

EE372 System Dynamics and Control (3+2)

Spring 2014

Lectures: Monday 9:30 - 12:20 MB345, PS: Thu 14:30 - 16:20 MC162,
Labs: Mon. 16:30 - 18:20, Fri. 15:30 - 17:20

Course Web: <http://mimoza.marmara.edu.tr/~mdogruel/ee372> (in construction)

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Office Hours: By appointment.

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Course Outline: Mathematical models of systems. Analysis of linear control systems by differential equations and transfer function methods using Laplace transforms. State variable models: Signal-flow graph state models. Stability of closed loop systems. Routh-Hurwitz criterion, root-locus diagrams. System analysis in frequency domain. Introduction to design and optimization of linear control systems, compensation techniques.

Learning Outcomes:

1. Learn physical systems and the concept of control systems,
2. Review mathematical background for control systems, obtain mathematical modelling of physical systems,
3. Represent physical systems by transfer functions, block diagrams, signal flow graphs,
4. Represent physical systems by state variables and state-space modelling,
5. Develop simulation diagrams and perform computer simulation of the systems,
6. Analyze transient responses of first and the second order systems by applying test signals,
7. Analyze the stability of linear time invariant systems by Routh-Hurwitz Criterion.

Text Book:

Control Systems Engineering, Norman S. Nise, 6th Edition, 2011, Wiley. [The Student Companion Site](#)

Additional Material:

Modern Control Engineering, K. Ogata, 2009, 5th Edition, Prentice Hall.

Modern Control Systems, Richard C. Dorf, Robert H. Bishop, 2012, 12th Edition, Prentice Hall.

Automatic Control Systems, Farid Golnaraghi, Benjamin C. Kuo, 9th Edition, 2009.

Feedback Systems, by K. J. Astrom, R. M. Murray, 2009, v2.10b, Princeton University Press.

Honor Code: All work done on the exams will be done on your own and pledged. Homework concepts and approaches may be discussed with other students, but the work will be done by the individual.

Attendance: Classroom attendance is mandatory. Pop-quizzes will be given at unscheduled and random times. No make-ups will be arranged for pop-quizzes.

Homework: Normally, homework is due one week from the assigned date, and will be collected at the beginning of the class. No late homework.

Examinations: Exams will be closed book and in-class.

Grades:

Attendance, Homework, Quizzes*	15%
Lab Work and PS	15%
Midterm	30%
Comprehensive Final Exam	40%

*Percentages for each homework and quiz will be determined at the end of the course.