

**ECSE-6420: Nonlinear Control Systems
SPRING 2009**

Instructor: Dr. Agung Julius (JEC 6044, Email: agung@ecse.rpi.edu, Phone: x6993)

Office hours: Monday, Wednesday; 15.00 – 16.00

Teaching Assistant: He Bai (CII 8123, Email: baih@rpi.edu)

Office hours: Monday 14.00 – 16.00

Classroom: JEC 4107/ Monday, Thursday; 12.30 – 13.50

Textbook: Khalil, *Nonlinear Systems*, Prentice Hall, 3rd Edition

Grading:

Homework	30%
Midterm exam	25%
Final exam	30%
Project + Presentation	10% + 5%

- Homework sets are due one week after hand-out. For each day late (maximum 7 days), there is a 10pt penalty.
- Midterm exam is a 48-hour take home test. No collaboration is allowed. Late submissions will not be accepted.
- Class project consists of a report and presentation of a self-chosen topic (consult with instructor/TA to avoid conflicts). Presentations will be graded by students.

Prerequisites: The course is for graduate or advanced undergraduate students with working knowledge in differential calculus, linear algebra, and linear systems/control theory.

Tentative course outline:

Nr.	Date	Day	Topic	Assignments
1	12-Jan	Monday	Intro	
2	15-Jan	Thursday	Nonlinear models and phenomena (Ch 1)	
3	22-Jan	Thursday	Planar/Second order dynamical systems (Ch 2)	
4	26-Jan	Monday	Planar/Second order dynamical systems (Ch 2)	

5	29-Jan	Thursday	Fundamental properties (Ch 3)	HW 1 hand-out
6	2-Feb	Monday	Fundamental properties (Ch 3)	
7	5-Feb	Thursday	Fundamental properties (Ch 3)	HW 1 hand-in
8	9-Feb	Monday	Lyapunov stability (Ch 4)	
9	12-Feb	Thursday	Lyapunov stability (Ch 4)	
10	17-Feb	Tuesday	Lyapunov stability (Ch 4)	
11	19-Feb	Thursday	Lyapunov stability (Ch 4)	HW 2 hand-out
12	23-Feb	Monday	Lyapunov stability (Ch 4)	
13	26-Feb	Thursday	Lyapunov stability (Ch 4)	HW 2 hand-in
14	2-Mar	Monday	Input - Output Stability (Ch 5)	Midterm hand-out
15	5-Mar	Thursday	Input - Output Stability (Ch 5)	
16	16-Mar	Monday	Input - Output Stability (Ch 5)	
17	19-Mar	Thursday	Passivity (Ch 6)	HW 3 hand-out
18	23-Mar	Monday	Passivity (Ch 6)	
19	26-Mar	Thursday	Frequency domain analysis (Ch 7)	HW 3 hand-in
20	30-Mar	Monday	Frequency domain analysis (Ch 7)	
21	2-Apr	Thursday	Perturbed systems (Ch 9)	HW 4 hand-out
22	6-Apr	Monday	Singular perturbation (Ch 11)	
23	9-Apr	Thursday	Feedback control and linearization (Ch 12 - 13)	HW 4 hand-in
24	13-Apr	Monday	Feedback control and linearization (Ch 12 - 13)	
25	16-Apr	Thursday	Feedback control and linearization (Ch 12 - 13)	HW 5 hand-out
26	20-Apr	Monday	Project presentation	
27	23-Apr	Thursday	Project presentation	HW 5 hand-in
28	27-Apr	Monday	Project presentation	