وصــف مقـــرر دراســي Course Description

متطلب متزامن Co-Req.	متطلب سابق Pre-Req	تمارين TU	عملي LB	نظري LT	الساعات CR	اســـــــم المقـــــرر C o u r s e Title	رقم ورمز المقرر Course Code
–	301 كهر	1	-	3	3	مبادئ أنظمة التحكم	351 كهر
-	EE 301					Principles of Control Systems	EE 351

محتويـات المـقرر :

مراجعة الخلفية الرياضية (المتغيرات التخيلية، لابلاس، المعادلات التفاضلية)؛ تمثيل النظم (المخطط الوظيفي، دوال التحويــل، أشــكال انسياب الإشارات)؛ نمذجة النظم الكهربائية والميكانيكية؛ تحليل متغيرات الحالة؛ استقرار النظم؛ تحليل النظم في البعد ألزمـــاني؛ مســـار الجذور؛ تحليل النظم في البعد الترددي؛ مقدمة إلى المتحكم التناسبي والتفاضلي والتكاملي

Course Contents:

Review of mathematical background (complex variables, Laplace, Diff. Equations); System representation (block diagram, transfer functions, signal flow graph) Modeling of electric and mechanical systems; State variable analysis; Stability; Time domain analysis; Root locus; Frequency domain analysis; Introduction to PID control

Course Objectives:

This course aims to introduce the basic concept of linear feedback control to the students. As the first and main course in control, special emphasis is on the analysis of feedback control systems, especially on the stability analysis. First modeling of the systems with transfer functions, and block diagrams are introduced, and flow graphs and Mason rule for its simplification is taught next. Then the time response characteristics of first and second order system is explained, and the stability analysis is started using Roth-Horowitz criteria. Next static feedback compensation, and stability analysis through Root Locus method is taught, and then frequency response method and Bode, and Nyquist plots are elaborated. Finally Dynamic compensation, and the general method of feedback controller design for PID's are explained. For a given system and controller specification, students will be able to select the appropriate tools and methods from the collection of tools and methods developed above.

Evaluation Methods:

1. Midterm exams
2. Assignments
3. Quizzes
4. Final exam

Text Book and References:

R. Dorf and R. Bishop, "**Modern Control Systems**", Addison-Wesley,1998