COURSE SYLLABUS
EDUC (489 / 689)
Science, Technology, Engineering, and Mathematics (STEM) & Society
3 Credits
Fall Term 2015
University of Nevada-Reno

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Class Meeting: Tuesday 1-3:50 pm.
Office Hours: Call me to make an appointment

Catalogue Description: Science, Technology, Engineering, and Mathematics & societal and ethical issues, problems, and advances including ethical, historical and contemporary concerns and technological advancement.

Prerequisite: Silver Core Natural Sciences Core Objective 4

REQUIRED COURSE MATERIALS
2. TBA
* Possible supplementary readings: Merchants of Doubt, Six Glasses, Meaning of it all, etc.

Student Learning Objectives (Core 9 & 12):
1. The students will be able to distinguishing between sound and unsound interpretations of scientific information through cogent reasoning and research methods in science, technology, engineering and mathematics (STEM) as it relates to a societal concern and associated ethical issues from multiple perspectives as demonstrated through written research and presentation to class.
2. The students will identify a societal issue with related ethical implications (that are both the same and different from your own stance) within an associated STEM advancement and design a solution for solving an identified issue using the engineering design process and appropriate scientific research methods.
3. Students will articulate the ways in which society is transformed by advances in STEM and be able to integrate, synthesize and apply knowledge of the relationships within these disciplines for broader interdisciplinary contexts through weekly readings and reflections.

Course Objectives:
Nature of Science
History of Science (How scientific knowledge changes society over time)
Sputnik, international comparisons of math and science, STEM and STEAM movements
Contemporary issues in science and STEM (climate change, GM foods, global food distribution, evolution, vaccinations, plagues, education, role of technology)
Ethics of scientific knowledge and technological advancement
Technology and Engineering Design in the 21st century

Assessment:
Three Content Exams
5 Quizes
1 essay on societal issues w/ presentation
1 Engineering Design (STEM) challenge for solving a societal solution (Grand Challenges)

Disability Statement:
Each student who qualifies with a disability is to provide his or her instructor with a letter from the Disability Resource Center (DRC) stating the appropriate accommodations for this course. If you have a documented disability and wish to discuss how these academic accommodations will be implemented for this course, please contact me as soon as possible in person, at the above address, phone, or e-mail.

Methodology (on campus)
This course is a biology content course that will utilize, primarily, a hands-on inquiry approach to instruction. Additionally, instruction will be provided through whole class instruction models that meet a discovery / inquiry approach and direct instruction models of lecture and demonstration when necessary. However, individual and small group discussions and problem solving experiences may be explored on occasion or when more methodologically appropriate.

Academic Honesty: has become more of an issue in recent years with the accessibility of the internet, technology, and use of cellular phones in picture and video mode, etc. The University of Nevada, Reno holds high expectations with regard to academic honesty. Any violation of university policy will result in serious consequences that may lead to a failing grade in this class or, in extreme cases, dismissal from the program. To read in-depth the universities policy on academic honest please visit: www.ss.unr.edu/standard3/pdf/standard3.pdf

UNR Policy:
Academic Success Services: Your student fees cover usage of the Math Center (784-4433 or www.unr.edu/mathcenter/), Tutoring Center (784-6801 or www.unr.edu/tutoring/), and University Writing Center (784-6030 or http://www.unr.edu/writing_center/). These centers support your classroom learning; it is your responsibility to take advantage of their services. Keep in mind that seeking help outside of class is the sign of a responsible and successful student.

Statement on Audio and Video Recording: “Surreptitious or covert video-taping of class or unauthorized audio recording of class is prohibited by law and by Board of Regents policy. This class may be videotaped or audio recorded only with the written permission of the instructor. In order to accommodate students with disabilities, some
students may be given permission to record class lectures and discussions. Therefore, students should understand that their comments during class may be recorded.”

UNR / COE Disclaimer: As is true for all of the work you do for all of your classes, your instructor and others may review your work while evaluating the quality of courses and programs. However, your work cannot be used for any research projects without written approval from the UNR Office of Human Research Protection.

Grading:
Attendance: (Undergraduate & Graduate)
Each of you adds a unique dimension to class activities and discussions that cannot be duplicated. Your presence and contributions to this course are extremely important. Therefore, attendance is mandatory! To be eligible for an A in this course you must be present at least 90% of class time, regardless of points accrued. Each absence is 5 points or 5% off your grade. Although absences from class really can’t be made up, I will work with you under special conditions. (remember - these will only be for extreme circumstances!) Tardiness is considered unprofessional behavior. Three (3) late arrivals to class will result in an unexcused absence and grade will be docked accordingly.

Tests / Quizes (60%)
   a) Three (3) content exams (50%)
   b) Five (5) quizzes (10%)

400 Assignments: (35%)
   a) Research paper on societal issues and ethical considerations with oral presentation (10 references) (10%)
   b) Engineering design (STEM) challenge for solving a societal solution with ethical considerations (15%)
   c) Weekly reflection / discussion on readings (10%)

600 Assignments
   a) Scholarly review of the literature on a societal issue with a technical focus (20 sources with 10 minimum from empirical journals) (10%)
   b) Engineering design (STEM) challenge for solving a societal solution (15%)
   c) Weekly Reflection / discussion on readings (5%)
   d) Classroom / Community Volunteer hours for societal concerns endeavor with written report and documentation (5%)

Participation, Professionalism & Attitude - 5%
This section of your grade is determined by your willingness to learn and keep involved in class. Although there is not a particular assignment or accurate assessment other than teacher observation, you will have input on this section on both your midterm and final evaluations. However, I will be watching for the willingness and positive attitudes toward both the teaching and learning that you would demonstrate in front of your own classroom.

Overall Course grading
   94% - 100% = A
   90% - 93.99% = A-
   87% - 89.99% = B+
   83% - 86.99% = B
   80% - 82.99% = B-
   77% - 79.99% = C+
   73% - 76.99% = C
70% - 72.99% = C-
67% - 69.99% = D+
63% - 66.99% = D
60% - 62.99% = D-
< 60% = F
Course Outline

Week 1: Introduction to Science Technology Engineering and Mathematics (STEM) and Society. Our changing world!

Week 2: Nature of Science (how and why we know what we know)

Week 3: History of Science, STEM and Technological Development

Week 4: Contemporary Issues in Science, Health and Society I (Ethics and Society)

Week 5: Contemporary Issues in Science, Health, and Society II (Ethics and Society)

Week 6: Contemporary Issues in Engineering and Technology I (Grand Design Challenges) (Ethics and Society)

Week 7: Contemporary Issues in Engineering and Technology II (Grand Design Challenges) (Ethics and Society)

Week 8: Midterm paper presentations

Week 9: Introduction to Engineering Design and Technology for the public

Week 10: Ask, Research, Imagine and Create Engineering Plan

Week 11: Test, Improve, Redesign, and communicate Engineering Plan

Week 12: Ethics of the advancement of science, technology and STEM I

Week 13: Ethics of the advancement of science, technology and STEM II

Week 14: Diversity and cultural issues with STEM and STEM related careers

Week 15: Presentations of Engineering Challenges to solve