SYST 330: Systems Methods
Spring 2014

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Course web site: GMU Blackboard

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, management control techniques, safety, reliability, and maintainability analysis, and economic and life cycle cost analysis.

Prerequisite

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

COURSE OUTLINE

Topics	Reference
Alternative and Models in Decision Making	**Chap. 7**
Models for Economic Evaluation	**Chap. 8**
Optimization in Design and Operations	**Chap. 9**
Probability and Statistical Methods	**Appendix B and Handouts**
Queuing Theory and Analysis	**Chap. 10**
Control Concepts and Techniques	**Chap. 11**
Design for Reliability	**Chap. 12**
Reliability and Safety Analysis	**Handouts**
Design for Maintainability	**Chap. 13**
Design for Economic Feasibility	**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*, 5th Edition, Prentice Hall, 2011.
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	*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*	