Texas A&M University
Zachry Department of Civil Engineering
CVEN 322-150: Civil Engineering Systems (3-0)
Summer I 2016 – Study Abroad (Rome, Italy)
Course Syllabus

Description: Fundamentals of engineering economics; economic analysis and evaluation of engineering projects. Application of systems analysis to civil engineering problems: optimization modeling, solution techniques and simulation analysis.

Instructor: Dr. Luca Quadrifoglio
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Prerequisite: STAT 211

Textbook: *Civil and Environmental Systems Engineering*, 2nd Edition, by Charles S. Revelle, Earl Whitlatch and Jeff Wright; Pearson Prentice-Hall.
ISBN-10: 0130478229 *ISBN-13: 978-0130478221*
Supplemental readings will also be assigned

Class website: @ eCampus (http://ecampus.tamu.edu/)
Assignments, lectures and other material will be posted.

Evaluation:

Reflection Papers (RP)	**10%**	
Homework (HW)	**15%**	
Quizzes (Q)	**10%**	
Final Exam (F)	**65%**	and so divided:
- Engineering Economics (F1)	40%	(replaced by T1, only if F1 < T1)
- Optimization (F2)	40%	
- Simulation (F3)	20%	

A test will be assigned on Engineering Economics (T1). If the grade (%) of T1 is better than F1, then F1 is dropped and replaced by T1; otherwise T1 is dropped.
F2/F3 cannot be replaced or dropped.

Grading: You will be guaranteed at least the following letter grades:
A: ≥90; B: ≥80 and <90; C: ≥70 and <80; D: ≥60 and <70; F: <60.
However, depending on the performance of the class overall, you might earn a better grade than expected (example: you might earn an A even with a final score <90)

Homework/ Quizzes: Homework will be assigned and directed during afternoon sessions. Active participation will guarantee you full credit for it.
At the end of each day of class a quiz will also be assigned and graded.

Exams: The Final Exam will be ***closed book/notes***, but two 8.5x11 cheat sheet (both sides written) will be allowed. The Exam can include any type of questions (True/False, multiple choice, short answer, work-out problems and previously assigned homework assignments).

Reflection Paper: The Eng. Int. Office will assess your experience by asking you to provide pre and post reflection papers.

Attendance: The University views class attendance as the responsibility of an individual student. It has been observed that attendance has a direct correlation with your final grade, so attendance is essential to complete the course successfully. It is strongly recommended that you come to class and pay attention: use the class time wisely to understand the material; it will save you a lot of your study time throughout the semester.
Missing exams is not acceptable and you will earn a 0, unless an excused absence is documented. University rules related to excused and unexcused absences are located on-line at http://student-rules.tamu.edu/rule07.

Course Objectives:
This class is an introduction to civil engineering systems. The main objectives of this class are:

1. Introduce the student to the principles of engineering economics and economic evaluation techniques;
2. Introduce the student to engineering optimization models including model formulation, solution approaches, and model implementation in computer environments, such as MS Excel and Matlab;
3. Introduce the student to engineering system simulation methods;
4. Demonstrate how system simulation, optimization techniques and engineering economics are used for decision support in civil engineering applications.

Learning Outcomes Addressed:
This course emphasizes the following ABET Learning Outcomes and Global Competency Outcomes.

1. Ability to apply knowledge of basic mathematics, science, and engineering;
2. Ability to analyze and interpret data;
3. Ability to design a civil and/or ocean engineering system to meet desired needs;
4. Ability to formulate and solve civil and/or ocean engineering problems;
5. Ability to use computers to solve civil and/or ocean engineering problems;
6. Ability to apply probability and economics to civil and/or ocean engineering decisions.
7. Culture Learning: the student expresses knowledge of the host culture (material culture and underlying values, beliefs and practices central to the host culture).
8. Cross-Cultural Thinking: ability to recognize his/her own culture in a comparative context.
9. Critical Thinking: ability to use knowledge, diverse cultural frames of reference, and alternative perspectives to think critically, solve problems, and evaluate sources & information.
10. Global Connections: ability to make complex global connections by analyzing global issues, processes, trends, and systems.
11. Academic or Professional Development: ability to articulate cross-cultural view of intended academic/professional field and to understand how his/her intended field is viewed and practiced in different cultural contexts.

Americans with Disabilities Act (ADA) Policy:

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information visit http://disability.tamu.edu.

Academic Integrity:

"An Aggie does not lie, cheat, or steal or tolerate those who do."

Students are expected to understand and abide by the Aggie Honor Code presented on the web at: http://www.tamu.edu/aggiehonor. No form of scholastic misconduct will be tolerated. Academic misconduct includes cheating, fabrication, falsification, multiple submissions, plagiarism, complicity, etc. These are more fully defined in the above web site. Violations will be handled in accordance with the Aggie Honor System Process described on the web site.

The handouts used in this course are copyrighted. By "handouts," I mean all materials generated for this class, which include but at not limited to syllabi, notes, quizzes, exams, in-class materials, review sheets, and additional problem sets. Because these materials are copyrighted, you do not have the right to copy the handouts unless I expressly grant permission.

Cheating on quizzes and exams will not be tolerated. Cheating will be reported and handled in accordance with the Aggie Honor System Process. Some or all examinations will be closed book; "looking at another student's examination or using external aids (for example, books, notes, calculators, conversation with others, or electronic devices)" during these examinations is a violation of Texas A&M Aggie Honor Code, Cheating, unless specifically allowed in advance by the instructor.

Unless specifically allowed in advance by the instructor, all assignments and homework in this class are expected to be completed based on individual effort. Copying the work of others, including homework, is a violation of Texas A&M Aggie Honor Code, Cheating.

Tentative Course Schedule:

Week	Day	Lecture	Topics	Text Reading
1	1	1	Introduction; Cash Flow; Interest	Ch.14
		2	Rule of 72; Loan Tables; Economic Equivalences	
		3	Economics Equivalences	
	2	4	Excel; Nominal/Effective Interest	
		5	PW & Breakeven Analysis	Ch.15
		6	PW(i) Charts; IRR analysis	
2	3	7	B/C Analysis; Payback Period; Sunk Cost; Bonds	
		8	Depreciation, Taxes	Ch.16
		9	Inflation; Test 1 Guidelines	
	4	10	**Test 1**	
		11	Systems Introduction	Ch.1/2
		12	Linear Programming & Graphical solution	Ch.3/4
	5	13	Simplex Algorithm	
		14	Excel Solver	
		15	Sensitivity Analysis	
3	6	16	Network Modeling	Ch.6
		17	Multi-Objective Problems	Ch.5
		18	Integer Programming	Ch.7
	7	19	Simulation – Introduction, Input Analysis	Handouts
		20	Simulation – Output Analysis	
		21	Simulation – Matlab SimEvents	
	8	22	**Final**	