

ESE 502 Syllabus for Fall 2009
Instructor: John J. Murray

1 Text

The required textbook is:

Chen, C.-T., “Linear System Theory and Design”, 3rd edition, Oxford University Press, 1999.
ISBN: 0-19-511777-8 (fourth printing, if possible.)

2 Website

The class website address is:

www.ece.sunysb.edu/~ese502

3 Schedule

3.1 Class

Classes will be on Tuesdays from September 1st to December 8th, **except for September 29th**, when there will be no class. Classes will start at 6:50pm and end at 9:50pm in room 183, Earth and Space Sciences, and will have a 20-minute break.

3.2 Tests

There will be one midterm test which will be held in class on October 27th, and a comprehensive final on **Thursday**, December 17th, from 8:150pm to 11:00pm (period 5).

3.3 Office Hours

Phone	Hours	Office	email
632-8413	4:00 - 6:00 p.m. Tuesday	253 Light Eng.	John.Murray@sunysb.edu
	5:30 - 7:30 p.m. Wednesday	253 Light Eng.	

4 Course Outline

This course is a basic introduction to the theory of linear systems. There are four essential elements:

1. Linear algebra, which is the mathematics underlying linear system theory; the first part of the course will cover the basic concepts of linear algebra. While most of you are probably familiar with this material, some may not be, and it will serve as a review for the others.
2. The *internal* description of linear systems — state variables.
3. The *external* description of linear systems — transfer functions and transfer function matrices
4. The relationship between the internal and external descriptions, including analysis, stability, realization, controllability and observability.

Linear systems are highly abstracted and simplified models of real systems, and so the treatment is highly *theoretical*. If you don't like fairly abstract theoretical ideas, this course is not for you!

The following topics will be covered:

1. Overview of Linear Systems
2. Linearity, Time-Invariance, Continuous- and Discrete-Time Systems
3. Linear Algebra
4. State-Space Solutions and Realizations
5. Stability
6. Controllability and Observability
7. State Feedback and Estimators
8. Minimality and Coprimeness
9. Pole Placement and Model Matching

This corresponds to chapters 1, 2, 3, 4, 5, 6, and parts of 7,8, and 9 in the text.

In addition to the ordinary theoretical homework, there are MATLAB-based examples in the textbook. It is therefore useful if students have access to MATLAB (at least the student edition), together with the Linear System Toolbox either on the campus computing facilities or privately. Alternatively, the free software packages `Gnu Octave` or `Scilab` may be useful.

5 Grading

There will be one midsemester test and a final, each counting for 50% of the overall grade. In addition to counting for 50% of the grade, the final will also be divided into two parts, the first of which will function as a makeup for the midsemester test. If the final is missed, a makeup will be allowed only for the most serious reasons; written evidence of the reasons for missing the final will be required.

6 Other Remarks

For additional reading, the following book is also recommended:

Kailath, T., "Linear Systems", Prentice-Hall Englewood Cliffs, N.J., 1980. ISBN: 0-13-536961-4

7 Disability

If you have a physical, psychological, medical, or learning disability that may impact your course work, please contact Disability Support Services at (631) 632-6748 or at their website: <http://studentaffairs.stonybrook.edu/dss/>.

They will determine with you what accommodations are necessary and appropriate. All information and documentation is confidential.

Students who require assistance during emergency evacuation are encouraged to discuss their needs with their professors and Disability Support Services. For procedures and information go to the following website:

<http://www.sunysb.edu/ehs/fire/disabilities.shtml>

8 Academic Honesty

Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Any suspected instance of academic dishonesty will be reported to the Academic Judiciary. For more comprehensive information on academic integrity, including categories of academic dishonesty, please refer to the academic judiciary website at :

<http://www.stonybrook.edu/uaa/academicjudiciary/>

9 Conduct

The University at Stony Brook expects students to maintain standards of personal integrity that are in harmony with the educational goals of the institution; to observe national, state, and local laws and University regulations; and to respect the rights, privileges, and property of other people. Faculty are required to report disruptive behavior that interrupts faculty's ability to teach, the safety of the learning environment, and/or students ability to learn to Judicial Affairs.