CSCE 317: Computer Systems Engineering

1. Course number and name: CSCE 317: Computer Systems Engineering

2. Credit: 3-hrs; Contact: 3 lectures of 50 minutes each or 2 lectures of 75 minutes each per week

3. Instructor: Spring 2011: John B. Bowles

4. Text book: None
   Other Materials: John B. Bowles and Andrew K. S. Jardine, "Optimizing Life Cycle Costing Decisions for Sustainable Operations", Annual Reliability and Maintainability Symposium Tutorial, 2011.

   John B. Bowles "Introduction to reliability theory and practice", Annual Reliability and Maintainability Symposium Tutorial, 2001

   John B. Bowles, Class Notes: "Probability Review", "Poisson Processes", "Markovian Queing Systems"

   John B. Bowles, **"**Bounds on System Performance for Terminal Driven Systems", *Journal of Reliability, Maintainability, and Supportability in Systems Engineering*, Fall 2008

5. Specific course information
   a. Catalog description: 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.
   b. Prerequisites: CSCE 212, MATH 242, STAT 509
   c. Required in CE curricula

6. Specific goals for the course
   a. Specific outcomes of instruction:
      - Take an overall system and lifecycle view of the design and operation of a system.
      - Model and evaluate the reliability of system architectures.
      - Model and evaluate the performance and dynamic behavior of a system.
      - Model and evaluate the economics of cash flows in system design, development, and operation.

   b. Relation of course outcomes to Student Outcomes: CE: see page 2; CS & CIS: see page 3

7. Topics covered and approximate weight (14 weeks, 3 hours/week, 42 hours total)
   1. Systems engineering overview
   2. Probability review

3. Engineering Economic models, life-Cycle cost analysis and comparison of alternatives
4. System Reliability models, design evaluation and comparison of alternatives
5. Markovian queueing system models
    c. System Performance models, bottleneck analysis and comparison of alternative architectures

d.

Computer Engineering

Relation of Course Outcomes to EAC Student Outcomes*

Course Outcomes (CE)	Student Outcomes											
	(a) apply knowledge of mathematics, science, and engineering	(b) design and conduct experiments, … interpret data	(c) design a system, component, or process to meet desired needs …	(d) function on multidisciplinary teams	(e) identify, formulate, and solve engineering problems	(f) an understanding of professional and ethical responsibility	(g) communicate effectively	(h) the broad education to understand the impact of engineering solutions …	(i) a recognition of the need for, and an ability to engage in life-long learning	(j) a knowledge of contemporary issues	(k) use the techniques, skills, and modern engineering tools ….	(CE) demonstrate knowledge of discrete mathematics [CE]
Criteria	a	b	c	d	e	f	g	h	i	j	k	CE
1. Take an overall system and lifecycle view of the design and operation of a system.												
2. Model and evaluate the reliability of system architectures.												
3. Model and evaluate the performance and dynamic behavior of a system.												
4. Model and evaluate the economics of cash flows in system design, development, and operation.												

* 3 = major contributor, 2 = moderate contributor, 1 = minor contributor; blank if not related

e.

Computer Science & Computer Information Systems

Relation of Course Outcomes to CAC Student Outcomes*

Course Outcomes (CS & CIS)	Student Outcomes											
	All									CS		CIS
	(a) apply knowledge of computing and mathematics appropriate to the discipline	(b) analyze a problem, and identify and define the computing requirements …	c) design, implement, and evaluate a computer-based system, …	(d) function effectively on teams to accomplish a common goal	(e) An understanding of professional, ethical, legal, … responsibilities	(f) communicate effectively with a range of audiences	(g) analyze the local and global impact of computing on … society	(h) Recognition of the need for … continuing professional development	(i) current techniques, skills, and tools necessary for computing practice	(j) apply mathematical foundations, algorithmic principles, and CS theory …	(k) apply design and development principles	(j) An understand processes that support the information systems environment.
Criteria	a	b	c	d	e	f	g	h	i	j	k	j
1. Take an overall system and lifecycle view of the design and operation of a system.												
2. Model and evaluate the reliability of system architectures.												
3. Model and evaluate the performance and dynamic behavior of a system.												
4. Model and evaluate the economics of cash flows in system design, development, and operation.												

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