

**M.A.T. in Secondary Education**

## Chemistry Endorsement Course Checklist

Catalog Year 2024-2025

**Pedagogical Knowledge & Pedagogical Content Knowledge Requirements****Courses Required for Teacher Education Admission:** Grade of "C" or higher required in each course.

| Requirement              | Course                | Course Title                                  | Credits | Pre/Co-Requisites/Notes | Semester Offered |
|--------------------------|-----------------------|---|---------|-------------------------|------------------|
| <input type="checkbox"/> | EDUC 200 <sup>1</sup> | Foundations of Education in the United States | 3       |                         | FA/SP/SU         |
| <input type="checkbox"/> | PSYC 160 <sup>1</sup> | Life Span Human Development                   | 3       | C5SD                    | FA/SP/SU         |
| <input type="checkbox"/> | WRTC 103              | Rhetorical Reading and Writing                | 3       | C1W                     | FA/SP/SU         |

**Secondary Education Undergraduate Coursework:** Grades of "B-" or higher required in all courses unless otherwise indicated.

| Requirement   | Course                         | Course Title   | Credits | Pre/Co-Requisites/Notes  | Semester Offered |
|---|--------------------------------|--|---------|--|------------------|
| <input type="checkbox"/> Orientation to the Prof.                     | MSSE 101 <i>or</i><br>CSM 199  | Orientation to the Profession <i>or</i><br>Science Outreach in Schools                             | 1       |  | FA/SP<br>SP      |
| <input type="checkbox"/>  | EDUC 200 <sup>1</sup>          | Foundations of Education in the United States  | 3       | Required for Teacher Education admission; grade of "C" or higher | FA/SP/SU         |
| <input type="checkbox"/>  | MSSE 210                       | Diversity in Middle/Secondary Grades   | 3       | 1,2  | FA/SP            |
| <input type="checkbox"/> General Instructional Methods                | MSSE 370                       | General Instructional Methods for Grades 6-12  | 3       | 1,3  | FA/SP            |
| <input type="checkbox"/> Initial Field Placement                      | MSSE 371 <i>or</i><br>MSSE 430 | Clinical Experience in Adolescent Education <i>or</i><br>Introduction to Mentoring Valley Scholars | 1<br>3  | 1,3  | FA/SP<br>FA      |
| <input type="checkbox"/> Middle School Teaching Methods and Practicum | MSSE 414                       | Natural Sciences Teaching Methods, Grades 6-8  | 3       | 1,3,4; C: MSSE 415   | FA               |
| <input type="checkbox"/>  | MSSE 415                       | Content Area Field Experience in Middle Schools  | 3       | 1,3,4; C: MSSE 414   | FA               |
| <input type="checkbox"/>  | LED 440                        | Disciplinary Literacy in Secondary Educ.   | 3       | 1,3,4  | FA/SP/SU         |

<sup>1</sup> Pre-professional Secondary Education minor declared & approved<sup>2</sup> Application to the Teacher Education Program required<sup>3</sup> Admission to the Teacher Education Program required<sup>4</sup> Completion of MSSE 370**Mandatory Tasks:**

- Be admitted to the Teacher Education Program before you enroll in MSSE 370 and MSSE 371.
- Attend a Student Teaching Information Meeting in the Fall of your senior year and apply to Student Teaching by October 31 of your senior year.
- Apply to The Graduate School no later than November 15 of your senior year for Spring admission or no later than April 1 of your senior year for Summer admission. Earlier is better to have a transcript review prior to your final undergrad semester.
- Attempt your Praxis Subject Assessment no later than March 1 of your senior year and pass it no later than August 15.

