

Master of Science in Science Education

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Home Page: www.montana.edu/msse (<http://www.montana.edu/msse/>)

Program Director

Dr. John Graves

Program Features

- Designed for science educators by experienced science, science education, and mathematics faculty with the collaboration of outstanding classroom teachers
- Online courses offered during the academic year allowing the flexibility to participate when it is most convenient for you
- Summer field and lab courses based out of campus that vary in length from one day to two weeks
- Accredited 30-credit graduate program
- Graduate in 2 to 3 years with up to 6 years to complete all coursework
- Courses are structured to support both formal classroom teachers and informal science educators
- Emphasizes Next Generation Science Standards
- Personalized science education capstone project for each student
- Interdisciplinary program with the opportunity to expand knowledge in all science disciplines
- Affordable online graduate program tuition and fees

Online graduate courses are offered during the fall, spring, and summer sessions. Montana-based field and lab graduate courses are offered during the summer session.

Instructors

The MSSE degree program was developed by Montana State University faculty members who are active in science, science education, and mathematics. The program is a unique, cooperative effort of several colleges and departments. Faculty members of the departments of Biology, Chemistry and Biochemistry, Earth Science, Education, Engineering, Health and Human Development, Land Resources and Environmental Science, Mathematics, Microbiology, Plant Science and Environmental Science, Physics, and other related areas will teach most courses. Faculty members of other departments and units will play a major role in some courses. When appropriate, courses may be taught by faculty members of other institutions.

Admission

Entrance requirements include: A bachelor's degree in science, science education, elementary/middle school/secondary education, or a related area; be a practicing educator with a strong science background; and an undergraduate GPA of 3.0 or higher. (Students with a GPA of less than 3.0 have the opportunity to begin the program as a non-degree student to earn admission.)

Applications are accepted throughout the fall, spring, and summer sessions. Application documents include all official transcripts, three letters of recommendation, an essay, and a resume. For more information about the application process, visit the MSSE website (<https://www.montana.edu/msse/home/>).

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>).

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	Advanced Ecology for Teachers (2 cr)
BIOH 585	Human Dissection for Teachers (2 cr)
BIOH 586	AP Biology for Teachers (3 cr)
BIOH 595	Anatomy & Physiology for T chrs (3 cr)

CHMY 587	Exploring Chemistry for Teachers (3 cr)	LRES 582	Streamside Science for Teachers (3 cr)
CHMY 593	Kinetics, Equilibrium & Thermodynamics for Teachers (3 cr)	LRES 584	Soil Science for Middle and High School Teachers (3 cr)
CHMY 594	Seminar (1 cr)	LRES 585	Water Quality in the Classroom for Teachers (3 cr)
CHMY 595	Chemistry of the Environment for Teachers (3 cr)	M 517	Advanced Mathematical Modeling for Teaching (3 cr)
CHMY 596	Exploring Organic Chemistry for Teachers (3 cr)	M 518	Statistics for Teaching (3 cr)
CHMY 597	Exploring Biochemistry I for Teachers (3 cr)	M 520	Access and Equity in Mathematics Teaching (3 cr)
CHMY 598	Exploring Biochemistry: Metabolism for Teachers (3 cr)	M 521	Mathematics Learning Theory for Teaching (3 cr)
CHMY 599	An Atoms-First Primer for AP/IB Chemistry Teachers (3 cr)	M 525	Analysis for Teaching (3 cr)
CSCI 581	Computational Thinking Tchrs (2 cr)	M 534	Research in Mathematics Education (3 cr)
CSCI 582	Joy Beauty Data for Teachers (2 cr)	MB 533	Current Topics in Microbiology for Teachers (3 cr)
CSCI 583	Integrating Computer Science in Science Classrooms (3 cr)	MB 536	Exploring Microbiology (3 cr)
ERTH 516	North Rocky Mtn Geology (2 cr)	MB 540	Environmental Microbiology (3 cr)
ERTH 519	Watershed Hydrology for Teachers (3 cr)	MB 541	Microbial Genetics (3 cr)
ERTH 520	Fundamentals of Oceanography for Teachers (3 cr)	PHSX 511	Astronomy for Teachers (3 cr)
ERTH 521	Geology of the Moon for Teachers (3 cr)	PHSX 512	General Relativity Online for Teachers (3 cr)
ERTH 523	Weather for Elementary and Middle School Teachers (3 cr)	PHSX 513	Quantum Mechanics Online (3 cr)
ERTH 524	K-14 Earth System Science (3 cr)	PHSX 514	Comparative Planetology Online (3 cr)
ERTH 525	Landforms for Elementary Teachers (1 cr)	PHSX 571	Electric Circuits and Magnetism for Teachers (3 cr)
ERTH 527	Weather & Climate for Teachers (3 cr)	PHSX 572	Space Science for Elementary Teachers (1 cr)
ERTH 528	Climate Change for Teachers (3 cr)	PHSX 573	The Science of Sound for Teachers (2 cr)
ERTH 587	Invertebrate Paleontology for Teachers (3 cr)	PHSX 574	World of Motion & Force for Elem/MS Teachers (2 cr)
ERTH 594	Seminar (1 cr)	PHSX 579	Special Relativity for Teachers (3 cr)
ERTH 595	Historical Geology for Teachers (3 cr)	PHSX 580	Conceptual Physics for Teachers (3 cr)
ERTH 596	Geology of Glacier National Park for Teachers (2 cr)	PHSX 582	Astrobiology for Teachers Online (3 cr)
ERTH 597	Vertebrate Paleontology for Teachers (3 cr)	PHSX 584	Physics by Inquiry: Light & Color for Teachers (2 cr)
GEO 521	Dinosaur Paleontology (2 cr)	PHSX 586	Physics by Inquiry: Heat & Temperature for Teachers (2 cr)
GEO 522	Dino Paleontology II (2 cr)	PHSX 587	Physics by Inquiry: Geometric Optics for Teachers (2 cr)
GEO 585	Mineralogy for Science Teachers (1 cr)	PHSX 597	Physics of Renewable Energy for Teachers (3 cr)
MSSE 502	Emerging Technology and the Science Classroom (2 cr)	PSPP 521	Plant Science for Teachers: It Grows on You (1 cr)
MSSE 503	Integrating Literature into the Biology/Life Science Classroom (3 cr)	PSPP 522	Insect-ology for Teachers (3 cr)
MSSE 506	Crime Scene Investigators: Forensic Science for Teachers (2 cr)	PSPP 547	Biomimicry for Teachers (2 cr)
MSSE 508	Statistics Bootcamp for MSSE Capstone Projects (1 cr)	PSPP 548	Flowering Plants of the Northern Rocky Mountains (2 cr)
MSSE 511	STEM Methods for Teachers (2 cr)	PSPP 549	Botany of Spices & Medicinal Plants 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)		