

**ECE 3510, Engineering of Real-Time Systems
Required Course (CPE)**

2006-2007 Catalog Data: Characterizing, modeling and specifying real time systems. Designing, programming and verifying sequential and concurrent real time systems. Software engineering processes in real time system development. Case studies and project using C/C++.

Credits Hours: 3-0

Prerequisites: ECE 2510, CS 1120

Class Schedule: Monday, Wednesday and Friday, 2:30 to 3:20 pm

Textbook: *Real-Time Systems*, Liu, J.W.S., ISBN: 0-13-099651-3, Prentice Hall, 2000.

Recommended Materials:

[1] *Visual C++. Net How To Program*, (2nd Edition), Deitel H.M., Deitel, P.J., and Nieto T.R., ISBN: 0-13-437377-4, Prentice Hall, 2002

[2] *Visual Basic .NET How To Program*, (2nd Edition), Deitel H.M., Deitel, P.J., and Nieto T.R., ISBN: 0-13-029363-6, Prentice Hall, 2002

[3] *Real-Time Digital Signal Processing – Implementations and Applications*, by Sen M. Kuo, Bob H. Lee, Wenshun Tian, ISBN: 978-0470014950 , Wiley 2006

Coordinator: Massood Z. Atashbar, Associate Professor, ECE

Instructor (Fall 2006): Liang Dong, Assistant Professor, ECE

Prerequisites by Topic:

1. Basic knowledge of how to structure and write computer programs in object orientated languages.
2. Knowledge in signals and systems.
3. An understanding of automated systems.
4. Basic knowledge of embedded microcontrollers and microcomputer architecture.
5. A basic understanding of computer operating systems and peripheral interconnection.

Course Objectives: (ABET Learning Outcomes)

ABET learning outcome assigned to this course be ECE assessment plan: d, g, and i.

1. Learn how to document basic development processes.
2. Learn how to comment and structure code for ease of readability and maintenance.
3. Understand the basic issues associated with data acquisition and analysis and how to compensate appropriately.
4. Learn how to create an effective user interface for practical applications.
5. Be able to research current information and subsequently be able to assess the viability of certain market relevant products.

6. To assess ABET outcomes b and h.

Topics: Real-Time systems
Software Engineering Process
Coding Standards
Graphical User Interface Development Standards
Windows Programming
Real-Time Operating Systems
Signal Analysis
Data Acquisition concepts
Digital to/from Analog converters
Serial Communications
Advanced Programming Topics

Evaluation: Assignments 30%
Midterm Exam 30%
Final Exam 40%

Grading Policy: Letter: A BA B CB C CD D E
Range: 100-91 90-86 85-81 80-76 75-71 70-66 65-61 60-0

Computer Usage: Students will have to extensively use computers to code, test and document various programming assignments in Visual Basic and/or C++.

Contribution to Professional Component:

Engineering Design: 2 credits or 66.7%
Engineering Science: 1 credit or 33.3%

Relation of Course to Program Outcomes:

This course provides significant support for:
EE and CE programs objectives depth and breadth.
ECE expected learning outcomes d, g, and i.

Prepared By: Liang Dong, Assistant Professor, ECE, March 23rd, 2007