**University of Massachusetts, Amherst**
**College of Education**
**Department of Teacher Education and Curriculum Studies**

# Mathematics, Science, and Learning Technology (MSLT) Concentration Doctoral Program Handbook

**Mathematics, Science, and Learning Technology (MSLT) Concentration Doctoral Program**

**Program Overview**

**A. Mission and Values**

MSLT prepares graduate students to improve the learning and instruction of Science, Technology, Engineering, and Mathematics (STEM) disciplines. To achieve that goal, we are deeply committed to research and scholarship, using both basic and applied research.

We place a premium on developing principled approaches to affect educational practice and pursue rigorous theory-building in regards to educational phenomena. We apply such knowledge in developing curriculum and state-of-the-art instructional designs. These efforts grow from an understanding of educational practice and close work with practitioners in both formal and informal learning settings.

Importantly, we recognize that certain social groups have been historically marginalized within and way from STEM disciplines, education, and work. We seek to understand processes and structures contributing to the systematic exclusion of these groups and to actively contribute to correcting such inequities. Our work draws from a variety of disciplines including cognitive science, sociology, anthropology, the learning sciences, psychology, and computer science.

**B. Doctoral Student Competencies**

Graduates of the MSLT doctoral concentration will demonstrate excellence in their content area, teaching, research and scholarship that reflects critical examination of past and current theories and work, an engagement in new inquiry, and an active involvement in the ongoing work of mathematics education, science education and learning technology. Through coursework, practical experiences, assessments, comprehensive examination and dissertation completion, graduates will demonstrate excellence in the following five key areas:

- **Content Knowledge and/or Content Knowledge for Teaching.**
  Graduates will demonstrate deep content knowledge and/or content knowledge for teaching and/or designing in their chosen field of study. Such knowledge, which builds the foundation for research and scholarship, includes the history and philosophy of their chosen field of study, and may include skills and competencies expected of pre- and in-service teachers, best practices to developing these skills and competencies, issues related to student learning, an understanding of assessment practices, knowledge of the use of technology in teaching and learning, ability to design curriculum and/or digital learning environments and current debates in the fields of MSLT.

- **Understanding of Social Justice Issues.**
  Graduates will demonstrate an understanding of issues, problems, or questions from multiple perspectives (e.g., economic, social, political, racial, ethnic, gender, disability, sexual orientation, or language) and within the context of a classroom, school, school district, work setting, and/or community. They will demonstrate the capacity to apply their knowledge in designing and implementing a project or investigation to improve the context.

- **Becoming a Skillful and Creative Educational Researcher.**
  Graduates will demonstrate expertise in educational research by developing skills in using sound methodologies to generate new knowledge in the fields of MSLT. They will seek opportunities to work with faculty on research projects, write conference presentations and publishable papers based on their own original research, present at conferences, and submit their work to peer-reviewed journals.

- **Understanding of Foundational Theories and Works.**
  Graduates will demonstrate an understanding of foundational theories and works in the fields of MSLT, teaching and learning, mathematics and science teacher education, design of digital learning environments, and other related disciplines. They will demonstrate excellence in summarizing, interpreting, and applying such theories and works to their scholarly endeavors.

- **Growing as a Professional.**
  Graduates will demonstrate the capacity to apply their evolving scholarly knowledge, contextual awareness, and research skills in developing and conducting studies in their chosen field. They will engage collaboratively with

others both within and outside academia. They will require competence in understanding and using ethical guidelines for the protection of human subjects in their scholarly work, especially when those research subjects are vulnerable minors.

**C. Summary of Course and Credit Requirements**

Doctoral students must complete a minimum of 57 credit hours after the master's degree towards the doctoral degree. This includes a minimum of 18 dissertation credits to be completed during the dissertation phase of the degree and a minimum of 39 credits of graduate coursework, completed prior to the dissertation phase. Of these 39 course credits, students must complete a minimum of 4 foundational graduate courses for a total of 15 credits in the MSLT concentration, 2 courses from your chosen field of study (6 credits), 4 research methods courses (12 credits), and 2 elective courses in any department (6 credits). Students must complete *692K—Theories of Learning* or the equivalent as a prerequisite.

