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 411	**Control Systems I**	4
Specialization:	**No. of Instructional Units:** **Lecture** 2 **Tutorial/Practical**	
Electrical and Control Engineering	3	

2- Course Aim	To attain the ability to analyze and design of control system via classical approaches
3- Intended Learning Outcome	
a- Knowledge and Understanding	A.4 Principles of design including elements design, process and/or a system related to specific disciplines A.5 Methodologies of solving engineering problems, data collection and interpretation 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 A.31 Formulate the problem, realizing the requirements and identifying the constraints

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.5 Assess and evaluate the characteristics and performance of components, systems and processes B.8 Select and appraise appropriate ICT tools to a variety of engineering problems 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.13 Design and perform experiments, as well as analyze and interpret experimental results related to electrical power and machines systems C.15 Integrate electrical, electronic and mechanical components and equipment with transducers, actuators and controllers in creatively computer controlled systems C.16 Specify and evaluate manufacturing of components and equipment related to electrical power and machines
d- General Skills	D.3 Communicate effectively D.4 Demonstrate efficient IT capabilities D.5 Lead and motivate individuals

4- Course Content	*Week Number 1:* Mathematical modelling of systems. *Week Number 2:* Frequency response analysis. *Week Number 3:* Polar plots. *Week Number 4:* Bode diagrams. *Week Number 5:* Advanced topics of bode diagrams. *Week Number 6:* Concept of stability in control system. *Week Number 7:* Routh's stability criterion. *Week Number 8:* Nyquist stability criterion. *Week Number 9:* Stability criterion and Bode plots. *Week Number 10:* Root locus methods. *Week Number 11:* More topics on root locus. *Week Number 12:* Types of compensators in control systems. *Week Number 13:* Lead compensation in root locus. *Week Number 14:* Lead compensation in frequency domain. *Week Number 15:* Lag / PID compensators. *Week Number 16:* Final Exam.
5- Teaching and Learning Methods	- Lectures - Tutorials - Discussion papers - Focus group - Practical Training
6- Teaching and Learning Methods for Students with Special Needs	- Lectures - Tutorials - Discussion papers - Focus group - Practical Training

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 6 — 14th Week
c- Weighing of Assessment:	7th Week Examination — 30% 12th Week Examination — 20% Final-term Examination — 40% Oral Examination — 0% Practical Examination — 5% Semester Work — 5% Total — 100%
8- List of References:	K. Ogata , " Modern control Engineering " Prentice – Hall , 1985
a- Course Notes	
b- Required Books (Textbooks)	Benjamin C.Kuo, "Automaic Control Systems", Prentice Hall, Inc.
c- Recommended Books	
d- Periodicals, Web Sites, ..., etc.	

Course Instructor

Name: **Prof. Ezz Eldin Zakzouk**

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: