Course Specifications

Program(s) on which this course is given:	Electronics & Electrical Communications Engineering
Major or Minor element of programs:	Major
Department offering the program:	Electronics and Electrical Communications
Department offering the course:	Electronics and Electrical Communications
Academic year / Level:	Fourth Year
Date of original/modified specification approval:	2003/2010
Semester of course offering:	First

A- Basic Information

1.a. Title:	Control 2			**1.b. Code:**	ELC 407B			
2. Units/Credit hours per week:	2.a. Lectures	3	2.b. Tutorial	1	2.c. Practical	0	2.d. Total	4

B- Professional Information

1. Overall Aims of the Course:

- To analyse & design Digital Control Systems using the general state space representation.
- To gain general understanding and ability to develop PLC programs for sequential Control applications.

2. Intended Learning Outcomes of Course (ILOs):

a) Knowledge and Understanding

1. Identify basic concepts of state space representation of digital control systems (1.2, 1.7)
2. Define fundamentals of PLC program development for sequential control applications (1.2, 1.7)

b) Intellectual Skills

1. Analyze techniques in state space representation of DCS (3.1)
2. Analyze techniques in PLC programming for sequential control applications (3.1 , 3.2)
3. Solve Problems related to state space representation (3.7)
4. Apply design techniques in PLC programming (3.2)

c) Professional and Practical Skills

1. Design techniques in state space representation of DCS (2.4)
2. Design techniques in PLC programming (2.4)
3. Accumulate knowledge and use it in an efficient way in PLC programming and in solving problems (2.1 ,2.5)

d) General and Transferable Skills

1. Manage tasks efficiently (4.4)

3. Contents

Topic	Total hours	Lectures	Tutorial/ Practical
Introduction, state- space representation and pulse transfer function	6	3	2
Discretization & analysis of continuous state space systems	6	3	2
Controllability/observability	4	2	1

Pole-placement & observer design of discrete time controllers	6	3	2
Introduction to sequential logic development	4	2	2
PLC program development for sequential control applications	8	4	2
4. Teaching and Learning Methods	Lectures (Y)	Laboratory (N)	Seminar/Workshop (N)
	Class Activity (Y)	Case Study (N)	Projects (N)
	E-learning (N)	Assignments /Homework (Y)	Other: Videos

5. Student Assessment Methods	
5.a. Method	**To assess (with reference to the ILOs)**
-MATLAB Assignment	c1 – c3, d1
-Mid-term exam	a1 – a2, b1 – b4, c1 – c3
-Final exam	a1 – a2, b1 – b4, c1 – c3
5.b. Assessment Schedule	**Week**
-Assessment 1; MATLAB Assignment	4
-Assessment 2; Mid-term exam	8
Assessment 3; Final exam	15
5.c. Weighting of Assessments	
-MATLAB Assignment	10%
-Mid-Term Examination	20%
-Final-term Examination	70%
-Total	100 %

6. List of References

6.a. Course Notes: available together with PowerPoint lectures for PLC handouts

6.b. Essential Books (Text Books)

- Discrete Time Control Systems by K. Ogata
- Digital Control Systems : Analysis & Design by C. Philips & J.h. T. Nagle
- Programmable Logic Controllers by W. Bolton

6.c. Recommended Books: N/A.

6.d. Periodicals, Web Sites: www. Controleng.com

7. Facilities Required for Teaching and Learning

- Access to MATLAB.

Course Coordinator:	**Prof. Dr. Mohamad Aboulseoud Sultan**
Head of Department:	**Prof. Dr. Mahmoud Elhadidi**
Date:	**2011**