Teaching and Learning, M.S.

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 g.p.a. 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 M.S. in teaching and learning with a science education subprogram requires the following coursework.

Required Courses

Code	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		6
A minimum of 12 s.h. chosen from these:		
EDTL:6758	Writing in the Science Classroom	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
RCE:7338	Essentials of Qualitative Inquiry	3
One additional qualitative or quantitative research methods course chosen in consultation with advisor		
May include 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.

Code	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 maintain a program g.p.a. of at least 3.00.

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 M.S. in teaching and learning with a STEM education subprogram requires the following coursework.

Required Courses

STEM Pedagogy Courses

Code	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

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

Science/Mathematics Courses

Code	Title	Hours
Two of these:		
EDTL:4565	Mathematics in Management and Social Sciences	3
EDTL:4768	Computer Science Methods	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

Students select two elective courses (at least 6 s.h.) chosen in consultation with their 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 math 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 math area (or combination of science areas), science education, math education, or in elementary education with a science or math emphasis;
- a minimum g.p.a. of 3.00 or the international equivalent as determined by the Office of Graduate Admissions; and
- international applicants whose first language is not English must score at least 81 (internet-based) with a minimum score of 600 on the Test of English as a Foreign Language (TOEFL) or a minimum International English Language Testing System (IELTS) score of 7.0 (with no subscore lower than 6.0).

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