**College of Education** Department of Middle, Secondary, and Mathematics EducationMemorial Hall, 395 S. High Street, Room 3200, MSC 6912 Harrisonburg, VA 22807 | (540) 568-6486 | <https://www.jmu.edu/coe/msme/>

*This document is provided as an advising resource only. Official curriculum requirements are listed in the JMU Undergraduate Catalog and the JMU Graduate Catalog. In the case of discrepancies, the University Catalog is the official curriculum students must follow. This document was reviewed by the Middle, Secondary, and Mathematics Education Academic Unit Head on June 1, 2024.*

**Secondary Education Graduate Coursework:** Grades of "B-" or higher required in all courses unless otherwise indicated.

| Requirement              | Course                                     | Course Title   | Credits  | Pre/Co-Requisites/Notes | Semester Offered   |    |
|--------------------------|--|--|--|-------------------------|--------------------|----|
| <input type="checkbox"/> | EDUC 540                                   | Educational Technology   | 3  | 1,2                     | SP/SU              |    |
| <input type="checkbox"/> | EXED 512                                   | Behavior Management in the Classroom   | 3  | 1,2                     | SP/SU              |    |
| <input type="checkbox"/> | MSSE 607                                   | Curriculum Theory in a Diverse Society   | 3  | 1,2                     | FA/SU              |    |
| <input type="checkbox"/> | MSSE 625                                   | Assessment of and for Learning   | 3  | 1,2                     | SP/SU              |    |
| <input type="checkbox"/> | MSSE 620                                   | Differentiation of Instruction and Assessment to Meet the Needs of Adolescent Learners | 3  | 1,2                     | FA/SP              |    |
| <input type="checkbox"/> | High School Teaching Methods and Practicum | MSSE 544   | Natural Sciences Teaching Methods, Grades 9-12                 | 3                       | 2,3; C: MSSE 549   | FA |
| <input type="checkbox"/> |  | MSSE 549   | Field Experience in High School Natural Science, Practicum III | 3                       | 2,3; C: MSSE 544   | FA |
| <input type="checkbox"/> |  | MSSE 630   | Research for Practitioners                                     | 3                       | 2,3                | FA |
| <input type="checkbox"/> |  | MSSE 650   | Internship Seminar   | 3                       | 2,3,4; C: MSSE 675 | SP |
| <input type="checkbox"/> | Student Teaching #1                        | MSSE 675   | Internship in Middle and Secondary Educ.                       | 3                       | 2,3,4; C: MSSE 650 | SP |
| <input type="checkbox"/> | Student Teaching #2                        | MSSE 675   | Internship in Middle and Secondary Educ.                       | 3                       | 2,3,4; C: MSSE 650 | SP |

<sup>1</sup>Conditionally admitted to the graduate program

<sup>2</sup>Admission to the Teacher Education Program required

<sup>3</sup>Unconditionally admitted to the graduate program

<sup>4</sup>Passing score on Praxis Subject Assessment

## B.S. Degree Requirements (6 credits)

For guidance on courses to satisfy your degree requirements: [https://www.jmu.edu/registrar/ba\\_and\\_bs\\_degree\\_courses.shtml](https://www.jmu.edu/registrar/ba_and_bs_degree_courses.shtml).

| Requirement              | Course                 | Course Title | Credits              | Pre/Co-Requisites/Notes | Semester Offered  |          |
|--------------------------|------------------------|--------------|----------------------|-------------------------|---|----------|
| <input type="checkbox"/> | Scientific Literacy    | CHEM 132     | General Chemistry II | 3                       | P: "C-" or higher in CHEM 131 and CHEM 131L or CHEM 135L, C: CHEM 132L or CHEM 136L | FA/SP    |
| <input type="checkbox"/> | Quantitative Reasoning |              |                      |                         | Second cognate math course  | FA/SP/SU |

## Chemistry Content Knowledge Licensure Requirements...

...as they fit with the JMU General Chemistry – BS major, General Concentration.

