Philadelphia University
Course Outline first 2016

Course Title	**:**	**: REAL-TIME SYSTEMS** **630512**
Prerequisite	**:**	Computer Design Lab 630430
Text Book	**:**	**1. Real-Time Computer Control,** By: Stuart Bennett, Prentice-Hall, 2nd edition, 1994**.** **2. Software Engineering for Real-Time Systems,** By: J. Cooling, Addison Wesley, UK 2003. www.pearsopneduc.com
Credit Hours	**:**	3 **Level** 2d year

Course Goals:

To cover the principles and design methods of real-time computer systems. It covers the interfacing techniques and microprocessor system realization. The principles of real-time operating systems and real-time software system will be covered in this course.

Time Schedule:

Duration:	16 weeks	**Lectures:**	3 hours /week

Objectives:

At Completing this module the student should be able to :

1-	Understand the operation of real-time computer systems.
2-	Design and implement microprocessor-based real-time systems
3-	Modify the performance of real-time systems.

	Course Contents	Week
	Reference (1):	
❖	**Chapter 1: INTRODUCTION TO REAL-TIME SYSTEMS:** Elements of a computer control system, Classification of RTS, Time constraints, Classification of programs.	2
❖	**Chapter 2: CONCEPTS OF COMPUTER CONTROL:** Sequence control, DDC, Supervisory control, Centralized control, Hierarchical systems, Distributed systems, Human-computer interface.	3
❖	**Chapter 3: HARDWARE REQUIREMENTS FOR REAL-TIME SYSTEMS:** Process related interfaces, Data transfer techniques, Standard interfaces.	3
❖	**Chapter 4: REAL-TIME COMPUTER CONTROL:** Implementation of control algorithms, Controller Tuning, Choice of sampling interval, Control algorithm realization.	2
❖	**Chapter 5: LANGUAGES FOR REAL-TIME APPLICATIONS:** Security, Readability, Flexibility, Simplicity, Portability, Efficiency, Run-time support, Interrupt.	1
	Reference (2):	
❖	**Chapter 4: REAL-TIME SOFTWARE & PROGRAM DESIGN:** Design fundamentals, Program control structure, and Data flow design.	2
❖	**Chapter 5: OPERATING SYSTEMS FOR REAL-TIME APPLICATIONS:** Basic features of RTOSs, Scheduling: concepts & implementation, Control of shared resources. Inter-task communication, Analysis & review of scheduling policies	2

Mode of Assessment

1-	**First Exam**	**20%**
2-	**Second Exam**	**20%**
3-	**Quizzes**	**20%**
4-	**Final Exam**	**40%**

References

1- **J.W.S. LIN,** Real-Time Systems, Prentice Hall, 2000.

2- **N. NISSANKE,** Real-Time Systems, Prentice Hall, 1997.

3- **R.J.A. BUHR & D.L. BAILEY,** An Introduction to Real-Time Systems, Prentice Hall, 1999.

4- **S. BENNETT & G.S. VIRK,** Computer Control of Real-Time Processes, IEE 1990.

5- **S. HEATH,** Embedded Systems Design, Newness 1999.

6- **W. VALVANO,** Embedded Microcomputer Systems: Real-Time Interfacing, Brooks-Cole Publisher, 2000