secondary teachers in their work and provision for background and enrichment. Selected topics spanning ancient times to the present. Course may be taken for graduate credit and for certificate renewal by secondary teachers.

**MATH 618. Probability and Statistics II. 3 credits.**
A course to update and broaden secondary teacher's capability and point-of-view with respect to selected topics in statistics and to prepare teachers to teach AP statistics. Course may be taken for graduate credit and for certificate renewal by secondary school teachers. *Prerequisite: MATH 517.*

**MATH 685. Selected Topics II. 3 credits.**
An in-depth study of selected topics not otherwise covered in the regular offerings of the department. May be repeated for credit when course content changes.

## Middle Education

**MIED 501. Workshop in Middle Education. 1-3 credits.**
Designed to provide students with workshop experiences related to current needs evident in middle education. The topics considered will be determined by interest and demand. No more than six credit hours earned in workshops in education can be applied to a major program.

**MIED 530. Teaching Mathematics in the Elementary and Middle Grades. 3 credits.**
Individual and group study of content, methodology and instructional materials necessary to the design and implementation of instructional programs in modern mathematics. Attention is given to differentiation of instruction in terms of learning ability.

**MIED 610. Collaborative Leadership in Schools. 3 credits.**
Designed to provide students with research, theories and practices regarding teacher leadership and collaboration in school contexts and methods for addressing school-based improvement efforts and processes. Specific attention is given to collaboration and leadership toward community involvement and communication in middle schools.

**MIED 620. Assessment in Middle Education. 3 credits.**
The course is designed to help teacher education candidates develop competencies for designing and utilizing effective assessment strategies for determining student performance and progress in a variety of instructional situations and for making a range of instructional decisions, including how to integrate the curriculum to best serve middle school students' needs. *Prerequisites: MSSE 370, and admission to the M.A.T. program in Middle Education.*

**MIED 656. Seminar in Middle Education. 3 credits.**
An intensive study of selected problems in middle education. Research findings are reviewed and educational theory is explored.

**MIED 680. Reading and Research. 3 credits.**
Directed reading and research in areas of student interest. Reading and research may be done only in the major field of study. A plan for study must be submitted in prescribed form and approved prior to registration for the course. *Prerequisites: Written permission of adviser and program coordinator.*
Middle and Secondary Education

MSSE 570 (E, H, M, or S) Content Methods Course for High School. 3 credits.
Research findings about teaching in the content area will be used to identify the most effective instructional strategies for teaching that content to students in grades 9-12. Emphasis will be on developing plans for employing the strategies and making appropriate instructional decisions based on instructional goals, the learner and available resources. Prerequisites: MSSE 470, MSSE 471, READ 440, admission to teacher education, and admission to the M.A.T. program. Corequisite: MSSE 571.

E. English Teaching Methods, Grades 9-12. 3 credits.
H. Social Studies Teaching Methods, Grades 9-12. 3 credits.
M. Mathematics Teaching Methods, Grades 9-12. 3 credits.
S. Natural Sciences Teaching Methods, Grades 9-12. 3 credits.

MSSE 570F. Methods of Language Teaching. 3 credits.
Research findings about language teaching will be used to identify the most effective instructional strategies for teaching languages to students in grades preK-12. Emphasis will be on developing plans for employing the strategies and making appropriate instructional decisions based on instructional goals, the learner, and available resources. Prerequisites: MSSE 370, admission to Teacher Education and admission to the M.A.T. program for Fifth year M.A.T. foreign language students; ESL minors should have completed EDUC 422, EDUC 425, and EDUC 428. Corequisite: MSSE 571F for Fifth year M.A.T. foreign language students.

MSSE 571 (E, H, M, S). Content Area Field Experience in High School. 3 credits.
Provides practical classroom experience for teacher education candidates in the secondary education programs under the supervision of an in-service teacher and a clinical professor. Students engage in classroom activities that provide an opportunity for them to practice the strategies and concepts learned in the methods courses. Prerequisites: MSSE 470, MSSE 471, READ 440.

E. Field experience in High School English, Practicum III. 3 credits.
H. Field Experience in High School Social Studies, Practicum III. 3 credits.
M. Field Experience in High School Mathematics, Practicum III. 3 credits.
S. Field Experience in High School Natural Science, Practicum III. 3 credits.

