Rationale for Modified Master’s Degree Pathways for the STEMteach MSE in Secondary Education Option

Background: STEMteach is a cohort-based initial teacher certification program for science, technology, engineering, and math (STEM) degree holders. The program includes the option to earn a master’s degree in secondary education after successful completion of the one year initial certification coursework.

The program is being offered through Outreach and Continuing Education and is designed for people who

- realize relatively late in their undergraduate studies (i.e. junior or senior year) that they want to pursue teaching
- want to earn both a bachelor’s degree in science or mathematics AND teaching certification
- want compact, rigorous, and STEM-focused teacher training
- have recently graduated but are not satisfied with their career options
- are working but want to make a career change to teaching

The STEMteach program was launched in June 2015 with a cohort of 8 teacher candidates. Surveys conducted by the UTeach Institute in Austin, as part of the NSF Robert Noyce Capacity Building grant, which has generously contributed funds toward the development and launch activities of the program, have revealed that all of the current candidates intend to complete the optional master’s degree.

The goal of this request is to modify the structure of the master’s degree requirements to best serve the initial licensure completers. This includes candidates who seek to complete the master’s degree while working as a teacher as well as those who seek to focus on completing the master’s degree before beginning a career in teaching.

The approved STEMteach program initial certification curriculum, the current Master’s Degree Pathways, and the proposed Master’s Degree Pathways are shown below. The three master’s degree pathways (Plans A, B, and C) represent the standard graduate pathways in effect at the time of the program approval. The proposed Master’s Degree Pathways reflect changes enacted under the approved Faculty Senate Motion 2014-2015/82.
(Approved) STEMteach Curriculum

Initial Certification Coursework (24 graduate degree credits, 30 total graduate course credits)

UTCH 701     Step 1 and 2 Combination (3 cr)
UTCH 702     Knowing and Learning in Math and Science (3 cr)
UTCH 703     Classroom Interactions (3 cr)
UTCH 704     Project-Based Instruction (3 cr)
UTCH 705     STEM Content Area Literacy (3 cr)
UTCH 706     Functions and Modeling (3 cr)
UTCH 707     Perspectives on Science and Mathematics (3 cr)
UTCH 708     Apprentice Teaching Seminar (3 cr)
*UTCH 709     STEM Apprentice Teaching for Secondary and Middle Grades (6 cr)

*Apprentice Teaching credits do not count toward required credits for optional master’s degree

(Approved) Master’s Degree Pathways (optional, 6-10 additional graduate credits)

Plan A (Thesis), 6 additional graduate credits:

   TED 760 Methods of Research (3 cr, on-line)
   TED 799 Thesis (also could be a STEM 799 course) (3 cr)
   Oral or written comprehensive exam

Plan B (Research Paper), 6 additional graduate credits:

   TED 760 Methods of Research (3 cr, on-line)
   TED 798 Independent Research (also could be a STEM 798 course) (3 cr)
   Oral or written comprehensive exam

Plan C (Additional Credits), 10 additional graduate credits:

   TED 760 Methods of Research (3 cr, on-line)
   7 credits of 500 level or greater coursework
   Oral or written comprehensive exam

Transfer or elective credits must be approved by the Program Director

All requirements for this degree must be completed within seven years from the start of the first term.
This program change request seeks to update the master’s degree pathways so that they resemble the newly approved standard pathways in both nomenclature and structure while allowing more tailored approaches to completing the master’s degree.

(Proposed) Master’s Degree Pathways (optional, 6-10 additional graduate credits)

1. Thesis (6 additional credits; 30 total credits)
   Methods of Research (TED 760, 3 cr)
   Thesis (BIOL 799, CHEM 799, or PHYS 799, or TED 799; 3 cr)
   Oral or written comprehensive exam

2. Research Paper (6 additional credits; 30 total credits)
   Methods of Research (TED 760, 3 cr)
   Choose one of the following area electives:
   • (Recommended) Professional Development Practicum (TED 780, 3 cr)
   • Independent Research (BIOL 798, CHEM 798, ESM 798, PHYS 798, or TED 798; 3 cr)
   • Final Research Paper (BIOL 793, CHEM 793, or PHYS 793; 3 cr)
   Oral or written comprehensive exam