The four foundational MSLT courses (15 credits) must include the following:

**Two r**equired foundational courses (6 credits) for all entering doctoral students (to be completed in the first two years of study):

- EDUC 792Q: Introduction to Research in Mathematics, Science, and Learning Technologies
- EDUC 738: Survey of Mathematics and Science Education Research

**One** required foundational course to be taken each year until the student has a comprehensive proposal accepted (6 credits minimum):

- EDUC 693B: MSLT Research

**One** social justice course is required. This course may be taken either within the MSLT concentration or another concentration within the College of Education (3 credits). This course must be approved by your advisor. Below are two social justice education courses taught with a focus on Mathematics, Science, and Learning Technology:

- EDUC 693F: Teaching Social Justice Through Science, Technology and Mathematics
- EDUC 704: Issues of Gender in Science and Science Education

A minimum of **two** MSLT Concentration Courses (6 credits) must be taken in one's chosen field of study. These courses must be approved by the faculty advisor. Below is a partial list of courses that may be chosen from:

*Mathematics education:*

- EDUC 651: Teaching Mathematical Problem Solving
- EDUC 710: Seminar in Mathematics Education
- EDUC 711: Recent Developments in Secondary Mathematics
- EDUC 790A: Mathematics Curriculum Issues and Trends

*Science education:*

- EDUC 667: Theories of Teaching and Learning in STEM
- EDUC 706: Workshop in Science Education
- EDUC 725: Recent Developments in Science Education
- EDUC 697SE: Professional Seminar in Science Education

*Learning technology:*

- EDUC 737: Educational Media Theory
- EDUC 897SC: Seminar in Digital Media Learning

A minimum of **two** elective courses (6 credits). These courses can come from the specialty courses listed above, the general MSLT courses list below, and/or from another department. These courses must be approved by the faculty advisor. Below is a partial list of courses that may be chosen from:

- EDUC 591SM: Introduction to Secondary Mathematics Education
- EDUC 603: Computer Mediated Communication
- EDUC 612: Educational Web Design
- EDUC 615GR: Teaching and Learning with Technology

- EDUC 667: Theory of Learning and Teaching in STEM Education
- EDUC 693F: Teaching Social Justice Through Science, Technology and Mathematics
- EDUC 693K: Instructional Design of Educational Technology
- EDUC 694G: Theories of Interest and Motivation
- EDUC 697CC: Secondary Mathematics Curriculum Topics and Innovations
- EDUC 697ME: Professional Seminar in Mathematics Education
- EDUC 697SE: Professional Seminar in Science Education
- EDUC 697SM: Statistics and Modeling in the Secondary Curriculum
- EDUC 697SN: Rate of Change and Modeling in the Secondary Curriculum
- EDUC 704: Issues of Gender in Science and Science Education
- EDUC 714: Learning and Thinking
- EDUC 722: Research on Teacher Education
- EDUC 790C: Historical and Social Foundations of Education
- EDUC 791S: Using Video in Research
- CMPSCI 691O: Tools and Explanatory Tutoring Systems
- COMM 791Q: Technology and Society
- HUMDEV 660: Theories of Human Development

A minimum of four research methods courses (12 credits) must be approved by the faculty advisor. Of those, at least **2 must be quantitative research courses** and at least **1 must be a qualitative research course**. The fourth course can be either quantitative or qualitative based on students' interest and advisor's approval. Confer with your advisor as you select research methods courses most salient for your program of study.

**D. Doctoral Program Sequence and Stages**

To complete a doctorate with a concentration in MSLT, all students must complete a series of courses, experiences, and milestones. The typical timeline and sequence for a *full-time* student is as follows:

| | |
|---|---|
| Years 1-3: | Coursework (D-1, D-2) |
| Year 3-4: | Comprehensive paper(s) and exam; Defend dissertation proposal (D-3; D-4) |
| Years 4-6: | Dissertation data collection and writing; Defend dissertation (D-5) |

While moving through the program, a doctoral student must also engage in a variety of professional and scholarly activities. To graduate, all MSLT students must complete the following activities. If not noted below, the timing and approach for fulfilling these activities will be determined in consultation with the faculty advisor:

- Create an E-portfolio and showcase it at a MSLT interactive poster conference (during the first three years).
- Write a paper on foundational theories in chosen field of study (e.g., EDUC 792Q, EDUC 738, EDUC 693B).
- Conduct a mini action research project focusing on an issue, problem, or question of social justice (during social justice course).
- Attend a regional or national conference (scholarly or practitioner).
- Present a paper at a regional or national conference (scholarly or practitioner).
- Submit a paper for publication to a peer-reviewed scholarly or practitioner journal.
- Gain relevant teaching experience; the form of which to be decided in consultation with your advisor.

