



## Course Syllabus – Spring 2012

### SCI 2310 Leadership in Science and Mathematics

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	<b>Office Hours:</b>	MF 1-2:30, R 11-12, F 10-12, R 2:30-5:30, and by appointment	TR 9-10, MWR 11-11:30, MW 1-4, R 2:30-4, F 11-12, and by appointment.

#### Course Overview

**Catalog Description:** Optional course for the general education requirement for Leadership Excellence and Virtue. An exploration of leadership, excellence, and virtue in the utilization of scientific disciplines to solve problems. Students will gain experience in scientific research through addressing a need expressed by a partner community. Laboratory participation is an integral part of the course.

**Pre-requisites:** general education science and math requirements, and sophomore standing.

**Course Overview:** This course will meet for 2 hours of lecture and one 3 hour lab each week. During the lecture hours, course content in leadership, excellence, virtue, and scientific background will be discussed. During the lab, faculty and students will research the problem and propose solutions. This year's service related research project involves an energy audit and mathematical modeling. We will be working in conjunction with a local nonprofit group to determine their energy usage and suggest (via optimization of a model) the most effective changes they can make to save energy.

#### Course Objectives:

Students participating in this course will:

1. Learn scientific principles and skills which are needed to understand the research project.
2. Apply knowledge from multiple academic disciplines to construct a solution to the problem.
3. Work effectively as part of a research team.
4. Explore the cultural and practical elements of leadership in the context of the research problem
5. Exercise leadership in interactions with peers and the host community
6. Demonstrate excellence in the research effort and in the quality of their chosen solution
7. Explore the virtues commonly associated with STEM research and with community service.
8. Demonstrate an understanding of virtuous behavior in their research participation.
9. Reflect critically on their role in the research project and on the intellectual and spiritual growth that they have experienced.
10. Gain a greater appreciation for the interdependence of various communities.

#### Course Materials and Support:

**Required Course Materials:** "How Good People Make Tough Choices", by R.M. Kidder, ISBN: 0688175902.

Computer with Internet connection.

Supplementary materials supplied by instructors.

## Course Policies:

**Attendance:** Students are expected to be present and on time for all class meetings. Excessive absences (more than 4 unexcused) may result in the student being dropped from the course. Contacting an instructor via email or phone prior to missing class for any reason is strongly encouraged, even if it is for a school sponsored event.

### **Grade Determination:**

**15% Quizzes:** Periodically, students will be quizzed on course topics.

**15% Journal Entries:** Each student will keep a digital journal to record their responses to specific questions. The quality and level of thought in the responses will be evaluated by the instructors.

**15% Midterm exam**

**15% Final exam**

**40% Laboratory:** This grade will be subdivided as follows:

**50% Final product:** A final report/presentation/demonstration, as appropriate, of the students' response to the research problem assigned.

**40% Lab participation:** Peer and faculty evaluations of individual student participation in the developed solution.

**10% Lab notebook:** Each student will keep hardcopy or digital notes on all decisions, discussions, and data generated during the laboratory periods.

**Make-up Work:** Make-up work will be given for excused absences only at the discretion of the instructors.

**+/- Grade System:** The following scale will be used in calculating letter grades:

92.00 to 100 = A, 89.00 to 91.99 = A-, 86.00 to 88.99 = B+, 82.00 to 85.99 = B, 79.00 to 81.99 = B-, 76.00 to 78.99 = C+, 72.00 to 75.99 = C, 69.00 to 71.99 = C-, 66.00 to 68.99 = D+, 62.00 to 65.99 = D, 59.00 to 61.99 = D-, 0.00 to 58.99 = F.

**Academic Dishonesty:** Every student is responsible for submitting original work when required. When working as a group, each student should have an understanding of what the group is doing and actively participate. Submitting another's work as your own is grounds for automatic failure. Serious cases such as plagiarism will be reported to the Dean of Students.

**ADA Compliance:** McMurry University abides by Section 504 of the Rehabilitation Act of 1973, which stipulates that no otherwise qualified student shall be denied the benefits of an education "solely by reason of a handicap". If you have a documented disability that may impact your performance in this class and for which you may be requesting accommodation, you must be registered with and provide documentation of your disability to the Disability Services Office, located in President Hall. Arrangements will be made for students needing special accommodations.

**Cell Phones, Calculators, and other Electronic Devices:** All electronic devices must be set for silent operation during class. Computers are only to be used for conducting class work, any non-academic use of a computer or other electronic device for communication, browsing, or game playing during class will result in a grade reduction. Repeated violations may result in other penalties.

**Other Course Policies:** This course relies heavily on collaborative effort and the ability to work well with each other. We expect each of you to actively participate in class and outside of class as necessary to ensure the success of the assigned project.

## Major Projects, Required Activities, and Assignments:

The course will center around a service related research project. This year, the project will be to work with one or more area nonprofit groups to take an audit of their energy usage and build a mathematical model of it. The details of how this will be done will be developed by the class during the course of the semester, but in general the methods may include direct measuring of watts over time, statistical estimates of usage, and modeling of external factors such as shade and window coverings, etc.

## Tentative Course Schedule:

The course schedule will be posted on Moodle and adjusted as needed during the semester as the research project advances.

The final exam is scheduled for May 8, 8-10 am.

### Course Objectives/Student Learning Outcomes And their Linkage to Program and University Goals and Outcomes

Course objectives and goals	Linked to which MCMOST program goal(s)	Linked to which institutional goal(s)?	Types of evidence that might be used to demonstrate student achievement of objectives & goals
Explore the historical, cultural, and/or practical elements of leadership.	Foster the development of leadership skills of participants in center activities.  Encourage excellence in the implementation of all center activities.	2,4	Students will successfully answer quiz questions on leadership and give satisfactory responses in their journal entries considering leadership.
Demonstrate understanding of leadership in personal contexts.	Foster the development of leadership skills of participants in center activities.  Encourage excellence in the implementation of all center activities.	1,2,4,8	Students will demonstrate leadership in personal contexts by receiving a satisfactory or better rating on Peer Evaluations. Students will show improvement on embedded questions that involve leadership through the use of a Pre/Post Survey.
Explore the historical, cultural, and/or practical elements of virtue.	Promote the exercise of virtue in human relationships.  Encourage excellence in the implementation of all center activities.	1,2,3,4,8	Students will successfully answer quiz questions on virtues and give satisfactory responses in their journal entries considering virtues.
Demonstrate understanding of virtuous behavior in personal contexts.	Promote the exercise of virtue in human relationships.  Encourage excellence in the implementation of all center activities.	1,2,3,4,8	Students will demonstrate an understanding of virtuous behavior by giving satisfactory responses in their journal entries that analyze their own behavior. Students will show improvement on embedded questions about demonstrating an understanding of virtuous behavior through the use of a Pre/Post Survey.

#### Institutional Goals Supported:

1. Students acquire an education shaped by Christian values.
2. Students are equipped for successful careers and post-graduate education.
3. Students acquire enthusiasm for lifelong learning through expanded intellectual and cultural experiences.
4. Students, in a community where leadership is cultivated, acquire a solid basis for future lives of leadership.
8. The institution will engage in an ongoing pursuit of excellence in curricula, programs, and policies.