

# Teaching and Learning, MS

## Learning Outcomes

Students will:

- demonstrate understanding of and ability to analyze theoretical concepts and research in their field of study;
- express ideas effectively in written and spoken communication;
- connect research to practice and practical questions in their professional context;
- effectively apply their knowledge and skills to their professional context; and
- demonstrate curiosity, inquiry, and critical and data-based decision making.

## Science Education

The Master of Science in teaching and learning with a science education subprogram requires a minimum of 38 s.h. of graduate credit. Students must maintain a program grade-point average of at least 3.00.

The program is designed for teachers and supervisors (K-college) and professionals in related fields, such as medical education, college teaching, museum program management, and outreach programs. It is intended to provide experience in understanding teaching and learning and the research processes required to advance the field. Students complete coursework in four areas: science education, education, research, and science. Their individual programs of study are approved by the science education faculty.

The MS in teaching and learning with a science education subprogram requires the following coursework.

## Required Courses

Course #	Title	Hours
All of these:		
EDTL:6757	Learning in the Science Classroom (no substitute for this course)	3
EDTL:6759	Advanced Pedagogy (no substitute for this course)	3
EDTL:7755	Independent Study in Science Education Research (taken two times for 3 s.h. each)	6
Two science content courses chosen in consultation with advisor. Courses numbered 3000 and above in biology (BIOL), chemistry (CHEM), computer science (CS), environmental sciences (ENVS), geography (GEOG), health and human physiology (HHP), and physics and astronomy (PHYS) may count.		6
A minimum of 12 s.h. chosen from these:		
EDTL:6758	Writing in the Science Classroom	3
CSED:7338	Essentials of Qualitative Inquiry	3

PSQF:4143	Introduction to Statistical Methods	3
PSQF:6200	Educational Psychology	3
PSQF:6220	Quantitative Educational Research Methodologies	3
PSQF:6275	Constructivism and Design of Instruction	3
One additional qualitative or quantitative research methods course chosen in consultation with advisor:		
EDTL:6761	STEM Research and Leadership Seminar	3
EDTL:6765	STEM Independent Research	3
EDTL:7040	Advanced Topics in Teaching and Learning	arr.
EDTL:7070	Qualitative Research Methods in Teaching and Learning	3
EDTL:7071	Critical Discourse Analysis in Educational Research	3
EDTL:7072	Advanced Methods of Literacy Research: Qualitative Data Analysis and Reporting	3
EDTL:7093	Research Project	arr.
EDTL:7756	Research Apprenticeship in Science Education	3
EDTL:7953	Seminar: Single Subject Design Research	3
EPLS:7373	Qualitative Research Design and Methods	3
PSQF:4143	Introduction to Statistical Methods (if not used to satisfy the 12 s.h. requirement)	3
PSQF:6243	Intermediate Statistical Methods	3
One of these:		
EDTL:7004	Schooling in the United States	3
EDTL:7033	Seminar on Teacher Education	3

## Thesis

Students must complete a thesis, for which they earn 2-4 s.h. of credit.

Course #	Title	Hours
EDTL:6393	Master's Thesis	2-4

## Final Examination

A final oral examination is administered on campus in which candidates defend their thesis. This examination includes a critical inquiry into the purposes, methods, and results of the thesis research investigation.

The final examination is conducted by a committee of no fewer than three members of the graduate faculty. In some cases, the committee must include a member from outside science education; consult the department.

## Admission

Applicants must meet the admission requirements of the Graduate College. They should hold an undergraduate major in a science area (or combination of science areas), in science education, or in elementary education with a science emphasis. The department recommends that applicants have teaching licensure/certification unless they are preparing for careers in allied health, museums, or community colleges.

### STEM Education

The Master of Science in teaching and learning with a STEM education subprogram requires 36 s.h. of graduate credit. Students must earn a UI cumulative grade-point average (GPA) of at least 2.75.

The program focuses on science, technology, engineering, and mathematics (STEM) education. The program includes coursework that may be used toward the K-12 STEM specialist endorsement. Degree requirements include online coursework to fit the schedule of a practicing teacher. The STEM education subprogram is not a licensure program.

The MS in teaching and learning with a STEM education subprogram requires the following coursework.

## Required Courses

### STEM Pedagogy Courses

Course #	Title	Hours
All of these:		
EDTL:6563	STEM Through Mathematical Modeling	3
EDTL:6761	STEM Research and Leadership Seminar	3
EDTL:6762	STEM Experiential Learning	3
EDTL:6764	STEM Extracurricular Experience and Capstone	6

### College of Education Course

Course #	Title	Hours
This course:		
EDTL:5095	Issues in U.S. Schools	3

### Science/Mathematics Courses

Course #	Title	Hours
Two of these:		
EDTL:4565	Mathematics in Management and Social Sciences	3
EDTL:6766	Physical Science Topics in STEM Education	3
EDTL:6767	Systems Thinking in Biology and Integrated STEM Education	3
This course:		
EDTL:6765	STEM Independent Research (taken two times for 3 s.h. each)	6

## Electives

Course #	Title	Hours
Additional approved elective coursework may need to be taken to complete the 36 s.h. required for the MS. At least 6 s.h. of elective coursework chosen from the following:		
EDTL:4066	Curriculum Concepts in Gifted Education	3
EDTL:4093	Teaching and Learning for a Global Perspective	3
EDTL:4199	Program Models in Gifted Education	3
EDTL:4392	Voice, Drama, and Debate in the Secondary Schools	3
EDTL:4393	Critical Media Studies and Production in Secondary Schools	3
EDTL:4467	Methods: ESL and Bilingual Education	4
EDTL:4498	Applied Linguistics and the Multilingual Classroom	4
EDTL:5081	Facilitating Student-Centered Discussions	3
EDTL:5085	Generation Innovation: Technology Integration in 21st-Century K-12 Schools	3
EDTL:5087	Anti-Oppressive Literature Instruction	3
EDTL:5090	Diversity and Identity in K-12 Schools	3
EDTL:5091	LGBTQ Topics in Education	3
EDTL:6483	Multilingual Education and Applied Linguistics	3
CSED:4137	Introduction to Educating Gifted Students	3
CSED:5300	Culturally Relevant Social and Emotional Learning	3
EPLS:5090	Instructional Coaching for Teaching Excellence	3
EPLS:6381	Analysis and Appraisal of Curriculum	3
PSQF:4121	Identification of Students for Gifted Programs	3
PSQF:4143	Introduction to Statistical Methods	3
PSQF:4740	Issues in K-12 Assessment	3
PSQF:4750	Learning Environments: Design, Context, and Activity	3
PSQF:4760	Participatory Learning and Media: Creating, Remixing, Making, and Education	3

Other courses in consultation with an advisor

## K-12 STEM Specialist Endorsement

The University of Iowa does not offer a state-approved program for the K-12 STEM specialist endorsement. In addition to the master's degree, teachers must have met the requirements for a standard Iowa teaching license with endorsement in mathematics, science, engineering, industrial

technology, or agriculture. They must demonstrate completion of 12 s.h. of science and 12 s.h. of mathematics content coursework (including computer science), which may include content coursework completed as part of this subprogram as well as other college-level courses. In addition, they must have completed 3 s.h. of engineering or technological design coursework not included in this subprogram; ENGR:1100 Introduction to Engineering Problem Solving and ENGR:1300 Introduction to Engineering Computing may be options for the requirement. Once the courses are completed, teachers may apply to the Board of Educational Examiners for transcript analysis and to add the endorsement. Students interested in pursuing the K-12 STEM specialist endorsement should notify their advisor upon admission to the program.

## Admission

Applicants must meet the admission requirements of the Graduate College. These include:

- a bachelor's degree from a regionally accredited American college or university or an equivalent degree from another country as determined by the Office of Graduate Admissions with an undergraduate major in a given science or mathematics area (or combination of science areas), science education, math education, or in elementary education with a science or math emphasis; and
- a minimum GPA of 3.00 or the international equivalent as determined by the Office of Graduate Admissions.

Teaching licensure/certification is recommended for the MS and required if the candidate seeks the K-12 STEM specialist endorsement from the Board of Educational Examiners (BOEE).

## Academic Plans

### Sample Plan of Study

Sample plans represent one way to complete a program of study. Actual course selection and sequence will vary and should be discussed with an academic advisor. For additional sample plans, see MyUI.

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### STEM Education Subprogram

Course	Title	Hours
<b>Academic Career</b>		
<b>Any Semester</b>		
36 s.h. must be graduate level coursework; graduate transfer credits allowed upon approval. More information is included in the General Catalog and on department website. <sup>a, b</sup>		
Graduate College program GPA of at least 2.75 is required. <sup>c</sup>		
<b>Hours</b>		<b>0</b>
<b>First Year</b>		
<b>Fall</b>		
EDTL:6563	STEM Through Mathematical Modeling	3
EDTL:6761	STEM Research and Leadership Seminar	3
Science/mathematics course <sup>d</sup>		3

Science/mathematics course <sup>d</sup>		3
<b>Hours</b>		<b>12</b>
<b>Spring</b>		
EDTL:6762	STEM Experiential Learning	3
EDTL:6764	STEM Extracurricular Experience and Capstone	6
<b>Hours</b>		<b>9</b>
<b>Second Year</b>		
<b>Fall</b>		
EDTL:5095	Issues in U.S. Schools	3
EDTL:6765	STEM Independent Research <sup>e</sup>	3
Elective course <sup>f</sup>		3
<b>Hours</b>		<b>9</b>
<b>Spring</b>		
EDTL:6765	STEM Independent Research <sup>e</sup>	3
Elective course <sup>f</sup>		3
<b>Hours</b>		<b>6</b>
<b>Total Hours</b>		<b>36</b>

a The MS non-thesis in STEM Education is not a licensure program. Students may pursue K-12 STEM Education Specialist Endorsement upon admission to the program; see the General Catalog and the College of Education website for specifics.

b Students must complete specific requirements in the University of Iowa Graduate College after program admission. Refer to the Graduate College website and the Manual of Rules and Regulations for more information.

c Graduate College program GPA is comprised of all courses that are approved degree requirements. If a student takes more than the minimum required number of semester hours to complete the degree, but all courses taken are eligible to count toward the degree, those courses will be included in the Graduate College program GPA.

d Choose from EDTL:4565, EDTL:6766, EDTL:6767.

e Taken twice for a total of 6 s.h.

f See the General Catalog for list of approved courses.