MSSE 571F. Field Experience in Foreign Language, Practicum III. 3 credits.
Provides practical classroom experience in elementary, middle and high school settings to middle and secondary foreign language students under the supervision of an in-service teacher and a clinical professor. Students engage in classroom activities that provide an opportunity for them to practice the strategies and concepts learned in the methods courses.

MSSE 607. Middle and Secondary Curriculum and Co-Curriculum. 3 credits.
The course is designed to help prospective teachers develop the knowledge, skills and dispositions necessary for their role in curriculum development and delivery in a diverse school and classroom environment. Prerequisites: MSSE 370, admission to teacher education, and admission to the M.A.T. program.

MSSE 625. Assessment in Secondary Education. 3 credits.
This course is designed to prepare prospective teachers to create and evaluate both formal and informal assessment strategies. Candidates will construct instruments ranging from formative learning checks to summative tests and projects/rubrics. Candidates will also learn to analyze assessment results in order to gauge student
progress and adjust instruction appropriately. *Prerequisites:* **MSSE 370, Admission to Teacher Education and the M.A.T. program.**

**MSSE 630. Inquiry in the Classroom.** 3 credits.
Skills, methods, insights and understandings which will enable the beginning teacher to become an intelligent and critical consumer of educational inquiry and a productive participant in the process of classroom-based inquiry. *Prerequisites: Admission to teacher education and the M.A.T. program.*

**MSSE 631. Inquiry Seminar.** 1 credit.
The course is designed to provide technical support and feedback for prospective teachers to successfully complete a classroom based inquiry project during their student teaching experience. Students will be graded on an S/U basis. *Prerequisites: MSSE 630, admission to the M.A.T. program, and admission to student teaching.*

**MSSE 650. Internship Seminar.** 3 credits.
A seminar designed to promote reflective decision making among teacher candidates during their internship experience. During seminar sessions teacher candidates will engage in case analysis and Teacher Work Sample development. *Corequisite: MSSE 690 for middle education students or MSSE 675 for secondary education students.*

**MSSE 675. Internship in Middle and Secondary Education.** 4 credits.
Participants will experience the full range of conditions and tasks expected of a teacher for students in grades 6-12. They will be expected to develop and demonstrate competencies in teaching with the supervision and support of experienced teachers. Students must register for two eight-week blocks during the same semester for a total of eight credits. Students will receive a grade of "S" for satisfactory performance or "U" for unsatisfactory performance. *Corequisite: MSSE 650.*

**MSSE 680. Applied Research in Middle and Secondary Education.** 3 credits.
Provides students with the resources, skills, and knowledge required to conduct an individualized classroom-based inquiry project as a capstone activity in the M.A.T. program. *Prerequisite: MSSE 630.*

**MSSE 690. Internship in Middle Education.** 4 credits.
Participants will experience the full range of conditions and tasks expected of a teacher for students in grades 6-8. They will be expected to develop and demonstrate competencies in teaching with the supervision and support of experienced teachers. Students must register for two eight-week blocks during the same semester for a total of eight credits. Students will receive a grade of "S" for satisfactory performance or "U" for unsatisfactory performance. Intended for middle education minors. *Corequisite: MSSE 650.*

**Secondary Education**

**SEED 600. Secondary Education in America: Past, Present and Future.** 3 credits.
The changing face of the American secondary school will be studied and attention will be given to many of the philosophical, social, cultural, demographic and other factors impacting those changes. Emphasis will be placed on problems, current trends and future perspectives. *Prerequisite: EDUC 620.*

**SEED 660. Instructional Development in the Secondary School.** 3 credits.
Effective teaching techniques and innovative forms of organization and instruction in secondary education will be studied. Emphasis will be on teaching strategies and
behaviors and materials selection for serving secondary school students. *Prerequisite:* An *instructional methods course.*

**SEED 680. Reading and Research.** 1-3 credits. Opportunities for directed reading and research in secondary English, foreign language, mathematics, science and/or social studies. *Prerequisites:* *EDUC 630* or equivalent and written permission of the adviser and program coordinator.