Comprehensive Science Education

Department Information

- **Department Location:**
  Katherine Kilbourne Burgum Family Life, 4-H Center
- **Department Phone:**
  701-231-7921
- **Department Web Site:**
  www.ndsu.edu/education/
- **Credential Offered:**
  B.S.; B.A.
- **Plan Of Study Sample:**
  bulletin.ndsu.edu/programs-study/undergraduate/comprehensive-science-education/#planofstudytext

**Major Requirements**

**Major: Comprehensive Science Education**

**Degree Type:** B.A. or B.S.

**Minimum Degree Credits to Graduate:** 120

**University Degree Requirements**

1. Satisfactory completion of all requirements of the curriculum in which one is enrolled.
2. Earn a minimum total of 120 credits in approved coursework. Some academic programs exceed this minimum.
3. Satisfactory completion of the general education requirements as specified by the university.
4. A minimum institutional GPA of 2.00 based on work taken at NDSU.
5. At least 36 credits presented for graduation must be in courses numbered 300 or higher.
6. Transfer Students: Must earn a minimum of 60 credits from a baccalaureate-degree granting or professional institution.
   a. Of these 60, at least 36 must be NDSU resident credits as defined in #7.
   b. Within the 36 resident credits, a minimum of 15 must be in courses numbered 300 or higher and 15 credits in the major field of study.
7. At least 36 credits must be NDSU resident credits. Resident credits include credits registered and paid for at NDSU.

For complete information, please refer to the Degree and Graduation Requirements (http://bulletin.ndsu.edu/academic-policies/undergraduate-policies/degree-and-graduation) section of this Bulletin.

**University General Education Requirements**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication (C)</td>
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<td>12</td>
</tr>
<tr>
<td>ENGL 110</td>
<td>College Composition I</td>
<td></td>
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<tr>
<td>ENGL 120</td>
<td>College Composition II</td>
<td></td>
</tr>
<tr>
<td>COMM 110</td>
<td>Fundamentals of Public Speaking</td>
<td></td>
</tr>
<tr>
<td>Upper Division Writing †</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quantitative Reasoning (R) †</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Science and Technology (S) †</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>Humanities and Fine Arts (A) †</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Social and Behavioral Sciences (B) †</td>
<td></td>
<td>6</td>
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<tr>
<td>Wellness (W) †</td>
<td></td>
<td>2</td>
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<tr>
<td>Cultural Diversity (D) ††</td>
<td></td>
<td></td>
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<tr>
<td>Global Perspectives (G) ††</td>
<td></td>
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</tr>
<tr>
<td>Total Credits</td>
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<td>39</td>
</tr>
</tbody>
</table>

* May be satisfied by completing courses in another General Education category.
† General education courses may be used to satisfy requirements for both general education and the major, minor, and program emphases, where applicable. Students should carefully review major requirements to determine if specific courses can also satisfy these general education categories.
A list of university approved general education courses and administrative policies are available here (http://bulletin.ndsu.edu/academic-policies/undergraduate-policies/general-education/#genedcoursestext).

### Major Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Comprehensive Science Education Requirements</strong></td>
<td><strong>Environmental Science and Environmental Science Laboratory (May satisfy general education category S and G)</strong></td>
<td>4</td>
</tr>
<tr>
<td>ENGL 324</td>
<td>Writing in the Sciences (May satisfy general education category C)</td>
<td>3</td>
</tr>
<tr>
<td>STAT 330</td>
<td>Introductory Statistics (May satisfy general education category R)</td>
<td>3</td>
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</table>

### Teaching Specialty Requirements

**Primary Concentration** - Select one primary concentration from biology, chemistry, earth science, physics. Concentrations listed below.

**Secondary Concentration** - Two secondary concentrations from the science area not selected for the primary concentration.

**Tertiary Concentration** - One tertiary concentration from the science area not selected for the primary or secondary areas.

### Math Requirements

Select the math requirement based on choice of primary concentration. See math requirement section below.

### Professional Education Requirements

<table>
<thead>
<tr>
<th>Code</th>
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<th>Credits</th>
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<tbody>
<tr>
<td>EDUC 321</td>
<td>Introduction to Teaching</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 322</td>
<td>Educational Psychology</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 451</td>
<td>Instructional Planning, Methods and Assessment</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 481</td>
<td>Classroom Practice Methods of Teaching I:</td>
<td>2-3</td>
</tr>
<tr>
<td>EDUC 482</td>
<td>Classroom Practice/Methods of Teaching II:</td>
<td>2-3</td>
</tr>
<tr>
<td>EDUC 485</td>
<td>Student Teaching Seminar</td>
<td>1</td>
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<tr>
<td>EDUC 486</td>
<td>Classroom Management for Diverse Learners</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 487</td>
<td>Student Teaching</td>
<td>9</td>
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<tr>
<td>EDUC 488</td>
<td>Applied Student Teaching</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 489</td>
<td>Teaching Students of Diverse Backgrounds</td>
<td>3</td>
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</table>

**Total Credits**

101-123

### Code

<table>
<thead>
<tr>
<th>Title</th>
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<tbody>
<tr>
<td><strong>Primary Concentration</strong></td>
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</table>

Select one primary concentration from biology, chemistry, earth science, or physics.

### Biology (24 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>BIOL 150</td>
<td>General Biology I and General Biology I Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>&amp; 150L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIOL 151</td>
<td>General Biology II and General Biology II Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>&amp; 151L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIOL 252</td>
<td>Plant and Animal Diversity</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 315</td>
<td>Genetics and Genetics Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>&amp; 315L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIOL 359</td>
<td>Evolution</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 364</td>
<td>General Ecology</td>
<td>3</td>
</tr>
<tr>
<td>MICR 202</td>
<td>Introductory Microbiology and Introductory Microbiology Lab</td>
<td>3</td>
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<tr>
<td>&amp; 202L</td>
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</table>

### Chemistry (24 credits)

Select one introductory chemistry sequence (A or B)

**Sequence A:**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CHEM 121</td>
<td>General Chemistry I and General Chemistry I Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>&amp; 121L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHEM 122</td>
<td>General Chemistry II and General Chemistry II Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>&amp; 122L</td>
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**Sequence B:**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>CHEM 150</td>
<td>Principles of Chemistry I and Principles of Chemistry Laboratory I</td>
<td>8</td>
</tr>
<tr>
<td>&amp; CHEM 160</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Code</td>
<td>Title</td>
<td>Credits</td>
</tr>
<tr>
<td>----------</td>
<td>--------------------------------------------------------------</td>
<td>---------</td>
</tr>
<tr>
<td>CHEM 151 &amp; CHEM 161</td>
<td>Principles of Chemistry II and Principles of Chemistry Laboratory II</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 341 &amp; 341L</td>
<td>Organic Chemistry I and Organic Chemistry I Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 342 &amp; 342L</td>
<td>Organic Chemistry II and Organic Chemistry II Laboratory</td>
<td>4</td>
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<tr>
<td>CHEM 425</td>
<td>Inorganic Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 431 &amp; 431L</td>
<td>Analytical Chemistry I and Analytical Chemistry I Laboratory</td>
<td>5</td>
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<tr>
<td>Earth Science (25 credits)</td>
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<tr>
<td>GEOL 105 &amp; 105L</td>
<td>Physical Geology and Physical Geology Lab</td>
<td>4</td>
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<tr>
<td>GEOL 106 &amp; 106L</td>
<td>The Earth Through Time and The Earth Through Time Lab</td>
<td>4</td>
</tr>
<tr>
<td>GEOL 350 &amp; 350L</td>
<td>Invertebrate Paleontology</td>
<td>3</td>
</tr>
<tr>
<td>GEOL 303</td>
<td>Paleontology Field Course</td>
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<tr>
<td>GEOL 412</td>
<td>Geomorphology</td>
<td>3</td>
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<tr>
<td>GEOL 420</td>
<td>Mineralogy</td>
<td>4</td>
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<tr>
<td>&amp; GEOL 421 &amp; 421L</td>
<td>and Mineralogy Laboratory</td>
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</tr>
<tr>
<td>PHYS 110</td>
<td>Introductory Astronomy</td>
<td>3</td>
</tr>
<tr>
<td>SOIL 217</td>
<td>Introduction to Meteorology &amp; Climatology</td>
<td>3</td>
</tr>
<tr>
<td>Physics (24 credits)</td>
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<tr>
<td>PHYS 171</td>
<td>Introductory Projects in Physics</td>
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<tr>
<td>PHYS 215</td>
<td>Research For Undergraduates</td>
<td>1-3</td>
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<tr>
<td>PHYS 251 &amp; 251L &amp; 251R</td>
<td>University Physics I and University Physics I Laboratory and University Physics I Recitation</td>
<td>6</td>
</tr>
<tr>
<td>PHYS 252 &amp; 252L &amp; 252R</td>
<td>University Physics II and University Physics II Laboratory and University Physics II Recitation</td>
<td>6</td>
</tr>
<tr>
<td>PHYS 350</td>
<td>Modern Physics</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 355</td>
<td>Classical Mechanics</td>
<td>3</td>
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<tr>
<td>PHYS 361</td>
<td>Electromagnetic Theory</td>
<td>3</td>
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<td>Code</td>
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<tr>
<td>Secondary Concentration</td>
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<td>Select two secondary concentrations not selected as the primary.</td>
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<tr>
<td>Biology (14 credits)</td>
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<tr>
<td>BIOL 150</td>
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<tr>
<td>&amp; 150L</td>
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<tr>
<td>BIOL 151</td>
<td>General Biology II and General Biology II Laboratory</td>
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</tr>
<tr>
<td>&amp; 151L</td>
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<td></td>
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<tr>
<td>BIOL 252</td>
<td>Plant and Animal Diversity</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 359</td>
<td>Evolution</td>
<td>3</td>
</tr>
<tr>
<td>Chemistry (12 credits)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select one introductory chemistry sequence (A or B)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sequence A:</td>
<td></td>
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</tr>
<tr>
<td>CHEM 121 &amp; 121L</td>
<td>General Chemistry I and General Chemistry I Laboratory</td>
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<tr>
<td>Sequence B:</td>
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<td></td>
</tr>
<tr>
<td>CHEM 150 &amp; CHEM 160</td>
<td>Principles of Chemistry I and Principles of Chemistry Laboratory I</td>
<td></td>
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</tbody>
</table>
### Comprehensive Science Education

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CHEM 151 &amp; CHEM 161</td>
<td>Principles of Chemistry II and Principles of Chemistry Laboratory II</td>
<td></td>
</tr>
<tr>
<td>CHEM 341 &amp; 341L</td>
<td>Organic Chemistry I and Organic Chemistry I Laboratory</td>
<td>4</td>
</tr>
<tr>
<td><strong>Earth Science (14 credits)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GEOL 105 &amp; 105L</td>
<td>Physical Geology and Physical Geology Lab</td>
<td>4</td>
</tr>
<tr>
<td>GEOL 106 &amp; 106L</td>
<td>The Earth Through Time and The Earth Through Time Lab</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 110</td>
<td>Introductory Astronomy</td>
<td>3</td>
</tr>
<tr>
<td>SOIL 217</td>
<td>Introduction to Meteorology &amp; Climatology</td>
<td>3</td>
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<tr>
<td><strong>Physics (12 credits)</strong></td>
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<tr>
<td>PHYS 110 &amp; 110L</td>
<td>Introductory Astronomy and Introductory Astronomy Lab</td>
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<tr>
<td>PHYS 211 &amp; 211L</td>
<td>College Physics I and College Physics I Laboratory</td>
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<tr>
<td>PHYS 212 &amp; 212L</td>
<td>College Physics II and College Physics II Laboratory</td>
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#### Tertiary Concentration

Select one tertiary concentration not selected as the primary or secondary concentrations.

<table>
<thead>
<tr>
<th>Code</th>
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</thead>
<tbody>
<tr>
<td><strong>Biology (8 credits)</strong></td>
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<tr>
<td>BIOL 150 &amp; 150L</td>
<td>General Biology I and General Biology I Laboratory</td>
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</tr>
<tr>
<td>BIOL 151 &amp; 151L</td>
<td>General Biology II and General Biology II Laboratory</td>
<td>4</td>
</tr>
<tr>
<td><strong>Chemistry (8 credits)</strong></td>
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</tr>
<tr>
<td>Select one introductory chemistry sequence (A or B)</td>
<td></td>
<td>8</td>
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<tr>
<td>Sequence A:</td>
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<tr>
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<tr>
<td>CHEM 122 &amp; 122L</td>
<td>General Chemistry II and General Chemistry II Laboratory</td>
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<tr>
<td>Sequence B:</td>
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<tr>
<td>CHEM 150 &amp; CHEM 160</td>
<td>Principles of Chemistry I and Principles of Chemistry Laboratory I</td>
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<tr>
<td>CHEM 151 &amp; CHEM 161</td>
<td>Principles of Chemistry II and Principles of Chemistry Laboratory II</td>
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<tr>
<td><strong>Earth Science (8 credits)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GEOL 105 &amp; 105L</td>
<td>Physical Geology and Physical Geology Lab</td>
<td>4</td>
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<tr>
<td>GEOL 106 &amp; 106L</td>
<td>The Earth Through Time and The Earth Through Time Lab</td>
<td>4</td>
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<tr>
<td><strong>Physics (8 credits)</strong></td>
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<td></td>
</tr>
<tr>
<td>PHYS 211 &amp; 211L</td>
<td>College Physics I and College Physics I Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 212 &amp; 212L</td>
<td>College Physics II and College Physics II Laboratory</td>
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#### Math Requirements

Select the math requirement based on the choice of primary concentration.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>MATH 105</td>
<td>Trigonometry</td>
<td>3 or 4</td>
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<tr>
<td>or MATH 146</td>
<td>Applied Calculus I</td>
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</table>
**Chemistry (8 credits)**

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>MATH 165</td>
<td>Calculus I</td>
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</tr>
<tr>
<td>MATH 166</td>
<td>Calculus II</td>
<td>4</td>
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</table>

**Physics (18 credits)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>MATH 165</td>
<td>Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 166</td>
<td>Calculus II</td>
<td>4</td>
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<tr>
<td>MATH 265</td>
<td>Calculus III</td>
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<tr>
<td>MATH 266</td>
<td>Introduction to Differential Equations</td>
<td>3</td>
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<tr>
<td>MATH 129</td>
<td>Basic Linear Algebra</td>
<td>3</td>
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<tr>
<td>or MATH 329</td>
<td>Intermediate Linear Algebra</td>
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</table>

**Degree Requirements and Notes**

- See School of Education (https://www.ndsu.edu/education) for admission requirements.
- Courses taken P/F may not be used to satisfy any requirements.
- A grade of ‘C’ or better is required in all professional education courses.
- To be placed in student teaching, a 2.75 cumulative GPA and a 2.75 GPA in professional education coursework is required.
- To exit the program, a 2.75 cumulative GPA and a 2.75 GPA in professional education coursework is required as well as completing the Praxis Subject test and the Principles of Learning and Teaching test.