EGE316 01 CONTROL SYSTEMS I (3 credits)
COURSE SYLLABUS
Fall 2011 Semester

1. GENERAL INFORMATION

Professor: Dr. Julio J. González

Office: REH 113 (inside REH 114)
Voice mail: (845) 257-3724, Fax: (845) 257-3730
E-mail: gonzalj@engr.newpaltz.edu
Office hours: Tuesday 10:00 AM – 12:00 PM,
Wednesday 01:00 PM – 03:00 PM

Textbook: "Automatic Control Systems" by Farid Golnaraghi & Benjamin C. Kuo, 9th edition, John Wiley and Sons, Inc., 2003.

2. DESIRED LEARNING OUTCOMES

I. Students will demonstrate their ability to model control systems, including: a) obtaining a model from a given experimental outcome, b) translating a model mathematical formulation into an equivalent one.

II. Students will demonstrate their ability to analyze control systems, including: a) obtaining the system output for a given input, b) determining stability, c) finding the steady-state error, d) finding the gain and phase margins

III. Students will demonstrate their ability to design control systems to satisfy predetermined design specification, such as overshoot, settling time, gain and phase margin, etc. They will also demonstrate their design skills through a Design Project Report, which will include a) producing a descriptive abstract and a motivating introduction, b) explaining mathematical calculations and the generation of theoretical expectations, c) analyzing simulation results and their match with theoretical expectations and d) providing relevant conclusions

3. STUDENT OUTCOMES

This course contributes to the Student Outcomes specified in the following table:

Student Outcome	Course Desired Learning Outcome	Level of Contribution 3 = strong; 2 = moderate; 1 = marginal
a) An ability to apply knowledge of mathematics, science and engineering	I, II	3
e) An ability to identify, formulate and solve engineering problems	III	3

4. COURSE CONTENTS

Automatic control systems: concept of feedback; Review of pertinent mathematical background: The Laplace Transform ;The transfer function; Signal Flow graph and Mason's gain formula; The state-space approach; Mathematical modeling of physical systems. Stability analysis: The Routh-Hurtwitz method; Stability analysis in the parameter space; Analysis using the Evans diagram; Analysis using Bode diagrams; Design of lag-phase and lead-phase controllers using Evans and Bode diagrams; Design of State-Feedback controllers.

5. TENTATIVE SCHEDULE FOR TOPICS

WEEK	TOPIC
1	Automatic control systems: concept of feedback
2	Review of mathematical background: The Laplace Transform
3, 4	The transfer function. Signal Flow graph and Mason's gain formula.
5, 6	The state-space approach. Mathematical modeling of physical systems
7, 8	Stability analysis: The Routh-Hurtwitz method. Stability analysis in the parameter space.
9, 10	Analysis using the Evans diagram.
11, 12	Analysis using Bode diagrams.
13	Design of lag-phase and lead-phase controllers using Evans and Bode diagrams
14	Design of State-Feedback controllers.

6. SCHEDULE FOR EXAMINATIONS, PROJECTS AND HOMEWORK

Event	Date Assigned	Date due
Homework 1	08/30	09/06
Homework 2	09/06	09/13
Homework 3	09/13	09/20
Homework 4	09/20	09/27
Homework 5	09/27	10/04
First Partial Examination	**10/14**	**10/14**
Homework 7	10/18	10/25
Homework 8	10/25	11/01
Homework 9	11/01	11/08
Homework 10	11/08	11/15
Second Partial Examination	**11/18**	**11/18**
Design Project	11/22	12/16
Homework 11	11/22	11/29
Homework 12	11/29	12/06
Final Examination	**12/20**	**12/20**

NOTES:

- The partial examinations will take place at REH 111 from 8 AM to 9:25 AM
- The final examination will take place at REH 111 from 8 AM to 10 AM
- The project and homework assignments will be due at the beginning of class, 8 AM. After that, the instructor will provide students with the homework solutions. No homework will be accepted after the solutions have been handed out. Therefore, if you late to class and the homework solutions have already been handed out, you will receive a grade of "0" for the homework that is due that particular date.

7. GRADING POLICY

7.1. Grade Distribution

Homework:	10%
Project report:	20%
First test:	20%
Second test:	20%
Final test:	30%

Total:	100%

NOTE: The course will be automatically failed if any of the following conditions apply:

- *Failing to take any of the three examinations or present the project report*
- *Obtaining less than the passing grade (65) in the project report, or in more than one examination. Obtaining less than a 65 average in the homework.*

7.2. Letter Grade Assignment

Your letter grade will be determined from your overall grade as follows:

Numerical grade	Letter grade
$G \geq 90$	A
$87 \leq G \leq 89$	A-
$83 \leq G \leq 86$	B+
$80 \leq G \leq 82$	B
$77 \leq G \leq 79$	B-
$73 \leq G \leq 76$	C+
$70 \leq G \leq 72$	C
$65 \leq G \leq 69$	C-
$G < 65$	F

7.3. Grading discrepancy

In case of grading discrepancy, the student should see the grader within a week from the date he/she receives the graded document. After this period of time has elapsed, grades will not be changed.

7.4. Class Attendance

Attendance to classes is strongly encouraged. The grade will be negatively affected when more than three unjustified missed classes occur.