

SYST 330: Systems Methods
Spring 2010

Instructor: Prof. K. C. Chang,
Office: Eng, Rm. 2235, (703) 993-1639,
Office hour: 12-1:30 PM, TR, Email: kchang@gmu.edu
Class room: EH, Rm. 277, 1:30 - 2:45 PM, TR

COURSE DESCRIPTION

The objective of this course is to provide students with a general introduction to a variety of quantitative techniques that are relevant to systems engineering. The focus is on the use of quantitative techniques to model and evaluate design options. The scope of this course include: Analysis methods of systems engineering design and management. Decision analysis, models for economic evaluation, optimization in design and operations, probability and statistical methods, queuing theory and analysis, management control techniques, reliability and maintainability analysis, and economic and life cycle cost analysis.

Prerequisite

Prerequisites: Math 114, Coreq: SYST 221, STAT 346

COURSE OUTLINE

Topics	Reference
<i>Alternative and Models in Decision Making</i>	Chap. 7
<i>Models for Economic Evaluation</i>	Chap. 8
<i>Optimization in Design and Operations</i>	Chap. 9
<i>Probability and Statistical Methods</i>	Appendix B and Handouts
<i>Queuing Theory and Analysis</i>	Chap. 10
<i>Control Concepts and Techniques</i>	Chap. 11
<i>Design for Reliability</i>	Chap. 12
<i>Markov Chain Analysis and Applications</i>	Handouts
<i>Design for Maintainability</i>	Chap. 13
<i>Design for Economic Feasibility</i>	Chap. 17

COURSE ASSIGNMENTS AND GRADING

This course will have weekly Homework assignments, two midterms, a final exam, and random quizzes. They will constitute 20%, 20%, 20%, 30% and 10% of the grade, respectively. Some homework assignments may be done using MATLAB.

COURSE MATERIALS

Required text: Blanchard and Fabrycki, *Systems Engineering and Analysis*, 4rd Edition, Prentice Hall, 2006.

Supplement text: J. Sepulveda, W. Souder, B. Gottfried, *Engineering Economics*, Schaum's outlines, McGraw Hill, 1984.

COURSE SCHEDULE

Wk#1	Course Introduction/Decision Making Model	Chap 7
Wk#1	Decision under Risk and Uncertainty	Chap 7
Wk#2	Economic Models	Chap 8
Wk#2	Economic Evaluation	Chap 8
Wk#3	Probability Concept	Appendix B
Wk#3	Probabilistic Analysis	Appendix B
Wk#4	Statistical Methods	Handouts
Wk#5	Mid-term 1: Chap. 7, 8, Appendix B, Handouts	
Wk#5	Optimization Theory	Chap 9
Wk#6	Constrained and Unconstrained Optimization	Chap 9
Wk#6	Constrained and Unconstrained Optimization	Chap 9
Wk#7	Queuing Theory	Chap 10
Wk#7	Queuing Analysis	Chap 10
Wk#8	Spring Recess	
Wk#9	Queuing Analysis	Chap 10
Wk#10	Mid-term 2: Chap. 9, 10	
Wk#10	Control Concepts	Chap 11
Wk#11	Control Techniques	Chap 11
Wk#11	Reliability: Concept and Measures	Chap 12
Wk#12	Markov Chain for Reliability and Safety Analysis	Handouts
Wk#13	Reliability: Design and Evaluation	Chap 12
Wk#13	Maintainability: Concept and Measures	Chap 13
Wk#14	Maintainability: Design and Evaluation	Chap 13
Wk#14	Design for Economic Feasibility	Chap 17
Wk#15	Life-Cycle Cost Analysis	Chap 17
Wk#16	Final Exam: Chap. 11, 12, 13, 17, Handouts	