Fall 2004

CEG 770: Computer Engineering Mathematics

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F04

CEG 770 Computer Engineering Mathematics

4 Credits, Fall Quarter 2004

Syllabus

Time/Place: Lecture: 4:10 – 5:25 PM, M. & W., 144 Rike Hall

Instructor: Dr. Yong Pei, 340 Russ Engineering Center
Tel. 937-775-5111, Email: ypei@cs.wright.edu
Office Hours: 2:30-4:30pm, Tu.

Description: Computer Engineering and Science students need proficiency in relevant applied mathematics to be able to discover and model difficult real-world computer engineering and science problems. The relationship of these problems to mathematical theory will be discussed. This course provides an introduction to linear and nonlinear programming, queueing theory, mathematics of signal processing, difference equations, and related differential and matrix equations. In addition to mathematical theory, appropriate applications will be presented.

Prerequisites: CEG 616 (Matrix Computations) and CS 600 (Data Structures and Software Design).

Textbooks:

1. Operations Research, Second Edition, Richard Bronson and Govindasami Naadimuthu, Schaum's Outlines, McGraw-Hill, 1997.
2. Advanced Engineering Mathematics with Matlab, Second Edition, Dean G. Duffy, Chapman & Hall/CRC, 2003.
3. Signals and Systems, Hwei P. Hsu, Schaum's Oultines, McGraw-Hill, 1995.
4. Advanced Mathematics for Engineers and Scientists, Murray R. Spiegel, Schaum's Outlines, McGraw-Hill, 1971.

References:

1. Linear and Nonlinear Programming, Stephen G. Nash and Ariela Sofer, McGraw-Hill, 1996.
2. Queueing Systems, Volume I: Theory, L.Kleinrock, John Wiley & Sons, 1975.
3. Digital Signal Processing: A Practical Approach, Second Edition, Emmanuel Ifeachor and Barrie Jervis, Prentice-Hall, 2002.
4. Matrix Theory: A Second Course, James M. Ortega, Plenum Press, 1987.
5. An Introduction to Difference Equations, Second Edition, Saber Elaydi, Springer-Verlag, 1999.

Software: We will use Matlab as our primary programming environment. It would be useful for you to have the Student Edition with several of the relevant toolboxes such as Optimization and Signal Processing. You may use RC152C lab. It has Matlab and all the toolboxes needed for this course.

Course Website: Through WebCT

Grading:

- Mid-term exam – **30%**
- Final exam – **40%**
- Projects and Homework assignments – **30%**

(including textbook problems/programming)

Requirements and Policy:

Students are expected to have graduate student status. A solid background in matrix algebra is expected. **HW** is due at the start of class on date specified. Exceptions may be made in special circumstances: documentation required. No late exams unless verifiable emergency.

All work must be your own. However, sharing ideas and general computer skills with others outside of class is encouraged. Reading assignments will be given for the Textbooks and References above. Unless specific questions are asked, it is assumed that students are studying and understand the material which parallels the lecture. Questions concerning reading assignments are encouraged.

Schedule: Topics may vary Exam dates are firm.

Week	**Topic/Tests etc.**
1-3	Basic concepts of linear programming; the simplex method. Selected topics from Chapters 1,2,3,5 of Bronson.
3-4	Nonlinear Programming – basic descent methods, conjugate directions and Newton methods. Selected topics from Chapters 10-12 of Bronson.
5-8	Queueing Theory.
	(Mid-term exam in the 5th week)
9-10	Mathematical Foundations of Systems and Signals with Applications. Selected topics from Chapters 4, 7, 8, and 13 of Spiegel and Chapters 1-4 of Hsu.
10	Advanced Topics in Digital Signal Processing (as time permits). Chapter 3 of Ifeachor and Jervis.
	Final Exam.