Course Description: Each Master of Science in Science Education (MSSE) student, with the cooperation of her or his graduate committee, identifies and completes a science education capstone project. Each project is designed to provide experience and information that aids our understanding of science teaching-learning or science curriculum. The capstone project topic is identified during the student's graduate program and relates to science education in the student's educational setting, linking multiple courses in the student's program of study in both the core and science content areas.

The results of each student's capstone project are summarized in a written, professional paper completed by May of the summer of planned completion of the Capstone Project. In addition, during the final summer session of the graduate program each student presents the capstone project to his/her committee, classmates, and other interested persons at the Symposium in Science Education.

Learning Outcomes:

The student will complete the implementation of a personalized capstone project, either classroom-based or science-based, and successfully write a professional paper to be approved by the project advisor and science reader.

The student will successfully present his/her capstone project to a group of peers and other interested MSU staff and faculty.

The student will attend the presentations of peers, reflect in writing on the work of peers in light of his/her own practice, and provide feedback to peers on presentations attended.

The student will participate as required in the D2L Capstone Preparation forum and maintain contact with his/her project advisors.
Course Requirements and Scoring:

Adequate Participation in the Spring Capstone Preparation Forum 20%
  Weekly Check-In
  Meet Capstone Project Deadlines and Requirements throughout the Academic Year
  Ongoing Communication with Advisors as directed by the Project Advisor

Capstone Week Attendance 20%
  Attend Peer Presentations as Directed
  Complete Presentation Reports
  Facilitate and Report on Peer Presentation

Project Paper and Presentation 60%
  Complete Revisions as Requested (As desired by Graduate Committee)

Evaluation of these learning outcomes is based on the Capstone Rubric found at http://www.montana.edu/msse/capstones.html

Remember, this is a graduate level course and the writing must be graduate level quality.

Course Grading:
A (94-100%)
A- (90-93%)
B+ (87-89%)
B (84-86%)
B- (80-83%)
C+ (77-79%)
C (74-76%)
C- (70-73%)
D+ (67-69%)
D (64-66%)
D- (60-66%)
F (0-59%)

MSSE Capstone Paper Criteria

Overview
Each Master of Science in Science Education (MSSE) student, with the cooperation of her or his graduate committee, will identify and complete a capstone project. The results of each student's capstone project must be summarized in a written, professional paper approved by the student's graduate committee and submitted as a Word document to the MSSE office. Oral project presentations will be made at the Symposium in Science Education scheduled in July of each year. Students should follow MSSE guidelines and paper template given, as this is a three credit capstone project, not a six credit master’s thesis.

Capstone Professional Paper Criteria

I. The Capstone Professional Paper must have sections to match each area below.

INTRODUCTION AND BACKGROUND A concise statement of the project focus question. A rational for why the question is a current topic, researchable and relevant to science education. Background information about your experience, project setting and what led you to this topic.

CONCEPTUAL FRAMEWORK The Capstone Project should be based on modern and innovative approaches and ideas. It should be well documented with existing literature, including a review of current thinking relative to this topic, a synthesis of science and education information related to the project. Include the framework of concepts, principles and theories underlying and informing the project.

METHODOLOGY A description of methods selected and the treatments used to generate data for answering the above focus question. If a treatment was used, include it here.

DATA AND ANALYSIS Science and education data should be able to stand tests of validity and reliability. Data display (i.e. tables and figures) and analysis should be appropriate to the question and setting of the study. Effort should be made to triangulate and synthesize together data from various instruments.

INTERPRETATION AND CONCLUSION Your interpretation of the project results, which should lead to clarification or resolution of the focus question. The project's claims should meet criteria for validity.

VALUE A summary of how the project expands, clarifies, validates, or invalidates the principles and/or process of science education. The results should generate new questions. The project should have implications for teaching-learning beyond your individual classroom or situation.
II. Writing style, language, grammar, and format must be appropriate for a scientific English paper.

Style & Format. Specific style and formatting rules that all MSSE students should use will be provided in the MSSE Writing Style Workbook (found at http://www.montana.edu/msse/capstones.html) along with an examples of capstones that demonstrates these guidelines. These standards are a combination of APA and MSU Graduate School guidelines and are unique to MSSE. For further questions regarding style and formatting, contact the MSSE office.