- Gain relevant research or clinical experience; the form of which to be decided in consultation with an assigned advisor.

- Complete the CITI training for human subject research through the UMass research office.

**E. Comprehensive Exams and Defense**

***Goals and Purposes:***
The comprehensive/qualifying examination is the transition point at which the doctoral student demonstrates the foundational knowledge, understanding, and scholarship relevant to their course of study. Falling after coursework and prior to the dissertation proposal, the comprehensive/qualifying examination is the doctoral student's opportunity to demonstrate proficiency in MSLT's five competencies (see above).

The comprehensive/qualifying examination consists of an empirical research study centered on a specific problem in the student's field of study. The paper must include the following components:

1. introduction with problem statement/research question(s);
2. situating the research question/problem within the relevant literature and describe alternative ways of understanding and conceptualizing your research question/problem;
3. involve either a qualitative, quantitative, or mixed methods study;
4. a description and discussion of results; and
5. implications of your results for your field of study.

Students will present a proposal for their comprehensive/qualifying examinations to their committee for feedback. The proposal will be 5-10 pages in length and will clearly explain the nature of the work to be undertaken. Typically, the proposal is disseminated two weeks in advance of a meeting with the committee. The committee will provide feedback to the student on the proposal. When the committee has approved the proposal, the committee signs the D3 form provided by the student. Usually, approval is given at the meeting. **It is expected that students will complete and defend their comprehensive exams within one year of the signing of the D3.** Students who fail to make adequate progress on their comprehensive exams may have their case referred to the concentration faculty for further disposition.

***Composition and responsibility of the committee:***

- The composition of the comprehensive/qualifying examination committee follows D3 requirements, however; at least one member should be within the student's disciplinary area.
- The committee chair will provide feedback on the comprehensive/qualifying examination paper in a timely manner.
- Upon approval of the committee chair the doctoral student will set the defense date with the committee.
- Committee members will receive the paper at least two weeks prior to the defense date.

***Comprehensive/qualifying examination defense:***
The comprehensive/qualifying examination defense is a two-hour oral exam comprised of a 30-to-40-minute presentation of the doctoral students work followed by 40 minutes of questions from the committee members. The comprehensive/qualifying examination oral defense is open for the public during the presentation and questions from the committee. At the discretion of the committee chair, questions from the audience may be entertained. After the question-and-answer segment of the exam, the doctoral candidate and the public will leave the room in order for the committee to discuss the doctoral student's performance. Performance outcomes are pass, fail, or revisions. If revisions are recommended, the committee will decide which committee members will review the revised paper and this decision will be communicated to the student. If the revisions made are not adequate, the doctoral student may, at this point, fail to advance to candidacy and the student will be recommended for a terminal degree at the Education Specialist (Ed.S.) level.

**F. Dissertation Exams and Defense**

***Goals and Purpose:***
The dissertation is the final milestone at which the doctoral student demonstrates foundational knowledge, understanding, and scholarship relevant to the student's course of study. Falling after coursework and comprehensive/qualifying

examination the dissertation is the doctoral student's opportunity to demonstrate their growing proficiency across MSLT's five competencies.

Prior to conducting dissertation research, the doctoral student will design and defend their dissertation proposal as outlined below. Only after passing the dissertation proposal defense will the doctoral student be approved to conduct their dissertation research.

***Composition and responsibility of the committee:***

- The composition of the dissertation committee follows D4 requirements, however: At least one member should be within the student's disciplinary area.
- The committee chair will provide feedback to the dissertation proposal and the dissertation in a timely manner.
- Upon approval of the committee chair the doctoral student will set the defense date with the committee.
- Committee members will receive the dissertation proposal at least two weeks prior to the defense date and the dissertation at least four weeks prior to the defense date.

