M.S. in Science Education

The MSSE degree program of study may begin with online courses in any semester, or summer field/lab courses based from the MSU-Bozeman campus. Study continues with online courses taken asynchronously, and ends with a campus visit for presentation of the results of a personalized science education capstone project. Thirty (30) semester credits are required for the degree. Students typically will complete the degree in two or three years.

All students seeking the MSSE degree complete core courses (14 credits) in education. For the remaining credits, students complete sixteen (16) credits of elective courses, including at least two credits from a campus-based summer field or lab course. No more than four (4) elective credits may come from education elective courses.

Interdisciplinary efforts and incorporation of both science content and pedagogy have been encouraged during the development of courses. Each student seeking the degree is advised by a three-person faculty committee, and programs are designed taking into account the student's background, interests, and career goals.

In addition to the MSSE degree, twelve (12) credit graduate certificates in science education are available in chemistry, climate, earth science, elementary school science, life science, physics, and STEM. Credits earned toward the graduate certificates can be applied toward a Master of Science in Science Education (MSSE) degree.

For a full list of courses offered visit the MSSE Course Catalog (https://www.montana.edu/msse/course-catalog/#PHSX497).

Program Learning Outcomes

- Conduct research and/or scholarship that explores a relevant topic in science education
- Demonstrate effective communication of science/science education content using multiple modes
- Demonstrate instructional use of inquiry strategies embedded in the Next Generation Science Standards
- Demonstrate mastery of content from at least two science disciplines

MSSE Program Courses

Complete these 14 credits of MSSE core education courses:

MSSE 501	Inquiry Sci Eng Prac	2
MSSE 504	Formative Assess in Sci Ed	3
MSSE 505	Foundations of AR in Sci Ed	3
MSSE 509	Implementing Action Research in Science Education	3
MSSE 575	Capstone Paper and Symposium in Science Education	1-3

Take a total of 16 credits from elective courses (at least 2 credits must come from campus-based field or lab courses. No more than 4 credits can be from education elective courses):

BIOE 513	Terrestrial Ecology of Plains and Prairies (1 cr)
BIOE 519	Riparian Zones/Wetlands (2 cr)
BIOE 520	Animal Biodiversity in GYE for Teachers (2 cr)
BIOE 522	Birds of Prey (2 cr)
BIOE 523	Wildlife Ecology (2 cr)
BIOE 526	Symbiosis for Teachers: Eat, Prey, Love (3 cr)
BIOE 527	Teaching Evolution (3 cr)
BIOE 536	A Study of Local Ecosystems for Teachers (2 cr)
BIOE 585	Exploring Biology for Teachers (3 cr)
BIOE 593	Alpine Ecology for Teachers (2 cr)
BIOE 595	Ecology and Conservation of the World's Marine Ecosystems for Teachers (3 cr)
BIOE 596	Land Use Issues in GYE for Teachers (2 cr)
BIOE 597	Ecology of Trout Steams for Teachers (2 cr)
BIOE 599	Winter Ecology in Yellowstone National Park (2 cr)
BIOH 585	Human Dissection for Teachers (2 cr)
BIOH 586	AP Biology Principles for Teachers (3 cr)
BIOH 595	Anatomy & Physiology for Tchrs (3 cr)
CHMY 587	Exploring Chemistry for Teachers (3 cr)
CHMY 593	Kinetics, Equilibrium & Thermodynamics for Teachers (3 cr)
CHMY 594	Seminar (1 cr)
CHMY 595	Chemistry of the Environment for Teachers (3 cr)
CHMY 596	Exploring Organic Chemistry for Teachers (3 cr)
CHMY 597	Exploring Biochemistry for Teachers (3 cr)
CHMY 598	Exploring Biochemistry: Metabolism for Teachers (3 cr)
CHMY 599	An Atoms-First Primer for AP/IB Chemistry Teachers (3 cr)
CSCI 581	Computational Thinking Tchrs (2 cr)
CSCI 582	Joy Beauty Data for Teachers (2 cr)
CSCI 583	Integrating Computer Science in Science Classrooms (3 cr)
ERTH 516	Geology of the Northern Rocky Mountains (2 cr)
ERTH 519	Watershed Hydrology for Teachers (3 cr)
ERTH 520	Fundamentals of Oceanography for Teachers (3 cr)
ERTH 521	Geology of the Moon for Teachers (3 cr)
ERTH 523	Weather for Elementary and Middle School Teachers (3 cr)
ERTH 524	K-14 Earth System Science (3 cr)
ERTH 525	Landforms for Elementary Teachers (1 cr)
ERTH 527	Weather & Climate for Teachers (3 cr)
ERTH 528	Climate Change for Teachers (3 cr)
ERTH 587	Invertebrate Paleontology for Teachers (3 cr)
ERTH 594	Seminar (1 cr)
ERTH 595	Historical Geology for Teachers (3 cr)
ERTH 596	Geology of Glacier National Park for Teachers (2 cr)
ERTH 597	Vertebrate Paleontology for Teachers (3 cr)
GEO 521	Dinosaur Paleontology I (2 cr)
GEO 522	Dino Paleontology II (2 cr)
GEO 585	Mineralogy for Science Teachers (1 cr)
MSSE 502	Emerging Technology and the Science Classroom (2 cr)
MSSE 503	Integrating Literature into the Biology/Life Science Classroom (3 cr)
MSSE 506	Crime Scene Investigators: Forensic Science for Teachers (2 cr)