For specific language and grammar questions: -A classic writing guide is The Elements of Style by Strunk and White. -Scientific English by Robert Day is a guide specific for scientists and other professionals. -Online resource: Online Writing Lab at Purdue (http://owl.english.purdue.edu/owl/)

III. Professional papers are reviewed and edited to ensure clarity of writing.

Graduate Committees are more interested in careful, thoughtful, concise writing and organization than in length. No page limits are provided with these criteria.

Have committee members read and comment on early drafts. They expect to assist you with paper revisions. One faculty member has mentioned that he expects a paper to go through about seven drafts prior to the final accepted version.

You may also want to have a peer (classmate, colleague, family member, or friend) read your paper and edit for grammar, organization, and clarity.

Allow sufficient time to circulate drafts, incorporate suggestions, and polish the final paper.

An additional thought – when you wrote assignments for MSSE 509 you used present or future tense. Your project is now complete (or will be very soon) so the capstone project professional paper should be written in the past tense. If you put your paper together as sections of separate assignments for MSSE 509, there may be statements, paragraphs, or concepts that appear repeatedly. Please be sure to edit for re-statement, repetition, and redundancy. Your advisors will appreciate your efforts to be concise.

NOTE: The MSU spring semester ends the first week of May, so please avoid the end of semester crush as much as possible! Expect that committee members might be "unavailable" during parts of May and June. Many faculty advisors are doing field research, attending conferences, and preparing for the summer session in May and June.
Maintaining Intellectual Integrity (Plagiarism)

Paraphrasing or quoting another’s work without citing the source is a form of academic misconduct. Even inadvertent or unintentional misuse or appropriation of another's work (such as relying heavily on source material that is not expressly acknowledged) is considered plagiarism. All sources of information that are not your original thoughts need to be cited. This includes, but is not limited to, journal articles, textbooks and online resources. Adapted from MSU Syllabus language page: http://www.montana.edu/teachlearn/TLResources/SyllabusLanguage.html

Student Conduct

Montana State University expects all students to conduct themselves as honest, responsible and law-abiding members of the academic community and to respect the rights of other students, members of the faculty and staff and the public to use, enjoy and participate in the University programs and facilities. For additional information reference see

www2.montana.edu/policy/student_conduct/student_conduct-code_2008-2009.htm

Collaboration:

University policy states that, unless otherwise specified, students may not collaborate on graded material. Any exceptions to this policy will be stated explicitly for individual assignments. If you have any questions about the limits of collaboration, you are expected to ask for clarification.

Academic Misconduct:

Section 420 of the Student Conduct Code describes academic misconduct as including but not limited to plagiarism, cheating, multiple submissions, or facilitating others’ misconduct. Possible sanctions for academic misconduct range from an oral reprimand to expulsion from the university.
Academic Expectations:

Section 310.00 in the MSU Conduct Guidelines states that students must:

A. be prompt and regular in attending classes;
B. be well prepared for classes;
C. submit required assignments in a timely manner;
D. take exams when scheduled;
E. act in a respectful manner toward other students and the instructor and in a way that does not detract from the learning experience; and
F. make and keep appointments when necessary to meet with the instructor.

In addition to the above items, students are expected to meet any additional course and behavioral standards as defined by the instructor.

Keys to Success

The following practices have proven to help students be as successful as possible in online courses:

- Communicate, communicate, communicate. When in doubt, ask. If you are behind, let us know. If you get stuck, give a call. We can usually clear up in a five minute phone call what may take you days to figure out on your own.
- Keep up with Course ANNOUNCEMENTS and email messages. We post vital information in the ANNOUNCEMENTS section and through email messages. Make it a habit to check these every time you login.
- Use the course Resources, they are there to assist you with requirements, writing and more. Use them.
- Read all the feedback provided by your advisors and make changes accordingly. Don't get into the habit of creating bad habits...each revision should be an improvement on the prior.
- Enjoy the journey. This is a process...a marathon, not a sprint. Enjoy it, but don't forget to take that first step.