***Dissertation proposal:***

The dissertation proposal outlines the student's plan for an empirical research study of a significant problem, issue, or question in a chosen field of study. The proposal is comprised of

1. an introduction with problem statement/research question(s),
2. a review of the relevant literature that situates the research question/problem within the field of study,
3. a description of the theoretical framework, and
4. the research methodology.

***Dissertation proposal defense:***

The dissertation proposal defense is an approximately 90-minute oral exam comprised of a 20-minute presentation of the doctoral students work followed by questions from the committee members and suggestions for improvement and/or changes of the proposed study. Revisions to the dissertation proposal may be requested at this time.

***Dissertation:***

The dissertation is comprised of an empirical research study centered on a specific problem in the student's chosen field of study. The dissertation must include the following components:

1. introduction with problem statement/research question(s);
2. situating the research question/problem within the relevant literature (including provision a conceptual framework) and describe alternative ways of understanding and conceptualizing the research question/problem;
3. involve either a qualitative, quantitative or mixed methods study;
4. a description and discussion of results;
5. a description of limitations of the research; and
6. implications of the results for the field of study.

***Dissertation defense:***

The dissertation defense is an approximately two-hour oral exam comprised of a 30-minute presentation of the doctoral students work followed by 90 minutes of questions from the committee members and the committee's discussion regarding pass/fail and/or revisions.

The dissertation oral defense is open for the public during the presentation and questions from the committee. At the discretion of the committee chair questions from the audience maybe entertained. The doctoral candidate and the public will leave the room during the committee's conference regarding the doctoral student's exam. During this time, the committee will decide if the doctoral student will pass and/or needs to revise her/his dissertation. If revisions are necessary, the candidate will have six months within which to submit the revisions to the committee chair. The committee will review the revisions and assess their adequacy for completion of the degree.

**MATHEMATICS EDUCATION DOCTORAL ADVISING FORM**

Name Year Program Began

The doctoral program in MSLT is committed to research and scholarship, using both basic and applied research in a specialty area. To achieve the goals of the doctoral program and that of the candidate, thoughtful advising about program development is essential. This form is meant to help advisors and doctoral candidates conceptualize and keep track of their formal progress through the doctoral program.

**PREREQUISITE**
**The following course or the equivalent:**

_____ EDUC 692K: Theories of Learning

**CORE COURSES (15 cr)**

**Each of the following:**

_____ EDUC 792Q: Intro to Research in MSLT

_____ EDUC 738: Survey of Mathematics & Science Ed Research

_____ EDUC 693B: MSLT Research (1st time)

_____ EDUC 693B: MSLT Research (2nd time)

**One of the following:**

_____ EDUC 693F: Teaching Social Justice Through Science, Technology and Mathematics

_____ EDUC 704: Issues of Gender in Science and Science Education

**RESEARCH COURSES (min 12 cr)**

**A minimum of four research methods courses (12 credits) must be approved by the faculty advisor. A minimum of 2 quantitative research courses and 1 qualitative course must be taken. The fourth course may be quantitative or qualitative.**

**List course choices on the lines below.**

_____ **1.Quant**_____

_____ **2.Quant**_____

_____ **3.Qual** _____

_____ **4. Either** _____

**SPECIALTY EXPERIENCES (min 6 cr)**

**Two of the following, selected in consultation with your faculty advisor:**

_____ EDUC 651: Teaching Mathematical Problem Solving

_____ EDUC 710: Seminar in Mathematics Education

_____ EDUC 711: Recent Developments in Secondary Mathematics

_____ EDUC 790A: Mathematics Curriculum Issues and Trends

**POTENTIAL ELECTIVE COURSES (min 6 cr)**

**Two additional courses, which can come from the Specialty Experiences, from the following elective courses, or from another department, selected in consultation with your faculty advisor.**