MSSE 508	Statistics Bootcamp for MSSE Capstone Projects (1 cr)
MSSE 511	STEM Methods for Teachers (2 cr)
MSSE 518	Master Teaching Strategies for Science Teachers (3 cr)
MSSE 536	Construction Curriculum in Science Education (2 cr)
MSSE 537	The 3 D's of NGSS (2 cr)
EELE 508	Solar Cell Basics for Teachers (2 cr)
EGEN 511	Engineering Methods for Teachers (3 cr)
NUTR 526	Nutrition for Fitness/Performance (3 cr)
LRES 557	Thermal Biology in YNP (2 cr)
LRES 569	Ecol of Invasive Plants in GYE (2 cr)
LRES 582	Streamside Science for Teachers (3 cr)
LRES 584	Principles of Soil Science for Teachers (3 cr)
LRES 585	Water Quality in the Classroom for Teachers (3 cr)
M 517	Advanced Mathematical Modeling for Teaching (3 cr)
M 518	Statistics for Teaching (3 cr)
M 520	Access and Equity in Mathematics Teaching (3 cr)
M 521	Mathematics Learning Theory for Teaching (3 cr)
M 525	Analysis for Teaching (3 cr)
M 534	Research in Mathematics Education (3 cr)
MB 533	Current Topics in Microbiology for Teachers (3 cr)
MB 536	Exploring Microbiology (3 cr)
MB 540	Environmental Microbiology (3 cr)
MB 541	Microbial Genomics (3 cr)
PHSX 511	Astronomy for Teachers (3 cr)
PHSX 512	General Relativity Online for Teachers (3 cr)
PHSX 513	Quantum Mechanics Online (3 cr)
PHSX 514	Comparative Planetology Online (3 cr)
PHSX 571	Electric Circuits and Magnetism for Teachers (3 cr)
PHSX 572	Space Science for Elementary Teachers (1 cr)
PHSX 574	World of Motion & Force for Elem/MS Teachers (2 cr)
PHSX 579	Special Relativity for Teachers (3 cr)
PHSX 580	Conceptual Physics for Teachers (3 cr)
PHSX 582	Astrobiology for Teachers Online (3 cr)
PHSX 584	Physics by Inquiry: Light & Color for Teachers (2 cr)
PHSX 586	Physics by Inquiry: Heat & Temperature for Teachers (2 cr)
PHSX 587	Physics by Inquiry: Geometric Optics for Teachers (2 cr)
PHSX 597	Physics of Sustainable Energy for Teachers (3 cr)
PSPP 521	Plant Science for Teachers: It Grows on You (1 cr)
PSPP 522	Insect-ology for Teachers (3 cr)
PSPP 547	Biomimicry for Teachers (2 cr)
PSPP 548	Flowering Plants of the Northern Rocky Mountains (2 cr)
PSPP 549	Botany of Spices & Medicinal Plants for Teachers (2 cr)