

# SMED 888 – Science/Math Education Capstone Syllabus (online – Spring 2017)

**3 credit hours**

**Online Format**

**(January 9 – May 5, 2017)**

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**Required Textbook:** *none.* Any necessary materials will be made available by the instructor via Blackboard.

**Technical Requirements and Competencies.** Course delivery will be made entirely through Blackboard. A broadband internet connection (DSL, cable, etc.) is recommended but the instructor will make every effort to keep the size of course documents down to accommodate those with dial-up internet connections. Course documents may be in Adobe PDF or Microsoft Office (Word, Excel, Powerpoint) formats. Links to downloadable free viewers will be provided. It is expected that you be able to download documents and open them in their appropriate programs. Familiarity with standard online form functions – radio buttons, check boxes, fill-in blanks, etc. – is required.

**Course Prerequisite:** *Admission into Science/Math Education Program. Recommended preparation: Completion of [TE 800](#) and at least 24 credit-hours of the Science/Math Education degree program, including 6 or more in the Major Emphasis category.*

**Course Description:** This course is designed to culminate the student's experience in the Science/Math Education program. Students will complete the comprehensive exam and a capstone project that integrates educational research, curriculum design, science/math content application, and assessment. Based on a literature evaluation of a specific concept or problem in science/math teaching, the student will develop a new curricular unit, or redesign an existing one, to be implemented in a high school or middle school science/math course that the student is teaching that semester. This unit must apply science/math content from their degree program courses and the student must assess the impact of the new/revised unit on student learning.

**Course Learning Structure.** With the guidance of the course instructor and one or two additional faculty mentors, you will independently work through the following stages of a semester-long capstone project:

- **Identify a specific science/math concept, problem, or unit in a course that you teach to serve as the focus topic of the capstone project.**
- **Based on a science/math education literature evaluation of the project topic, propose the development, implementation, and assessment of a new or redesigned curricular unit to be applied in your course this semester.** The project must incorporate content from at least one of your science/math courses taken in your Science/Math Education degree program.
- **Implement the new/redesigned curricular unit and collect assessment data.**
- **Using the assessment data, evaluate the impact of the new/redesigned curricular unit on student**

learning.

- **Prepare a written report of the project results and complete a set of written comprehensive exam questions prepared by the Science/Math Education Program Committee.**
- **Complete a reflection assignment that addresses concerns or questions about the project report and/or comprehensive exam. This assignment may be written or oral.**

**Faculty Roles in SMED 888.** You will work independently with guidance and mentorship from two or three faculty members in the Science/Math Education program. *You must contact individual faculty members and request that they serve as your faculty mentors in this course:*

- **Course Instructor.** Will be responsible for the online delivery of the SMED 888 course to include the establishment of interim and final project deadlines, collection and grading of assignments (with input from the faculty mentor(s) Science/Math Education Program Committee, and/or comprehensive exam question authors as needed), and coordinating and presiding over the students' meetings with the Science/Math Education Program Committee. The course instructor may also serve as one of the two faculty mentors.
- **Content Faculty Mentor.** This must be a UNK Graduate Faculty member in the same disciplinary area of the course to which the capstone project is being applied. It is suggested that this faculty mentor be a current/previous course instructor or the Science/Math Education Graduate Program Committee representative from the appropriate disciplinary area. The SMED 888 course instructor may serve in this capacity if his or her expertise is in the appropriate disciplinary area. The content faculty member will guide you as needed during all phases of the project with an emphasis on the science/math content involved.
- **Teaching Methods Faculty Mentor.** This must be a UNK Graduate Faculty who is either a member of the Department of Teacher Education or is otherwise qualified to teach science/math pedagogy courses. It is suggested that this faculty mentor be a current/previous course instructor or a Science/Math Education Graduate Program Committee representative who meets this requirement. The SMED 888 course instructor may serve in this capacity if he or she meets this requirement. The teaching methods faculty mentor will guide you as needed during all phases of the project with an emphasis on the research, pedagogy, and assessment aspects.

**NOTE:** *These three roles must be served by at least two different faculty members.* In other words, the course instructor cannot also serve both faculty mentor roles.

## **GRADING**

Capstone Project Proposal	30%
Capstone Project Report	30%
Comprehensive Exam	30%
Reflection Assignment	10%

**Grading Scale.** The following weighted percentage point scale will be applied: A (90.00-100), A- (85.00-89.99), B+ (80.00-84.99), B (70.00-79.99), B- (65.00-69.99), C+ (60.00-64.99), C (50.00-59.99), F (below 50.00).

## **SMED 888 COURSE COMPONENT DESCRIPTIONS**

**Capstone Project Proposal.** While there are no word or length limitations, the proposal must include the following:

- **Identification of the class (subject and grade/level) in which the project will be implemented**
- **Identification of UNK faculty mentor(s)**
- **Description of the focus topic to be addressed and a justification for its need of addition to, enhancement of or revision within your class curriculum.** This justification must include support from the education research literature and/or state- or federally published educational data.
- **Description of a new or revised 2-5 day curricular unit to be implemented in your class.** This must include a thorough outline of class lectures/discussions as well as complete versions of any assignments, quizzes, tests, laboratory/field experiences, and/or presentation projects included in the unit. Your choices of pedagogical methods for enhancing student learning should be supported by the education research literature.
- **Description of an assessment data and analysis plan**
- **Description of pertinent state and/or national standards that this new curricular unit will address**

The proposal will be graded by the course instructor with input from the faculty mentor(s) and/or Science/Math Education Graduate Program Committee as needed according to the rubric provided in class. You will be given feedback with comments and suggestions to apply before implementing the project.