3. Capstone Experience (10 additional credits; 34 total credits)
   10 credits of approved area electives chosen from the following:

   - BIOL 500 Environmental Education
   - BIOL 514 Plant Pathology
   - BIOL 520 Plant Structure & Function
   - BIOL 523 Parasitology
   - BIOL 524 Microbiology
   - BIOL 544 Wildlife Biology
   - BIOL 553 Histology
   - BIOL 589 Special Topics in Biology
   - BIOL 644 Ornithology
   - BIOL 645 Wildlife & Visitor Management in Nature Tourism
   - BIOL 651 Molecular Biology
   - BIOL 663 Animal Cell Culture
   - BIOL 689 Special Topics in Biology
   - BIOL 700 Cardiac Anatomy and Physiology
   - BIOL 701 Neuroscience
   - BIOL 702 Emrg Infct Diseases
   - BIOL 703 Field Botany for Teachers
   - BIOL 707 Biotechnology Workshop for Teachers
   - BIOL 710 Medical Pharmacology
   - BIOL 721 Bioinformatics for Teachers
BIOL 722 Evolution for Teachers
BIOL 789 Special Topics in Biology
BIOL 798 Independent Research
BIOL 799 Thesis

BIOT 589 Special Topics in Biotechnology Biology
BIOT 689 Special Topics in Biotechnology
BIOT 789 Special Topics in Biotechnology Biology

CHEM 540 Physical Chemistry Biological Systems
CHEM 541 Thermodynamics & Kinetics
CHEM 556 Chemistry Instrumentation Lab
CHEM 561 Biochemistry I
CHEM 562 Biochemistry II
CHEM 566 Biochemistry Laboratory
CHEM 589 Special Topics in Chemistry
CHEM 601 Advanced Chemistry Lab I
CHEM 602 Advanced Chemistry Lab II
CHEM 616 Polymer Laboratory
CHEM 622 Advanced Inorganic Chemistry I
CHEM 632 Advanced Organic Chemistry
CHEM 661 Pharmacology
CHEM 706 Giant Molecules: Chemistry of Polymers
CHEM 707 Bio Organic Chemistry Concepts
CHEM 708 DNA
CHEM 720 Forensic Science for Secondary Teachers
CHEM 729 Chemical Structure-Property Relationships
CHEM 751 AP Chemistry Experiments-Visible Spectroscopy
CHEM 770 Chemical Demos
CHEM 780 Seminar
CHEM 789 Special Topics in Chemistry
CHEM 793 Final Research Paper
CHEM 798 Independent Research
CHEM 799 Thesis

CSIS 730 Enterprise and Cloud Computing
CSIS 731 Distributed and Mobile Computing
CSIS 732 Information Security
CSIS 733 Computing for Data Science and Big Data Analysis
CSIS 734 Software Engineering and Design Patterns
CSIS 735 Machine Learning and Knowledge Discovery
CSIS 736 Technology Innovation, New Product Development and Sustainability
CSIS 738 Practicum
CSIS 789 Special Topics in Computer Science
ESM 500 Environmental Education
ESM 533 Remote Sensing of Natural Resources
ESM 589 Special Topics in Resource Management
ESM 593 Comprehensive Planning
ESM 620 Wildlife Recreation, Nature Tourism & Sustainability-Based Systems
ESM 635 Advanced Land Use Planning & Design
ESM 636 Fall Wildland Education Workshop
ESM 645 Wildlife & Visitor Management in Nature Tourism
ESM 689 Special Topics in Resource Management
ESM 707 Sustainable Community Development
ESM 709 History and Theories of Sustainability
ESM 711 Site Planning for Sustainable Communities
ESM 715 Community Engagement for Sustainability
ESM 720 Sustainability-Focused Education Programming
ESM 735 Land Use Planning for Sustainable Communities
ESM 750 Wildlife Recreation & Nature Tourism Graduate Capstone
ESM 789 Special Topics in Resource Management
ESM 798 Independent Research