_____ EDUC 591SM: Introduction to Secondary Mathematics Education

_____ EDUC 603: Computer Mediated Communication

_____ EDUC 612: Educational Web Design

_____ EDUC 615GR: Teaching and Learning with Technology

_____ EDUC 667: Theories of Teaching and Learning in STEM

_____ EDUC 693F: Teaching Social Justice Through Science, Technology and Mathematics

_____ EDUC 693K: Instructional Design of Educational Technology

_____ EDUC 694G: Theories of Interest and Motivation

_____ EDUC 697CC: Secondary Mathematics Curriculum Topics and Innovations

_____ EDUC 697ME: Professional Seminar in Mathematics Education

_____ EDUC 697SE: Professional Seminar in Science Education

_____ EDUC 697SM: Statistics and Modeling in the Secondary Curriculum

_____ EDUC 697SN: Rate of Change and Modeling in the Secondary Curriculum

_____ EDUC 704: Issues of Gender in Science and Science Education

_____ EDUC 706: Workshop in Science Education

_____ EDUC 714: Learning and Thinking

_____ EDUC 722: Research on Teacher Education

_____ EDUC 725: Recent Developments in Science Education

_____ EDUC 737: Educational Media Theory

_____ EDUC 790C: Historical and Social Foundations of Education

_____ EDUC 791S: Using Video in Research

_____ EDUC 897SC: Seminar in Digital Media Learning

_____ CMPSCI 691O: Tools and Explanatory Tutoring Systems

_____ COMM 791Q: Technology and Society

_____ HUMDEV 660: Theories of Human Development

_____ Elective:

**18 DISSERTATION CREDITS**

_____ **Total Credits (min 57 cr)**

While moving through the program, a doctoral student must also engage in a variety of professional and scholarly activities. To graduate, all MSLT students must complete the following activities. If not noted below, the timing and approach for fulfilling these activities will be determined in consultation with the faculty advisor:

- ☐ Create an E-portfolio (see possible contents below) and showcase it at a MSLT interactive poster conference (during the two years). (EDUC 693B)
- ☐ Write a paper on foundational theories in chosen field of study (e.g., EDUC 792Q, EDUC 738, EDUC 693B, EDUC 667, EDUC 692K). (E-portfolio)
- ☐ Conduct a mini action research project focusing on an issue, problem, or question of social justice (during social justice course). (E-portfolio)
- ☐ Present a paper at a regional or national conference (scholarly or practitioner). (E-portfolio)
- ☐ Submit a paper for publication to a peer-reviewed scholarly or practitioner journal. (E-portfolio)
- ☐ Gain relevant teaching experience; the form of which to be decided in consultation with your advisor.
- ☐ Gain relevant research experience (e.g., research assistant, research practicum, clinical experience); the form of which to be decided in consultation with your advisor.
- ☐ Complete <u>all</u> CITI training modules for human subjects research through the UMass research office.

**SCIENCE EDUCATION DOCTORAL ADVISING FORM**

Name Year Program Began

The doctoral program in MSLT is committed to research and scholarship, using both basic and applied research in a specialty area. To achieve the goals of the doctoral program and that of the candidate, thoughtful advising about program development is essential. This form is meant to help advisors and doctoral candidates conceptualize and keep track of their formal progress through the doctoral program.

**PREREQUISITE**
**The following course or the equivalent:**

_____ EDUC 692K: Theories of Learning

**CORE COURSES (15 cr)**

**Each of the following:**

_____ EDUC 792Q: Intro to Research in MSLT

_____ EDUC 738: Survey of Mathematics & Science Ed Research

_____ EDUC 693B: MSLT Research (1st time)

_____ EDUC 693B: MSLT Research (2nd time)

**One of the following:**

_____ EDUC 693F: Teaching Social Justice Through Science, Technology and Mathematics

_____ EDUC 704: Issues of Gender in Science and Science Education

**RESEARCH COURSES (min 12 cr)**

**A minimum of four research methods courses (12 credits) must be approved by the faculty advisor. A minimum of 2 quantitative research courses and 1 qualitative course must be taken. The fourth course may be quantitative or qualitative.**

