AA/EE/ME 510  
Mathematical Foundations of Systems Theory  
Fall 2014; Syllabus

Instructor: Mehran Mesbahi  
Professor of Aeronautics & Astronautics  
Adjunct Professor of Mathematics  
Guggenheim Hall 318E; Tel: (206) 543-7937  
Email: mesbahi@uw.edu  
Instructor’s website: http://rain.aa.washington.edu/RAIN_Group_Members/Mehran_Mesbahi

Instructor Office Hours: Tuesdays: 3:00-5:00 pm

Teaching Assistant: Prachya Panyakeow; Email: prachya@uw.edu  
TA Office Hours: Mondays: 3:30-5:00 pm; Fridays: 10-11 am (location TBD)

Class website: (via) http://rain.aa.washington.edu/RAIN_Group_Members/Mehran_Mesbahi/Teaching  
Class Room: Loew 106  
Class Time: M,W: 1:30-3:20 pm

Textbooks:  

Recommended References:  

Theme: This course aims to provide a solid mathematical foundation for a number of disciplines in systems theory (communications, signal processing, control), optimization, machine learning, among others. Topics covered include finite dimensional vector spaces, matrix theory, norm and metric spaces, Hilbert spaces, and applications in systems sciences. Particular attention will be given to strengthening students ability to read and do formal mathematical reasoning as required for many graduate courses in systems, signal processing, communication, control, and optimization.

Topics: The topics to be covered include: vectors spaces, duality, norms, matrix decompositions, positive semidefinite and nonnegative matrices, metric and normed spaces, applications in systems sciences.

Website: The class website is a living document. Check it regularly as I plan to update it often. I will post homework, homework solutions, hints, thoughts, notes, references, etc., on it.  
Handouts: I will provide hand-outs or post papers/notes on the class website on topics of interest during the quarter.  
Homework: We will have weekly homework assignments, assigned every Wednesday; the homework is also due on every Wednesday. The contribution of homework toward the final grade is 20%.  
Homework Clinic: We will have homework clinics on Tuesdays during the office hours.  
Midterms: We will have two midterms approximately during the 4th and 8th weeks into the term. The midterms will contribute 30% each to the final grade.  
Project: There is a project for the class, details of which will be discussed during the lecture. The project will contribute 20% to the final grade.

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1Rev. 0.1; September 24, 2014