| Requirement              | Course                 | Course Title           | Credits  | Pre/Co-Requisites/Notes | Semester Offered   |                |
|--------------------------|------------------------|------------------------|--|-------------------------|--|----------------|
| <b>Chemistry Core</b>    |                        |                        |  |                         |  |                |
| <input type="checkbox"/> | VDOE: chemistry skills | CHEM 131               | General Chemistry I (C3PP)   | 3                       | C: CHEM 131L or CHEM 135L                                | FA/SP/SU       |
| <input type="checkbox"/> | VDOE: chemistry skills | CHEM 131L or CHEM 135L | General Chemistry Laboratory (C3L) or Special General Chemistry Laboratory I (C3L) | 1                       | C: CHEM 131  | FA/SP/SU       |
| <input type="checkbox"/> | VDOE: chemistry skills | CHEM 132               | General Chemistry II   | 3                       | P: "C-" or higher in CHEM 131 and CHEM 131L or CHEM 135L | FA/SP/SU       |
| <input type="checkbox"/> | VDOE: chemistry skills | CHEM 132L or CHEM 136L | General Chemistry Laboratory or Special General Chemistry Laboratory II            | 1<br>2                  | 136L<br>132L/136L C: CHEM 132                            | FA/SP/SU<br>SP |
| <input type="checkbox"/> | VDOE: Organic req.     | CHEM 241               | Organic Chemistry I  | 3                       | P: "C-" or higher in CHEM 132                            | FA             |
| <input type="checkbox"/> |                        | CHEM 242               | Organic Chemistry II   | 3                       | P: "C-" or higher in CHEM 241                            | SP             |
| <input type="checkbox"/> | VDOE: Inorganic req.   | CHEM 270               | Inorganic Chemistry I  | 3                       | P: "C-" or higher in CHEM 132                            | SP             |
| <input type="checkbox"/> |                        | CHEM 287L              | Integrated Inorganic/Organic Laboratory I  | 2                       | P/C: CHEM 241  | FA             |

| Requirement   | Course                 | Course Title   | Credits | Pre/Co-Requisites/Notes   | Semester Offered |
|---|------------------------|--|---------|---|------------------|
| <input type="checkbox"/>  | CHEM 288L              | Integrated Inorganic/Organic Laboratory II                             | 2       | P: "C-" or higher in CHEM 241, CHEM 270, CHEM 287L<br>C: CHEM 270 | SP               |
| <input type="checkbox"/> VDOE: Physical Chemistry                         | CHEM 331               | Physical Chemistry I   | 3       | P: CHEM 132, MATH 236, PHYS 240                                   | SP               |
| <input type="checkbox"/> VDOE: Analytical Chem.                           | CHEM 351               | Analytical Chemistry   | 4       | P: CHEM 132   | FA               |
| <input type="checkbox"/> VDOE: Biochemistry                               | BIO/CHEM 361           | Biochemistry   | 3       | P: "C-" or higher in CHEM 241 and permission of instructor        | FA/SP            |
| <input type="checkbox"/>  | CHEM 481               | Literature and Seminar I   | 1       | P: CHEM 242 or CHEM 288L  | FA               |
| <input type="checkbox"/>  | CHEM 482               | Literature and Seminar II  | 1       | P: CHEM 481   | SP               |
| <b>General Chemistry Concentration Requirements</b>                       |                        |  |         |   |                  |
| <input type="checkbox"/>  | CHEM 336L              | Applied Physical Chemistry Laboratory                                  | 2       | P/C: CHEM 331   | SP               |
| <input type="checkbox"/> General Chemistry                                | CHEM 352               | Instrumental Analysis  | 3       | P: CHEM 351, MATH 235   | SP               |
| <input type="checkbox"/>  | CHEM 352L              | Instrumental Analysis Laboratory                                       | 2       | C: CHEM 352   | SP               |
| <input type="checkbox"/> CHEM: Elective                                   | CHEM/GEOL 355          | Geochemistry of Natural Waters   | 3       | P: CHEM 131 & CHEM 132 or equivalent                              | FA               |
| <b>Cognate Courses</b>  |                        |  |         |   |                  |
| <input type="checkbox"/> VDOE: Calculus                                   | MATH 231 & MATH 232 or | Calculus with Functions I (C3QR) <i>and</i> Calculus with Functions II | 3       | P: ALEKS  | FA/SP/SU         |
|   | MATH 235               | Calculus I (C3QR)  | 3       |   |                  |
|   | MATH 235               | Calculus I (C3QR)  | 4       |   |                  |
| <input type="checkbox"/>  | MATH 236               | Calculus II  | 4       | P: "C-" or higher in MATH 232 or MATH 235                         | FA/SP/SU         |
| <input type="checkbox"/>  | PHYS 240               | University Physics I (C3PP)  | 3       | C: MATH 232 or MATH 235   | FA/SP            |
| <input type="checkbox"/>  | PHYS 240L              | University Physics Laboratory I (C3L)                                  | 1       | P/C: PHYS 240   | FA               |
| <input type="checkbox"/> CHEM/VDOE: Physics requirement                   | PHYS 250               | University Physics II  | 3       | P: "C-" or higher in PHYS 240<br>C: MATH 236                      | FA/SP            |
| <input type="checkbox"/>  | PHYS 250L              | University Physics Laboratory II                                       | 1       | P: PHYS 240, PHYS 240L, PHYS 250<br>C: PHYS 250                   | FA/SP            |
| <b>Required for Chemistry Endorsement but not part of Chemistry Major</b> |                        |  |         |   |                  |
| <input type="checkbox"/> VDOE: Safety Req.                                | CHEM 325               | Chemical Hazards and Laboratory Safety                                 | 1       |   | FA odd years     |
| <input type="checkbox"/> VDOE: Biology requirement                        | BIO 140                | Foundations of Biology I (C3NS)  | 3       | C: BIO 140L   | FA/SP            |
|   | BIO 140L               | Foundations of Biology I Laboratory (C3L)                              | 1       | C: BIO 140  | FA/SP            |

