SEOR 798/680 Systems Engineering and Operations Research

Applied Project Course

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Course Description

This course is intended to be the capstone course for the Masters Degree programs in Systems Engineering, Operations Research, and related Certificate programs. Emphasis in this course will be placed on the activities involved in proposal planning, completion, documentation, and presentation, in addition to the creative process of engineering design. Students will be required to manage a complex, unstructured project using the analytical, technical, management and teamwork skills that they have developed.

Prerequisites: 21 graduate credits in Systems Engineering and/or Operations Research
(SE students must have taken SYST 611)

Learning Objectives

SEOR 798/680 should be considered as an integrative course where through a team project and individual report outs you will show your understanding of concepts and methods by applying the lessons learned from your respective programs of study at GMU. This course will give you the creative space to interrelate the individual lesson pieces into the bigger systems picture, simulating a real life scenario. At the end of this course, you will formally demonstrate your assimilation and application of related materials within your disciplines to the SEOR faculty, who will review your oral presentations and written reports in lieu of a final exam.

Creative/Critical Process Thinking

Given a specific SEOR problem to address, students should be able to

- Select relevant applications from their knowledge base of SEOR methods and analytical approaches
- Generate an individualized, synthesized approach suitable to a successful resolution of the problem at hand

Course and Team Project Requirements

- The class will self-organize into project teams
- Each team will formally present a project proposal during the second class. (Certain projects will be proposed by sponsors for possible selection by teams.) Each member of a team must present an equal time
- Each team must tackle a complex system (interdisciplinary preferred) project
- A list of a few suggested projects will be provided, or teams may develop their own project proposal ideas (projects may be related to a student's job but must be separate from the student's assigned work responsibilities)
- The selected projects must be sufficiently complex for a capstone project, meaningful for learning, practical for application, and accomplishable (have closure) within an approximately 14 week time period, and must use
    - analytical and modeling methods where appropriate
- The project must provide expected value to the stakeholders
    - One of the stakeholders is the SEOR faculty as a group who will listen to and evaluate your formal project presentation and formal project reports
- The project should incorporate a system representation methodology/modeling language for communication among stakeholders
- The course will require on average 10 hours per person per week
- Each team will be composed of three-four students who will be responsible for:
    - developing a solution to their project,
    - producing interim deliverables,
    - writing a final report, and
    - presenting results to faculty and external sponsors. Each group is strongly encouraged to have an identified sponsor for the work being performed (sponsors are expected to provide guidance and feedback on students' work)
- A system solution will be developed after consideration of alternatives and presented to appropriate stakeholders
- Each group will construct and maintain a group website describing the project's development and status. (This website should be maintained within one of your team member's web space. When the project material has matured sufficiently, the project website URL will be made available to SEOR faculty for reviewing.)
- The project final presentation will be in PowerPoint for the oral report. Each teammate will provide an equal time portion of the presentation
    - Each presenter is evaluated
    - As will be the entire project effort and presentation
- A formal project report will be written by each team for faculty review
    - Must demonstrate the ability to use creativity to resolve ambiguity in the project system while managing complexity
    - Demonstrate systems engineering and/or operations research theory and methods in a holistic approach to the systems research

- Although not required, a top level project should be presentable in a conference proceeding or publishable in an appropriate journal

Final Deliverables for the Project Course

1. Team project oral presentation in PowerPoint. Submission will be digital in MSPowerPoint 2007 to the Blackboard course website; each team member will participate individually and equally in the presentation
2. Formal written report of the project which includes:
   a. one page executive summary or abstract
   b. table of contents, tables and figures, and bibliography
   c. the text body of the written report should not exceed 25 pages (no smaller than 10 point font, single spaced, 1" margins). However, supporting appendices may be provided additionally. Submission will be digital in MSWord 2007 to the Blackboard course website

(Projects will be archived for the benefit of future student guidance.)

Instructor:

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Office hours: Fri. 14:30-16:30 ET or by appointment
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Suggested Readings:

Useful readings will be provided on the course website or suggested for student private lookup.

Grading Policy:

Essentially, you will be evaluated based on your depth and breadth of thinking, comparable to assessing quality and productivity in an enterprise.

Upon individual team requests for status reviews at useful intervals throughout the semester, the instructor will review and provide feedback on reports and presentation materials using a guidance rubric that will be provided.

The final grade will be based on:

15%	Class Participation (attendance, discussions, and holistic thinking)
15%	Website
35%	Final team written report
35%	Faculty/Sponsor evaluation of final project presentation

Dissemination Policy:

The information provided in each project should not be proprietary but instead openly shareable with others for research and educational purposes.

Systems engineering and operations research is an evolving field, and good and creative new thoughts and ideas developed by members of the class can and will be folded into the next iteration of teaching and research. This is how scholarship develops. Any future reuse of the material will be credited to former students in a general way. Should you publish a work, then the citation will be given in the future.

Policy on Academic Integrity:

In the corporate environment and in various cultures it may be important to obtain a good answer to the question at hand while it may not be as important to be original or cite sources of ideas used. This is not the case at George Mason University, where it is important to create original work **and** to cite the source of ideas very carefully and completely. The George Mason University Honor Code can be found at: http://www.gmu.edu/catalog/apolicies/#faculty_responsibilities. These policies underscore the importance in academia of creativity and proper acknowledgment of sources. In order to achieve the objectives of this course, the work of individuals and teams must be original and where appropriate cite the contribution of others and relevant sources.