



**INTER AMERICAN UNIVERSITY OF PUERTO RICO
BAYAMON CAMPUS
SCHOOL OF ENGINEERING
ELECTRICAL AND COMPUTER ENGINEERING DEPARTMENT**

**ELEN 4416 – System Design Based on Microprocessors
Technical Elective**

Catalog Description: Study of fundamental criteria for the design of microprocessors base systems. Analysis of different types commercially available microprocessors and how to select them for a given application. Study of interfaces, memories and bus structure. Interface design with keyboards, digitizers, pens, mice, displays, mass memory and other devices. Analysis of series and parallel computing and multiple processors systems. Students will develop a project related to industry application.

Pre-requisite(s): ELEN 3340 - Microprocessors

Textbook: Gaonkar G. S., *“Microprocessor Architecture, Programming, and Applications with the 8085, 5th Edition, Prentice Hall, 2002.*

References:

Keitz W., *“Microprocessor and Microcontroller Fundamentals: The 8085 and 8051 Hardware and Software”, Prentice Hall, 1998.*

Uffenbeck, John; *“80x86 Family, The: Design, Programming, and Interfacing, 3/E”, Prentice Hall, 2002.*

Slater, M., *“Microprocessor-Based Design: A comprehensive guide to Effective Hardware Design”, Prentice Hall, 2003.*

Triebel, Walter A.; *“8088 and 8086 Microprocessors, The: Programming, Interfacing, Software, Hardware, and Applications, 4/E”, Prentice Hall, 2004.*

Brey, Barry B.; *“The Intel Microprocessors: 8086/8088, 80186/80188, 80286, 80386, 80486, Pentium and Pentium Pro Processors Architecture, Programming and Interfacing”, Prentice Hall, 2000*

Course Objectives

Upon successful completion of the course, the student will be able to:

1. Demonstrate a basic understanding of design of microprocessors.
2. Demonstrate a fundamental understanding of the characteristics and properties of microprocessors.
3. Understand, describe and explain the process of designing solutions to industry related problems.
4. Recognize and describe the industry different types of microprocessors.
5. Select the correct microprocessor for solving industry problems based on evaluation of applications for effective use of based systems.
6. Design and implement the interfaces to connect the different peripherals in the microprocessor's based systems.
7. Apply the different techniques for the simulation, verification and test of the microprocessor's based systems.
8. Analyze the design with the using of the computer aided design tools (CAD).

Topics Covered

Lecture Topic*	Hours
1. Introduction	3
2. Microprocessors selection and description	6
3. Bus architecture	6
4. Bus Peripherals	6
5. Memories	9
6. General information communications	9
7. Secondary memory	6
8. Discussion and applications of interfaces and memory controllers	6

Laboratory Topic*	Hours
1. Introduction	2
2. Assembly Language	4
3. Instructions set	4
4. Intel Microprocessors	4
5. Data communications	4
6. Applications	4

*Schedule is subject to change

Class/Lab Schedule: Four credit hours. Forty-five hour lecture and thirty-hour laboratory per term.

Evaluation Strategies

1. Exams (70%): Two partial exams and a final exam will be scheduled early in the semester. You are expected to take the exams at the times and dates specified. All calculations must be done clearly, stating units and showing a coherent procedure to arrive to the results.
2. Homeworks (15%): Homeworks will be made weekly and are due at the first meeting class of the next week. Each student must work individually but team work is also encouraged for challenging problems.
3. Project (15%) A team open design project is required at the end of the course. Partial and final written reports will be submitted. A presentation is required at the end of the semester.

Grading Policy

Grades are reported according to the following standard grading system:
A (90-100), B (80-89), C (70-79), D (60-69), F (0-59)

Contribution of Course to Meeting Professional Component

Two credit hours of engineering science and one credit hour of engineering design.

Relationship of Course to Program Educational Objectives**

1	2	3	4
√	√		√

Relationship of Course to Program Outcomes**

a	b	c	d	e	f	g	h	i	j	k
	√	√	√	√		√	√	√		√

**The numbers and letters correspond to the Program Educational Objectives and Program Outcomes of mechanical engineering, respectively. The program objectives and outcomes can be found in the ECE department website at <http://bc.inter.edu/ingeelectrica>.

Revised by: Prof. Jaime H. Yeckle,

Date:03/22/07