**The MSME Department recommends students meet with their Chemistry major advisor each semester to review program sequencing and determine possible substitute courses to meet program and license requirements.**

## General Education Requirements

Be sure to follow the General Education course suggestions listed below for maximum overlap of the General Education Program with your Pre-Professional Secondary Education minor and Chemistry major.

| Requirement                             | Course                               | Course Title                            | Credits   | Pre/Co-Requisites/Notes                               | Semester Offered                              |
|---|--------------------------------------|---|---|---|---|
| <b>MADISON FOUNDATIONS</b>              |                                      |   |   |   |   |
| <input type="checkbox"/>                | Critical Thinking (C1CT)             |   | 3   | Choose any option from the General Education Planner. | FA/SP/SU                                      |
| <input type="checkbox"/>                | Human Communication (C1HC)           |   | 3   |   |   |
| <input type="checkbox"/>                | Writing (C1W)                        | WRTC 103 Rhetorical Reading and Writing | 3   |   | Must earn a C or higher.                      |
| <b>ARTS AND HUMANITIES</b>              |                                      |   |   |   |   |
| <input type="checkbox"/>                | Human Questions and Contexts (C2HQC) |   | 3   | Choose any option from the General Education Planner. | FA/SP/SU                                      |
| <input type="checkbox"/>                | Visual and Performing Arts (C2VPA)   |   | 3   |   |   |
| <input type="checkbox"/>                | Literature (C2L)                     |   | 3   |   |   |
| <b>THE NATURAL WORLD</b>                |                                      |   |   |   |   |
| <input type="checkbox"/>                | Quantitative Reasoning (C3QR)        | MATH 231 <u>or</u><br>MATH 235          | Calculus with Functions I <u>or</u><br>Calculus I | 3<br>4  | 231 P: MATH 155, 156 or ALEKS<br>235 P: ALEKS |
| <input type="checkbox"/>                | Physical Principles (C3PP)           | CHEM 131                                | General Chemistry I                               | 3   | C: CHEM 131L or CHEM 135L                     |
| <input type="checkbox"/>                | Natural Systems (C3NS)               |   |   | 3   | Recommend BIO 140 or a GEOL course            |
| <input type="checkbox"/>                | Lab Experience (C3L)                 | CHEM 135L                               | Special General Chemistry Laboratory I            | 1   | C: CHEM 131                                   |
| <b>AMERICAN AND GLOBAL PERSPECTIVES</b> |                                      |   |   |   |   |
| <input type="checkbox"/>                | The American Experience (C4AE)       |   | 4   | Choose any option from the General Education Planner. | FA/SP/SU                                      |
| <input type="checkbox"/>                | The Global Experience (C4GE)         |   | 3   |   |   |
| <b>SOCIOCULTURAL AND WELLNESS AREA</b>  |                                      |   |   |   |   |
| <input type="checkbox"/>                | Wellness Domain (C5WD)               |   | 3   | Choose any option from the General Education Planner. | FA/SP/SU                                      |
| <input type="checkbox"/>                | Sociocultural Domain (C5SD)          | PSYC 160                                | Life Span Human Development                       | 3   | Must earn a C or higher.                      |