**List course choices on the lines below.**

_____ **1.Quant** _____

_____ **2.Quant** _____

_____ **3.Qual** _____

_____ **4. Either** _____

**SPECIALTY EXPERIENCES (min 6 cr)**

**Two of the following, selected in consultation with your faculty advisor:**

_____ EDUC 667: Theories of Teaching and Learning in STEM

_____ EDUC 710: Seminar in Mathematics Education

_____ EDUC 706: Workshop in Science Education

_____ EDUC 725: Recent Developments in Science Education

**POTENTIAL ELECTIVE COURSES (min 6 cr)**

**Two additional courses, which can come from the Specialty Experiences, from the following elective courses, or from another department, selected in consultation with your faculty advisor.**

_____ EDUC 591SM: Introduction to Secondary Mathematics Education

_____ EDUC 603: Computer Mediated Communication

_____ EDUC 612: Educational Web Design

_____ EDUC 615GR: Teaching and Learning with Technology

_____ EDUC 651: Teaching Mathematical Problem Solving

_____ EDUC 693F: Teaching Social Justice Through Science, Technology and Mathematics

_____ EDUC 693K: Instructional Design of Educational Technology

_____ EDUC 694G: Theories of Interest and Motivation

_____ EDUC 697CC: Secondary Mathematics Curriculum Topics and Innovations

_____ EDUC 697ME: Professional Seminar in Mathematics Education

_____ EDUC 697SM: Statistics and Modeling in the Secondary Curriculum

_____ EDUC 697SN: Rate of Change and Modeling in the Secondary Curriculum

_____ EDUC 704: Issues of Gender in Science and Science Education

_____ EDUC 710: Seminar in Mathematics Education

_____ EDUC 711: Recent Developments in Secondary Mathematics

_____ EDUC 714: Learning and Thinking

_____ EDUC 722: Research on Teacher Education

_____ EDUC 737: Educational Media Theory

_____ EDUC 790A: Mathematics Curriculum Issues and Trends

_____ EDUC 790C: Historical and Social Foundations of Education

_____ EDUC 791S: Using Video in Research

_____ EDUC 897SC: Seminar in Digital Media Learning

_____ CMPSCI 691O: Tools and Explanatory Tutoring Systems

_____ COMM 791Q: Technology and Society

_____ HUMDEV 660: Theories of Human Development

_____ Elective:

**18 DISSERTATION CREDITS**

_____ **Total Credits (min 57 cr)**

While moving through the program, a doctoral student must also engage in a variety of professional and scholarly activities. To graduate, all MSLT students must complete the following activities. If not noted below, the timing and approach for fulfilling these activities will be determined in consultation with the faculty advisor:

- ☐ Create an E-portfolio (see possible contents below) and showcase it at a MSLT interactive poster conference (during the two years). (EDUC 693B)
- ☐ Write a paper on foundational theories in chosen field of study (e.g., EDUC 792Q, EDUC 738, EDUC 693B, EDUC 667, EDUC 692K). (E-portfolio)
- ☐ Conduct a mini action research project focusing on an issue, problem, or question of social justice (during social justice course). (E-portfolio)
- ☐ Present a paper at a regional or national conference (scholarly or practitioner). (E-portfolio)
- ☐ Submit a paper for publication to a peer-reviewed scholarly or practitioner journal. (E-portfolio)
- ☐ Gain relevant teaching experience; the form of which to be decided in consultation with your advisor.
- ☐ Gain relevant research experience (e.g., research assistant, research practicum, clinical experience); the form of which to be decided in consultation with your advisor.
- ☐ Complete <u>all</u> CITI training modules for human subjects research through the UMass research office.

**LEARNING TECHNOLOGY EDUCATION DOCTORAL ADVISING FORM**

Name Year Program Began

The doctoral program in MSLT is committed to research and scholarship, using both basic and applied research in a specialty area. To achieve the goals of the doctoral program and that of the candidate, thoughtful advising about program development is essential. This form is meant to help advisors and doctoral candidates conceptualize and keep track of their formal progress through the doctoral program.