**Capstone Project Report.** While there are no word or length limitations, the report must include the following (items in italics may be copied from the project proposal):

- *Identification of the class (subject and grade/level) in which the project will be implemented*
- *Identification of UNK faculty mentor(s)*
- *Description of the focus topic to be addressed and a justification for its need of addition to, enhancement of or revision within your class curriculum.*
- **Description of a new or revised 2-5 day curricular unit to be implemented in your class.** This should be largely the same as you turned in for your proposal, but update with any modifications made.
- **Assessment data analysis results**
- **Discussion of the new/revised curricular unit's impact on student learning.** This should be heavily based on your assessment data and supported by literature references where possible. Describe (and support) any modifications you would make to this unit when offered in the future.

- *Description of pertinent state and/or national standards that this new curricular unit will address*

The proposal will be graded by the course instructor with input from the faculty mentor(s) and/or Science/Math Education Graduate Program Committee as needed according to the rubric provided in class. Feedback will be discussed during the meeting with the Science/Math Education Program Committee.

**Comprehensive Exam (Part 1).** At or around the 6<sup>th</sup> week of the semester, you will take a comprehensive exam (3-4 hour time limit, closed-book/notes) specific to your degree program. This is a UNK Graduate School requirement for graduation. Exam questions are compiled by the course instructor and approved by the Graduate Program Committee, who may seek input and/or solicit questions from students' past instructors. Questions will cover material from one-half to three-fourths of the courses in your degree program. Each question will be linked to at least one of the five assessment targets given in the comprehensive exam grading rubric/scale attached at the end of this syllabus. The exam is administered by a proctor to be identified by you. At the beginning of the semester, the instructor will ask you to complete and submit the Science/Math Education Comprehensive Exam application that will be provided in class.

Based on the exam answers, each of the five assessment targets will be assigned a score from 0 to 10. The exam score will be the sum of the individual assessment target scores. *If all assessment target scores are at least 7 points ("Meets Expectations"), you will not take Part 2 of the exam and your Part 1 exam score will stand as the comprehensive exam score to be factored into your SMED 888 grade.*

More information about the comprehensive exam can be found here:

<http://www.unk.edu/academics/science-math-ed/current-students.php>

**Comprehensive Exam (Part 2).** If one or more assessment target scores are below 7 points ("Does Not Meet Expectations"), then you will be required to take Part 2 of the comprehensive exam. The format may be written or oral as determined by the Graduate Program Committee. These questions will cover only the assessment target(s) with score(s) below 7 points. The Graduate Program Committee will grade Part 2 of the exam. **If answers in a designated assessment target area meet or exceed the "Meet Expectations" criteria, that target assessment score will be raised to 7 points.** If answers in a designated assessment target area do not meet the "Meet Expectations" criteria, that target assessment score will not be changed from what was scored in Part 1. *The Part 2 exam score, which by definition must be equal to or greater than the Part 1 score, will stand as the comprehensive exam score to be factored into your SMED 888 grade.*

**NOTE:** In terms of authorization for graduation, having any assessment target score below 7 points ("Does Not Meet Expectations") after taking Part 2 constitutes failure of the comprehensive exam. If this happens, you may re-take the comprehensive exam next semester outside of the capstone course.

**Reflection Assignment.** You will be assigned to address a series of questions based on the results of your comprehensive exam and final project report. The assignment format may be a written response, recorded oral report, or the questions and responses may be given during a meeting with the instructor, faculty mentor(s), and/or member of the Science/Math Education Graduate Program Committee. The instructor will specify the format to be employed in a given semester. Regardless of format, it will be expected that some deeper understanding of the capstone project (design, results, assessment), science/math content knowledge related to the comprehensive exam and/or capstone project, and pedagogical theory and techniques be conveyed. The assignment will be graded according to the rubric provided in class.

## SMED 888 (Spring 2017) Course Timeline

Week	Event
January 9-18	Course introduction – project & comp exam formats
<i>Wednesday, Jan. 18 (11:00 p.m. CT)</i>	<i>Deadline for choosing faculty mentor(s) and class to apply project</i>
January 18 – February 8	Literature research and Project Proposal writing
<i>Wednesday, February 8 (11:00 p.m. CT)</i>	<i>Project Proposal due</i>
February 9 - 15	Project Proposal graded. <b><u>Comprehensive Exam (part 1) taken.</u></b>
February 16 - 22	Make final revisions to Project Proposal. Comprehensive Exam is graded – student notified whether part 2 is needed.
February 23 – March 17	Implement New/Revised Curricular Unit and collect Assessment Data
March 27 - 31	<b><u>Comprehensive Exam (part 2) taken, if necessary,</u></b> and graded.
March 18 – April 24	Data assessment and Project Report writing.
<i>Monday, April 24 (11:00 p.m. CT)</i>	<i>Final Project Report deadline</i>
<i>Tuesday, May 2 (11:00 p.m. CT)</i>	<i>Reflection Assignment due</i>