FLORIDA ATLANTIC UNIVERSITY™

Graduate Programs—NEW COURSE PROPOSAL

UGPC APPROVAL _____
UFS APPROVAL _____
SCNS SUBMITTAL _____
CONFIRMED _____
BANNER POSTED _____
CATALOG _____

DEPARTMENT NAME: COMPUTER & ELECTRICAL ENGINEERING & COMPUTER SCIENCE

COLLEGE OF: Engineering and Computer Science

RECOMMENDED COURSE IDENTIFICATION:

PREFIX __EEL_____ **COURSE NUMBER** ___5613_____ **LAB CODE** (L or C) _____

(*TO OBTAIN A COURSE NUMBER, CONTACT MJENNING@FAU.EDU*)

COMPLETE COURSE TITLE **MODERN CONTROL**

EFFECTIVE DATE
(first term course will be offered)

___**FALL 2011**_____

CREDITS: 3

TEXTBOOK INFORMATION: LINEAR SYSTEM THEORY AND DESIGN, INTERNATIONAL 3RD. EDITION, C-T CHEN, OXFORD UNIVERSITY PRESS, FEBRUARY 9, 2009.

GRADING (*SELECT ONLY ONE GRADING OPTION*): **REGULAR** __X____ **SATISFACTORY/UNSATISFACTORY** _____

COURSE DESCRIPTION, NO MORE THAN 3 LINES: FUNDAMENTALS OF LINEAR SYSTEMS THEORY AND PRACTICE AS APPLIED TO MULTI-INPUT AND MULTI-OUTPUT FEEDBACK CONTROL SYSTEMS: STATE VARIABLE MODELS, STABILITY, CONTROLLABILITY, OBSERVABILITY, STATE FEEDBACK AND ESTIMATION, LINEAR QUADRATIC REGULATORS, COMPUTER AIDED ANALYSIS AND DESIGN (USING MATLAB CONTROL SYSTEMS TOOLBOX)

PREREQUISITES: EEL 4652 CONTROL SYSTEMS 1, OR ENGINEERING GRADUATE STANDING

COREQUISITES: N/A

OTHER REGISTRATION CONTROLS (MAJOR, COLLEGE, LEVEL):

PREREQUISITES, COREQUISITES & REGISTRATION CONTROLS SHOWN ABOVE WILL BE ENFORCED FOR ALL COURSE SECTIONS.

MINIMUM QUALIFICATIONS NEEDED TO TEACH THIS COURSE: PHD IN ENGINEERING

Other departments, colleges that might be affected by the new course must be consulted. List entities that have been consulted and attach written comments from each. N/A

_____Hanqi Zhuang, zhuang@fau.edu, 73413_____
Faculty Contact, Email, Complete Phone Number

SIGNATURES

Approved by:	***Date:***
Department Chair: _____	_____
College Curriculum Chair: _____	_____
College Dean: _____	_____
UGPC Chair: _____	_____
Dean of the Graduate College: _____	_____

SUPPORTING MATERIALS

Syllabus—must include all details as shown in the UGPC Guidelines.

To access Guidelines and download this form, go to: *http://www.fau.edu/graduate/facultyandstaff/programscommittee/index.php*

Written Consent—required from all departments affected.

Email this form and syllabus to *diamond@fau.edu* one week ***before*** the University Graduate Programs Committee meeting so that materials may be viewed on the UGPC website by committee members prior to the meeting.

EEL5613 Modern Control

Course Syllabus

Catalog Description: Fundamentals of linear systems theory and practice as applied to multi-input and multi-output feedback control systems: state variable models, stability, controllability, observability, state feedback and estimation, linear quadratic regulators, computer aided analysis and design (using Matlab control systems toolbox)

Number of Credits: 3

Prerequisites: EEL 4652 Control Systems 1 or Engineering Graduate Standing

Co-requisites: None

Textbook: Linear System Theory and Design, International 3rd. edition, C.T. Chen, Oxford University Press, 2009.

Supplementary materials: Handouts, including journal articles

Instructor: Dr. Hanqi Zhuang, Professor of Computer and Electrical Engineering and Computer Science

Contact Information: 561-297-3413, zhuang@fau.edu

Office Hours: TBD

Course Description, Objectives and Student Learning Outcomes:

This 3-credit introductory graduate course covers fundamentals of Modern Control and its applications as applied to multi-input and multi-output linear feedback systems. The course will also serve a foundation for more advanced graduate level control theory courses.

The course outcomes are:

- Understand the principles and concepts of modern control.
- Understand and the mathematical and analytical tools of modern control.
- Understand and apply simulation techniques for control system design in the state space.
- Experience with in projects to deal with semi-real world projects**.**

Instruction Methods: Lectures, assignments, presentations, simulation projects and tests.

Course Evaluation Method:

An overall course average will be computed for each student. The course average will combine scores from 7 homework and computer assignments, one final exam and one class project. Dates of semester tests will be announced on the first day of lecture. The weights assigned to each component of the final course average are given below.

Grading policy:

Homework (computational and theoretical):	20%
Computer-aided Design Projects:	40%
Tests (equally weighted midterm and final exams):	40%

90-100%=A, 80-89%=B, 70-79%=C, 60-69%=D+, <60%=F; grades may be curved to adjust to 100%

Assignments and projects may be submitted online. Online students are expected to take exams with the lecture section; distance learning students must arrange testing through the DEDECS office. Late assignments and projects will be accepted with penalty only until solutions have been posted. It is the student's responsibility to arrange for alternative testing dates. Late makeup exams will be administered only in documented cases of emergency.

Incomplete grades: A grade of incomplete will be given only under documented, exceptional circumstances, and will be completed in the semester following its issuance.

Classroom etiquette: As this class is being recorded, it is important that students refrain from disruptive or distracting behavior. Also, it is a strict DEDECS policy that no food or drinks are allowed in the studio, and cell phones must be turned off.

Students with disabilities:

The Americans with Disabilities Act (ADA) guidelines will be followed. Any student with a documented disability which may require special accommodations should self-identify to the instructor as early as possible in order to receive effective and timely accommodations.

Academic integrity: The Academic Integrity policy of the `university` will be enforced; refer to the `university` web-site for further details:
http://www.science.fau.edu/chemistry/chemlab/General/HONOR%20CODE.htm

Topics:

- Introduction to the mathematical description of systems: Linear vs. nonlinear, time-varying vs. time-invariant, continuous-time vs. discrete-time
- Review of Linear Algebra and Matrix Theory: Basis, representation and orthonormalization; linear algebraic equations, similarity transformation; diagonal form and Jordan form; functions of a square matrix; Lyapunov equation; quadratic form and positive definiteness; singular-value decomposition; norms of matrices
- Linear dynamic equations and state-space solutions and realizations
- Controlability and observability
- State Feedback and state estimators
- Stability of Linear Systems
- Linear Quadratic Regulators