**PREREQUISITE**
**The following course or the equivalent:**

_____ EDUC 692K: Theories of Learning

**CORE COURSES (15 cr)**

**Each of the following:**

_____ EDUC 792Q: Intro to Research in MSLT

_____ EDUC 738: Survey of Mathematics & Science Ed Research

_____ EDUC 693B: MSLT Research (1st time)
EDUC 693B: MSLT Research (2nd time)

**One of the following:**

_____ EDUC 693F: Teaching Social Justice Through Science, Technology and Mathematics

_____ EDUC 704: Issues of Gender in Science and Science Education

**RESEARCH COURSES (min 12 cr)**

**A minimum of four research methods courses (12 credits) must be approved by the faculty advisor. A minimum of 2 quantitative research courses and 1 qualitative course must be taken. The fourth course may be quantitative or qualitative.**

**List course choices on the lines below.**

_____ **1.Quant** _____

_____ **2.Quant** _____

_____ **3.Qual** _____

_____ **4. Either** _____

**SPECIALTY EXPERIENCES (min 6 cr)**

**Two of the following, selected in consultation with your faculty advisor:**

_____ EDUC 737: Educational Media Theory

_____ EDUC 897SC: Seminar in Digital Media Learning

**POTENTIAL ELECTIVE COURSES (min 6 cr)**

**Two additional courses, which can come from the Specialty Experiences, from the following elective courses, or from another department, selected in consultation with your faculty advisor.**

_____ EDUC 591SM: Introduction to Secondary Mathematics Education
_____ EDUC 603: Computer Mediated Communication
_____ EDUC 612: Educational Web Design
_____ EDUC 615GR: Teaching and Learning with Technology
_____ EDUC 651: Teaching Mathematical Problem Solving
_____ EDUC 667: Theories of Teaching and Learning in STEM
_____ EDUC 693F: Teaching Social Justice Through Science, Technology and Mathematics
_____ EDUC 693K: Instructional Design of Educational Technology
_____ EDUC 694G: Theories of Interest and Motivation
_____ EDUC 697CC: Secondary Mathematics Curriculum Topics and Innovations
_____ EDUC 697ME: Professional Seminar in Mathematics Education
_____ EDUC 697SE: Professional Seminar in Science Education
_____ EDUC 697SM: Statistics and Modeling in the Secondary Curriculum
_____ EDUC 697SN: Rate of Change and Modeling in the Secondary Curriculum
_____ EDUC 704: Issues of Gender in Science and Science Education
_____ EDUC 706: Workshop in Science Education
_____ EDUC 710: Seminar in Mathematics Education
_____ EDUC 711: Recent Developments in Secondary Mathematics
_____ EDUC 714: Learning and Thinking
_____ EDUC 722: Research on Teacher Education
_____ EDUC 725: Recent Developments in Science Education
_____ EDUC 790A: Mathematics Curriculum Issues and Trends
_____ EDUC 790C: Historical and Social Foundations of Education
_____ EDUC 791S: Using Video in Research
_____ CMPSCI 691O: Tools and Explanatory Tutoring Systems
_____ COMM 791Q: Technology and Society
_____ HUMDEV 660: Theories of Human Development
_____ Elective:

**18 DISSERTATION CREDITS**

_____ **Total Credits (min 57 cr)**

While moving through the program, a doctoral student must also engage in a variety of professional and scholarly activities. To graduate, all MSLT students must complete the following activities. If not noted below, the timing and approach for fulfilling these activities will be determined in consultation with the faculty advisor:

- ☐ Create an E-portfolio and showcase it at a MSLT interactive poster conference (during the first three years). (EDUC 693B)

- ☐ Write a paper on foundational theories in chosen field of study (e.g., EDUC 792Q, EDUC 738, EDUC 693B, EDUC 667, EDUC 692K). (E-portfolio)

- ☐ Conduct a mini action research project focusing on an issue, problem, or question of social justice (during social justice course). (E-portfolio)

- ☐ Present a paper at a regional or national conference (scholarly or practitioner).

- ☐ Submit a paper for publication to a peer-reviewed scholarly or practitioner journal.

- ☐ Gain relevant teaching experience; the form of which to be decided in consultation with your advisor.

- ☐ Serve as a research assistant or complete a research practicum. Gain relevant research experience (e.g., research assistant, research practicum, clinical experience) in consultation with your advisor.

- ☐ Complete all CITI training modules for human subjects research through the UMass research office.