Arab Academy for Science and Technology & Maritime Transport
College of Engineering & Technology
Electrical and Control Engineering

University/Academy: Arab Academy for Science and Technology & Maritime Transport
Faculty/Institute: College of Engineering & Technology
Program: Electrical and Control Engineering

Form no. (12)
Course Specification

1- Course Data

Course Code:	Course Title:		Academic Year/Level:
EE 515	**Computer Control of Dynamic Systems**		5/10
Specialization:	**No. of Instructional Units:**	**Lecture** 2	
Electrical and Control Engineering	3	**Tytorial/Practical** 2	

2- Course Aim	To understand the idea of using computer automatic controlled systems
	To appreciate the power and flexibility of the digital control techniques.
	To Implement different controller algorithms using computer
	To use Matlab program to design the discrete controller for selected applications.
	To use data acquisition card for real implementation of the PID controller

3- Intended Learning Outcome	
a- Knowledge and Understanding	A.2 Basics of information and communication technology (ICT)
	A.4 Principles of design including elements design, process and/or a system related to specific disciplines
	A.12 Contemporary engineering topics
	A.15 Principles of operation and performance specifications of electrical and electromechanical engineering systems
	A.27 Analysis, design and implementation of various methods of control using analogue and digital control systems
b- Intellectual Skills	B.1 Select appropriate mathematical and computer-based methods for modeling and analyzing problems
	B.2 Select appropriate solutions for engineering problems based on analytical thinking
	B.3 Think in a creative and innovative way in problem solving and design
	B.7 Solve engineering problems, often on the basis of limited and possibly contradicting information
	B.8 Select and appraise appropriate ICT tools to a variety of engineering problems
	B.11 Analyze results of numerical models and assess their limitations
	B.19 Design computer programs to analyze and simulate different electrical systems components and control applications
c- Professional Skills	C.1 Apply knowledge of mathematics, science, information technology, design, business context and engineering practice integrally to solve engineering problems
	C.5 Use computational facilities and techniques, measuring instruments, workshops and laboratory equipment to design experiments, collect, analyze and interpret results
	C.6 Use a wide range of analytical tools, techniques, equipment, and software packages pertaining to the discipline and develop required computer programs
	C.7 Apply numerical modeling methods to engineering problems
	C.16 Specify and evaluate manufacturing of components and

	equipment related to electrical power and machines C.17 Apply modern techniques, skills and engineering tools to electrical power and machines engineering systems C.19 Implement hardware and interface circuit for digital control and electrical drives system. C.20 Evaluate different techniques and strategies for solving electrical engineering problems
d- General Skills	D.3 Communicate effectively D.4 Demonstrate efficient IT capabilities D.6 Effectively manage tasks, time, and resources D.7 Search for information and engage in life-long self learning discipline D.9 Refer to relevant literatures

4- Course Content		
	Week Number 1:	Introduction to computer control.
	Week Number 2:	Review for state-variable representation of discrete time systems.
	Week Number 3:	Controllability, observability of the discrete system (1).
	Week Number 4:	Controllability, observability of the discrete system (2).
	Week Number 5:	Realization of a discrete system.
	Week Number 6:	Digital redesign of continuous controllers.
	Week Number 7:	7th week exam + Digital redesign of continuous controllers.
	Week Number 8:	State space approach for discrete control design (1).
	Week Number 9:	State space approach for discrete control design (2).
	Week Number 10:	State space approach for discrete control design (3).
	Week Number 11:	PC based data acquisition systems.
	Week Number 12:	12th week exam + PC based data acquisition systems.
	Week Number 13:	Applications.
	Week Number 14:	Applications.
	Week Number 15:	Applications.
	Week Number 16:	Final Exam.
5- Teaching and Learning Methods	- Lectures - Tutorials - Discussion papers - Designing codes	

6- Teaching and Learning Methods for Students with Special Needs	- Lectures - Tutorials - Discussion papers - Designing codes
7- Student Assessment:	
a- Procedures used:	**Quiz to asses part of the 7th week evaluation** **Quiz to asses part of the 7th week evaluation** **Report to asses the 7th week practical evaluation** **Written exam to asses the mid term exam** **Written exam to asses part of the 12th week evaluation**
b- Schedule:	**Assesssment 1** **3rd Week** **Assesssment 2** **5th Week** **Assesssment 3** **7th Week** **Assesssment 4** **10th Week** **Assesssment 5** **12th Week** **Assesssment 5** **14th Week**
c- Weighing of Assessment:	**7th Week Examination** **30%** **12th Week Examination** **15%+5% practical** **Final-term Examination** **40%** **Oral Examination** **0%** **Semester Work** **10%** **Total** **100%**
8- List of References:	Ogata . " Modern control Engineering" ,Prince –Hall, 1997 R. G. Jacquot, "Modern Digital Control Systems", Marcel Dekker, 1994

a- **Course Notes**	
b- **Required Books (Textbooks)**	K.J. Astrom & B. Wittenmark, "Computer Controlled Systems: Theory and Design" , Prince –Hall, 1997
c- **Recommended Books**	
d- **Periodicals, Web Sites, ..., etc.**	

Course Instructor

Name: **Prof. Alaa Khalil**

Signature:

Head of Department

Name: **Prof. Hamdy Ashour**

Signature:

Dean of College of Engineering and Technology of AASTMT

Name: **Prof. Moustafa Hussein Aly**

Signature:

Executive Manager of Quality Assurance Center of AASTMT

Name: **Prof. Aziz Ezzat**

Signature: