Automatic control - Course Syllabus

Instructor: Dr. Mahmoud KACHIT

1. Course general information

Course code: (402423), Course Title: Automatic control, Credit hours: 3, Course Level: 4

2. Course module description

Analysis and synthesis of automatic control systems. Transfer functions. Root locus, Nyquist and Bode techniques. Introduction to state space formulation.

3. Course module objectives

The objective of this course is to apply knowledge of mathematics and engineering to analyze and design a control system to meet desired specifications. Students should learn to analytically determine a control system’s functionality and select appropriate tests to demonstrate system’s performance and finally design a control system to meet a set of requirements. Develop an understanding of the elements of classical control theory as applied to the control of aircraft and spacecraft. In particular understand: the concept of feedback and its properties; the concept of stability and stability margins; and the different tools that can be used to analyze the previous properties. Finally gain a working knowledge of the basic linear design techniques.

4. Basic and support material to be covered

- Basic control system concepts
- Transfer functions of physical systems
- Transfer functions of physical systems
- Transient response
- Transient response
- Equivalent systems
- Transient response stability
- Forced response errors
- Forced response errors
- Root locus method
- Root locus method
- Design using the root locus method
- Frequency response
- Design using the frequency response

5. Course/ module components
Books (title, author(s), publisher, year of publication):


Study guide: Homework and laboratory guide(s) if applicable.

Teaching methods: Lectures, tutorials, and problem solving.

6. Learning outcomes - Knowledge and understanding

- An ability to apply knowledge of mathematics, science and engineering.
- An ability to perform laboratory work and report on its outcome.
- An ability to use the analysis and design tools of classical linear control in simplified homework problems, and in more realistic laboratory problems.
- An ability to use modern computer tools such as MatLab and web-based tutoring tools.
- Communication skills (personal and academic). To help the student develop critical thinking and Problem-solving. Practical and subject specific skills (Transferable Skills).

7. Allocation of Marks - Mark Assessment Instruments:

20 First examination 20, Second examination 50, Final examination: 50 marks, 10 Reports, research projects, Quizzes, Home works.

8. Expected workload

On average students need to spend 2 hours of study and preparation for each 50-minute lecture/tutorial.

9. Attendance policy

Absence from lectures and/or tutorials shall not exceed 15%. Students who exceed the 15% limit without a medical or emergency excuse acceptable to and approved by the Dean of the relevant college/faculty shall not be allowed to take the final examination and shall receive a mark of zero for the course. If the excuse is approved by the Dean, the student shall be considered to have withdrawn from the course.

Please feel free to make suggestions to improve the content of the class and my instruction skills. You can tell these suggestions directly to me or anonymously leave your comments in my mailbox or slide them under my office door.