GEOL 530 Meteorology
GEOL 572 Southwest Regional Field Trip
GEOL 579 Geology & Public Gardens of Southern England
GEOL 589 Special Topics in Geology
GEOL 617 Hazardous Waste Operation & Emergency Response
GEOL 650 Paleontology
GEOL 689 Special Topics in Geology
GEOL 700 Field Hydrology and Geomorphology for Teachers
GEOL 703 Minerals Rock
GEOL 704 Atmosphere & Surface on Earth
GEOL 705 Field Geology/Teachers
GEOL 710 Planetary Geology
GEOL 789 Special Topics in Geology
GEOL 798 Independent Research

MATH 636 History of Mathematics
MATH 689 Special Topics in Mathematics
MATH 705 Integrating Emerging Technologies in the Teaching and Learning of Mathematics
MATH 711 Geometry for Educators
MATH 726 Statistics for Teachers
MATH 736 Discrete Mathematics for Education
MATH 751 Modern Algebra for Educators
MATH 756 Probability for Educators
MATH 766 Calculus for Educators
MATH 789 Special Topics in Mathematics
MATH 798 Independent Research
MATH 799 Thesis

PHYS 589 Special Topics in Physics
PHYS 604 Aerospace Workshop
PHYS 689 Special Topics in Physics
PHYS 700 Mechanics for Secondary School Teachers
PHYS 701 Electricity and Magnetism for Secondary School Teachers
PHYS 704 Modern Physics for Secondary School Teachers
PHYS 705 Thermodynamics in Secondary School
PHYS 717 Astronomy SST
PHYS 718 Astrophysics for Secondary School Teachers
PHYS 720 Optics SST
PHYS 721 Acoustics for SST
PHYS 723 Laser Physics for Secondary School Teachers
PHYS 789 Special Topics in Physics
PHYS 793 Final Research Paper
PHYS 798 Independent Research
PHYS 799 Thesis

TED 614 Development of the Transescent
TED 664 Content Area Literacy in Middle & Secondary School Mathematics
TED 665 Management Strategies for the Secondary Science Classroom
TED 667 Management Strategies for the Secondary Mathematics Classroom
TED 689 Special Topics in Teacher Ed
TED 695 Contemporary Issues in Education
TED 701 Psychology of Teaching and Learning
TED 706 Historical, Philosophical, and Multicultural Foundations of Education
TED 721 Introduction to Service Learning
TED 722 Service Learning Management and Curriculum
TED 723 Service-Learning Research/Evaluation/Assessment
TED 724 Service Learning through Reflective Practice
TED 725 Service-Learning Practicum
TED 730 Introduction to Community Education
TED 733 Administration of Community Education
TED 734 Extended Learning Administration
TED 735 Culture & Education
TED 736 Family Community School Partnerships
TED 737 Community Education Practicum
TED 740 History, Philosophy, Multicultural Education
TED 747 Curriculum K-12
TED 750 Advanced Educational Psychology
TED 755 Social Issues in Education
TED 760 Methods of Research
TED 768 Curriculum of the Secondary School
TED 776 Comp Ed - Overseas Field Experience
TED 780 Professional Development Practicum
TED 783 Supervising Field Experience
TED 789 Special Topics in Education
TED 798 Independent Research
TED 799 Thesis

Current Graduate Studies policies apply:
https://www.uwrf.edu/GraduateStudies/CurrentStudentResources/GraduateDefinitions.cfm

In this proposed pathway, the Research Paper option (formerly Plan B) has a broader array of courses with which candidates could research and mature in their fields. Specifically, TED 780 is included as a discrete and preferred option. As part of this “induction” course, new teachers will develop as educators by completing an action research project. This course is also intended to support new teachers with classroom concerns and with state mandated professional development and thereby promote inquiry, research, and reflection while fostering a commitment to lifelong learning and professional development. Having a strong foundation of support and information for teachers during their early years in the profession is intended to improve job satisfaction, teacher effectiveness, and retention.

The Capstone Experience (formerly Plan C) follows the lead of graduate studies to rename this option and to remove the requirement for TED 760. The latter has the effect of focusing this option on advanced content while making degree completion more accessible for new teachers who are working out of the region.

Finally, the name “Plan A” has been removed from the first option.