



## A. Basic Information

<b>Course Title:</b> Automatic Control (1)	<b>Code:</b> EPE 314	<b>Total:</b> 5
<b>Lecture:</b> 3	<b>Tutorial:</b> 2	<b>Practical:</b> -
<b>Program on which the course is given:</b> B.Sc. Electrical Engineering (Electrical Power and Machines)		
<b>Major or minor element of program:</b> Major		
<b>Department offering the program:</b> Electrical Engineering Department		
<b>Department offering the course:</b> Electrical Engineering Department		
<b>Academic year / level:</b> Third Year / First Semester		
<b>Date of specifications approval:</b> 10/5/2006		

## B. Professional Information

### 1. Overall aims of course

By the end of the course the students will be able to:

- \* Understand the broad classifications of automatic control systems.
- \* Understand mathematical computations techniques in automatic control systems.
- \* Understand the analysis of electrical and mechanical control systems.

### 2. Intended Learning outcomes of Course (ILOs)

By completion of the course, the student should be able to:

#### a. Knowledge and Understanding:

- a.1) Concepts and theories of mathematics and sciences, appropriate to the discipline.
- 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 interpretation.
- a.8) Current engineering technologies as related to disciplines.

#### 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.4) Combine, exchange, and assess different ideas, views, and knowledge from a range of sources.
- b.5) Assess and evaluate the characteristics and performance of components, systems and processes.
- b.7) Solve engineering problems, often on the basis of limited and possibly contradicting information.
- b.11) Analyze results of numerical models and appreciate their limitations.

**c. Professional and Practical Skills**

- c.1) Apply knowledge of mathematics, science, information technology, design, business context and engineering practice to solve engineering problems.
- c.3) Create and/or re-design a process, component or system, and carry out specialized engineering designs.
- 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.

**d. General and Transferable Skills**

- d.1) Collaborate effectively within multidisciplinary team.
- d.2) Work in stressful environment and within constraints.
- d.3) Communicate effectively
- d.6) Effectively manage tasks, time, and resources.
- d.7) Search for information and engage in life-long self learning discipline.
- d.8) Acquire entrepreneurial skills.
- d.9) Refer to relevant literatures.



## 1. Contents

No	Topic	No. of hours	ILOs	Teaching / learning methods and strategies	Assessment method
1	Introduction to control system	5	a1 , b1 , c1 , d1	Lectures, Practical training / laboratory, Class activity, Case study, Assignments / homework	Home Assignments Quizzes , Oral Exam
2	Mathematical fundamentals	5	a1 , b1 , c1	Lectures, Practical training / laboratory, Class activity, Case study, Assignments / homework	Home Assignments Quizzes , Oral Exam
3	open loop and closed - loop control system.	5	a1 , a4 , b1 , c1 ,	Lectures, Practical training / laboratory, Class activity, Case study, Assignments / homework	Home Assignments Quizzes , Oral Exam
4	Transfer functions and block diagrams	5	a1 , a4 , b2 , b5 , c1	Lectures, Practical training / laboratory, Class activity, Case study, Assignments / homework	Home Assignments Quizzes , Oral Exam
5	Signal flow graph models	5	a1 , a4 , b1 , b4 , c1	Lectures, Practical training / laboratory, Class activity, Case study, Assignments / homework	Home Assignments Quizzes , Oral Exam
6	control systems components	5	a4 , a5 , b2 , b7 , b11 , c1 , d8	Lectures, Practical training / laboratory, Class activity, Case study, Assignments / homework	Home Assignments Quizzes , Oral Exam
7	Steady-state error and transient response of control systems	5	a1 , a4 , a5 , b3 , b5 , c1 , c7	Lectures, Practical training / laboratory, Class activity, Case study, Assignments / homework	Home Assignments Quizzes , Oral Exam
8	<b>Mid term Exam</b>				
9	Stability of control	5	a5 , b2 , c1 , d8 ,	Lectures, Practical training /	Home Assignments



	systems - Routh's			laboratory, Class activity, Case study, Assignments / homework	<b>Quizzes , Oral Exam</b>
10	State - space representation of control systems	5	a1 , a5 , a8 , b2 , b3 , b5 , c1 , d1 , d3 , d9	Lectures, Practical training / laboratory, Class activity, Case study, Assignments / homework	<b>Home Assignments Quizzes , Oral Exam</b>
11	Application of State - space on control systems	5	a4 , a8 , b7 , b11 , c6 , c7 , d2 , d3	Lectures, Practical training / laboratory, Class activity, Case study, Assignments / homework	<b>Home Assignments Quizzes , Oral Exam</b>
12	Application of State - space on control systems	5	a4 , a8 , b7 , b11 , c6 , c7 , d2 , d3	Lectures, Practical training / laboratory, Class activity, Case study, Assignments / homework	<b>Home Assignments Quizzes , Oral Exam</b>
13	Control Systems applications in electrical power engineering.	5	a5 , a8 , b3 , b4 , b7 , b11 , c3 , c6 , c7 , d6 , d7	Lectures, Practical training / laboratory, Class activity, Case study, Assignments / homework	<b>Home Assignments Quizzes , Oral Exam</b>
14	Control Systems applications in electrical power engineering.	5	a5 , a8 , b3 , b4 , b7 , b11 , c3 , c6 , c7 , d6 , d7	Lectures, Practical training / laboratory, Class activity, Case study, Assignments / homework	<b>Home Assignments Quizzes , Oral Exam</b>
15	<b>Home Assignments Quizzes , Oral Exam</b>				
16					

**4. Teaching and Learning Methods**

- Lectures
- Practical training / laboratory
- Class activity
- Case study
- Assignments / homework

**5. Student Assessment Methods**



Assignments to assess knowledge and intellectual skills.

Quiz to assess knowledge, intellectual and professional skills

Mid-term exam to assess knowledge, intellectual, professional and general skills.

Oral exam to assess professional, practical, general and transferable skills .

Final exam to assess knowledge , intellectual skills , professional and practical skills .

#### 6. Assessment schedule

Assessment 1 on weeks 2, 5, 9, 11

Assessment 2 Quizzes on weeks 4, 6, 10, 12

Assessment 3 Mid-term exam on week 8

Assessment 4 Oral Exam on week 14

Assessment 5 Final exam on week 15

#### 7. Weighting of Assessments

Mid- Term Examination	10 %
Final- Term Examination	60 %
Oral Examination	10 %
Semester Work	15 %
<u>Other</u>	<u>05 %</u>
Total	100%

#### 8. List of References

##### 8.1 Course Notes

Handouts prepared by instructor.

##### 8.2 Essential Books (Text Books)

\* A textbook of Automatic Control Systems B. C. Kuo, 2004

\* Feedback and control systems Shaum's series .



8.3 Recommended books

Control System Engineering by K. Ogata, 2007

**9 Facilities Required for Teaching and learning**

Lecture room equipped with overhead projector

Presentation board, computer and data show

**Course coordinator:** Prof. Dr. Wagdy Mohamed Mansour

**Course instructor:** Prof. Dr. Wagdy Mohamed Mansour , Prof. Dr. Fahmy Bendary

**Head of department:** Prof. Dr. Mousa Abd-allah

**Date: 27 / 11 / 2011**