SCIENCE TEACHING

Science Teaching

Websites:  cset.mnsu.edu/biology/
cset.mnsu.edu/chemgeol/
cset.mnsu.edu/pa/
cset.mnsu.edu/geography/

Coordinators:
Thomas Brown, Ph.D., Physics
Phillip Larson, Ph.D., Geography
Bryce Hoppie, Ph.D., Geology
Beth Lavoie, Ph.D., Biological Sciences
Jeffrey R. Pribyl, Ph.D., Chemistry

The State of Minnesota grants science teacher licensure for grades 5-8 general science, 9-12 Chemistry, 9-12 Earth Science, 9-12 Life Science, and 9-12 Physics. Students earning a degree from Minnesota State Mankato will qualify for two licenses (1) 5-8 general science and (2) 9-12 specialty.

POLICIES/INFORMATION

Each major requires the 31 credit general core and a science emphasis that ranges from 27-35 credits of science and science teaching methods courses. In addition, the student must complete a 30 credit professional education component and the 3 credit Drug Education course.

The University Science Teaching Program must meet specific competencies to meet professional accreditation and licensure requirements. To stay within the required degree limits of 120 credit hours, students are strongly advised to select courses within the 44 credit general education program that meet both teaching program and general education needs. It is important for the student to meet with their advisor to assist with program planning.

A minor is not required for any of the science teaching programs; however, to broaden one’s teaching opportunities, double majors are encouraged. For further details, the student should check with one of the science teaching advisors for an overview of available opportunities.

GPA Policy. Students obtaining a degree in science teaching must maintain a minimum cumulative GPA of 2.50 in the sciences. Students who are not science teaching majors should consult an advisor concerning possible additional course requirements.

P/N Grading Policy. Courses leading to a degree in science teaching may not be taken on a P/N basis except where P/N grading is mandatory.

SCIENCE TEACHING PROGRAMS

Required for all Science Teaching Programs unless otherwise noted.

Required General Education

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>HLTH 240</td>
<td>Drug Education (3)</td>
</tr>
</tbody>
</table>

Required General Science Core (31 credits)

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>AST 101</td>
<td>Introduction to Astronomy (3)</td>
</tr>
<tr>
<td>BIOL 105</td>
<td>General Biology I (4)</td>
</tr>
<tr>
<td>BIOL 106</td>
<td>General Biology II (4)</td>
</tr>
<tr>
<td>CHEM 201</td>
<td>General Chemistry I (5)</td>
</tr>
<tr>
<td>GEOL 121</td>
<td>Physical Geology (4)</td>
</tr>
<tr>
<td>GEOL 310</td>
<td>Earth and Space Systems (3)</td>
</tr>
<tr>
<td>PHYS 211</td>
<td>Principles of Physics I (4)*</td>
</tr>
<tr>
<td>PHYS 212</td>
<td>Principles of Physics II (4)*</td>
</tr>
<tr>
<td>PHYS 221, PHYS 222, PHYS 223, PHYS 232 and PHYS 233</td>
<td>may substitute. The additional credit hours will reduce the number of credits in the advanced physics courses.</td>
</tr>
</tbody>
</table>

Required for All Majors. (Professional Education, 30 credits)
See the SECONDARY EDUCATION section for additional information about admissions to Professional Education, and course requirements.

Required Minor: None.

CHEMISTRY 9-12 BS TEACHING

Degree completion = 120 credits

Required General Education

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 105</td>
<td>General Biology I (4)</td>
</tr>
<tr>
<td>CHEM 201</td>
<td>General Chemistry I (5)</td>
</tr>
<tr>
<td>HLTH 240</td>
<td>Drug Education (3)</td>
</tr>
<tr>
<td>MATH 121</td>
<td>Calculus I (4)</td>
</tr>
</tbody>
</table>

Major Common Core

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 202</td>
<td>General Chemistry II (5)</td>
</tr>
<tr>
<td>CHEM 305</td>
<td>Analytical Chemistry (4)</td>
</tr>
<tr>
<td>CHEM 316</td>
<td>Descriptive Main Group Chemistry (3)</td>
</tr>
<tr>
<td>CHEM 322</td>
<td>Organic Chemistry I (4)</td>
</tr>
<tr>
<td>CHEM 324</td>
<td>Organic Chemistry II (3)</td>
</tr>
<tr>
<td>CHEM 325</td>
<td>Organic Chemistry II Lab (1)</td>
</tr>
<tr>
<td>CHEM 340</td>
<td>Quant for Chem and Biochem I (1)</td>
</tr>
<tr>
<td>CHEM 341</td>
<td>Quant for Chem and Biochem II (1)</td>
</tr>
<tr>
<td>CHEM 360</td>
<td>Principles of Biochemistry (4)</td>
</tr>
<tr>
<td>CHEM 381W</td>
<td>Introduction to Research (2)</td>
</tr>
<tr>
<td>CHEM 440</td>
<td>Physical Chemistry I (3)</td>
</tr>
<tr>
<td>CHEM 450</td>
<td>Physical Chemistry Laboratory I (1)</td>
</tr>
<tr>
<td>CHEM 479</td>
<td>Teaching Physical Science (4)</td>
</tr>
<tr>
<td>CHEM 495</td>
<td>Senior Seminar (1)</td>
</tr>
<tr>
<td>PHYS 211</td>
<td>Principles of Physics I (4)</td>
</tr>
<tr>
<td>PHYS 212</td>
<td>Principles of Physics II (4)</td>
</tr>
</tbody>
</table>

