

## CSCE 317: COMPUTER SYSTEMS ENGINEERING

### **Catalog Description:**

**317—Computer Systems Engineering.** (3) (Prereq: CSCE 240, MATH 242, STAT 509)

System-level modeling and evaluation of computer systems; requirements elicitation and specification, architectural design, reliability and performance evaluation, Markov modeling, life-cycle cost analysis, project management.

### **Prerequisite(s) By Topic:**

Software engineering

Differential equations

Probability and statistics

### **Textbook(s) and Other Required Material:**

Benjamin S. Blanchard and Walter J. Fabrycky, *Systems Engineering and Analysis*, 3<sup>rd</sup> edition, Pearson Prentice Hall, Englewood Cliffs, NJ, 1998.

**Computing Platform:** Linux, Windows XP

### **Course Objectives:** {Assessment Methods Shown in Braces}

1. Specify computer system requirements {tests, homework, project}
2. Develop and evaluate analytical models of computer systems and components with respect to reliability, performance, and life-cycle cost {tests, homework, project}
3. Evaluate trade-offs in computer system design {tests, homework, project}
4. Allocate resources and responsibilities for project management {tests, homework, project}
5. Communicate technical information in written reports {project}

### **Topics Covered:**

1. Introduction (1)
2. Theoretical considerations (4)
3. Requirements analysis and elicitation (4)
4. Requirements specification (4)
5. System architectural design (4)
6. Implementation (4)
7. Testing (4)
8. Maintenance (4)
9. Project management (4)
10. Hardware and software co-design (4)
11. Reviews and examinations (5)

### **Laboratory Projects and Other Student Work**

Students complete several homework assignments and a small team systems engineering project in addition to the examinations.

**Syllabus Flexibility:** Medium. The instructor chooses the textbook and the specific assignments.

**Relationship of Course to Program Outcomes:**

The contribution of each course objective to meeting the program outcomes is indicated with the scale:

3 = major contributor, 2 = moderate contributor, 1 = minor contributor. Blank if not related.

Course Objectives	Program Outcomes										
	1. Logic & Math	2. Computing Fundamentals	3. Apply Computing Principles	4. Work on teams	5. Communicate Effectively	6. Liberal arts & Soc. Sciences	7. Basic Science and Lab Procedures	8. Learn New Tools & Processes	9. Employed upon Graduation	10. Application Area	11. Electronics and Digital Sys Design
1. Specify computer system requirements		3	3		2				2		1
2. Develop and evaluate analytical models of computer systems and components with respect to reliability, performance, and life-cycle cost	3	3	3					3	2		2
3. Evaluate trade-offs in computer system design	1	2	3						1		
Allocate resources and responsibilities for project management				3	2	1					
4. Communicate in written and oral reports					3				2		

**Estimated Computing Category Content (Semester hours):**

Area	Core	Advanced	Area	Core	Advanced
Algorithms			Data Structures		
Software Design		1.5	Programming Languages		
Computer Architecture		1.5			

**Estimated Information Systems Category Content (Semester hours):**

Computer Information Systems majors do not take this course

**Oral and Written Communication:**

Written project report.

**Social and Ethical Issues:** None

**Theoretical Content:**

Polynomial arithmetic, Poisson processes, Elementary queuing theory

**Analysis and Design:**

Simulation of network protocols, network design problems, protocol performance analysis

**Collaborative Work:** Team systems engineering project

**Class/Laboratory Schedule:**

Lecture: 3 periods of 50 minutes or 2 periods of 75 minutes per week

**Course Coordinator:** John Bowles

**Modification and Approval History:**

Initial description March 2004 by John Bowles for submission to Faculty Senate approval

Revised June 2005 by Caroline Eastman and John Bowles to conform to ABET format