Other Graduation Requirements

Professional Education

LEVEL 1
KSP 202 may be taken in either LEVEL 1 or LEVEL 2. KSP 464 must be taken in all levels but credit will be awarded in LEVEL 4 only.
KSP 202 Technology Integration in the Classroom (2)
KSP 220W Human Relations in a Multicultural Society (3)
KSP 222 Introduction to the Learner and Learning (2)
KSP 464 Professional Seminar (1)

LEVEL 2
KSP 202 may be taken in either LEVEL 1 or LEVEL 2. KSP 464 must be taken in all levels but credit will be awarded in LEVEL 4 only.
KSP 330 Planning, Instruction, and Evaluation in the Classroom (5)
KSP 464 Professional Seminar (1)

LEVEL 3
KSP 464 must be taken in all levels but credit will be awarded in LEVEL 4 only.
KSP 440 Creating Learning Environments to Engage Children, Families, and Community (3)
KSP 442 Reading, Literacy, and Differentiated Instruction in Inclusive Classrooms (3)
KSP 464 Professional Seminar (1)

LEVEL 4
Course credit for KSP 464 is awarded in LEVEL 4, but must be taken in all levels.
KSP 464 Professional Seminar (1)
KSP 477 5-12 Student Teaching (11)

Required Minor: None.

EARTH SCIENCE 5-12 BS TEACHING

Degree completion = 120 credits

Required General Education (3 credits)
Required General Science Core (31 credits)
Required Professional Education (30 credits)

Required for Major

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>AST 125</td>
<td>Observational Astronomy (3)</td>
</tr>
<tr>
<td>GEOG 217</td>
<td>Weather (4)</td>
</tr>
<tr>
<td>GEOG 315</td>
<td>Geomorphology (3)</td>
</tr>
<tr>
<td>GEOG 410</td>
<td>Climatic Environments (3)</td>
</tr>
<tr>
<td>GEOL 122</td>
<td>Earth History (4)</td>
</tr>
</tbody>
</table>
GEOL 201  Elements of Mineralogy (4)
GEOG 464  Teaching Earth Science (4)  OR
GEOL 479  Teaching Earth Sciences (4)

Required for Major  (Research, 1-3 credits)
GEOG 440  Field Studies: Colorado (3)
GEOG 440  Field Studies: Field Methods (3)
GEOG 480  Seminar (1-4)
GEOG 499  Individual Study (1-3)
GEOL 499  Individual Study (1-5)

Required for Major  (Electives, 9 credits)
(Must choose from at least two departments)
AST 102  Introduction to the Planets (3)
AST 104  Introduction to Experimental Astronomy (2)
GEOG 373  Introduction to Geographic Information Systems (4)
GEOG 420  Conservation of Natural Resources (3)
GEOL 330  Structural Geology (4)
GEOL 350  Environmental Geology (4)
GEOL 450  Hydrogeology (3)

Required Minor: None.

LIFE SCIENCE 5-12 BS TEACHING
Degree completion = 120 credits

Required General Education
AST 101  Introduction to Astronomy (3)
BIOL 105  General Biology I (4)
CHEM 201  General Chemistry I (5)
GEOL 121  Physical Geology (4)
HLTH 240  Drug Education (3)
KSP 220W  Human Relations in a Multicultural Society (3)
PHYS 211  Principles of Physics I (4)

Math Requirement (choose 3-4 credits)
MATH 113  Trigonometry (3)
MATH 115  Precalculus Mathematics (4)

Major Common Core
BIOL 106  General Biology II (4)
BIOL 211  Genetics (4)
BIOL 215  General Ecology (4)
BIOL 220  Human Anatomy (4)
BIOL 270  Microbiology (4)
BIOL 301  Evolution (2)
BIOL 485  Biology Teaching Methods and Materials (4)
GEOL 310  Earth and Space Systems (3)
PHYS 212  Principles of Physics II (4)

Independent Study (choose 1 credits)
At least one credit is required. Additional credits will be counted as electives.
BIOL 499  Individual Study (1-4)

Major Restricted Electives (choose 4 credits)
BIOL 408  Vertebrate Ecology (4)
BIOL 409  Advanced Field Ecology (4)

Major Unrestricted Electives
Choose at least 9 additional credits of 300-400 level Biology courses.

Other Graduation Requirements
Professional Education

LEVEL 1
KSP 202 may be taken in LEVEL 1 or LEVEL 2. KSP 464 must be taken in all levels, but credit will be awarded in LEVEL 4 only.
KSP  202  Technology Integration in the Classroom (2)
KSP  220W  Human Relations in a Multicultural Society (3)
KSP  222  Introduction to the Learner and Learning (2)
KSP  464  Professional Seminar (1)