FORM I: SUMMARY PAGE FOR PROPOSAL **#** CSCI102010-06

1. **Title:** ELET 3501: Control Systems

2. **Submitting College:** COST

3. **Department(s) Generating the Proposal:** Department of Engineering Technology and Mathematics

4. **Effective Date:** Fall semester 2011

5. **Brief Summary of Proposal:**

This proposal is being submitted to add ELET 3501 Control Systems as an elective option in the Computer Science Technology major classes grid. ELET 3501 is an existing class in the ELET program and is a 3 credit hour class.

6. **Type of Proposal:** Add existing ELET course to CSCI program.

7. **Graduate School Endorsement Status:** N/A

8. **Impact in Library Holdings:** none

9. **Impact on Existing Programs:** none

10. **Additional Resources Required:** none

11. **Approvals:**

This change was approved by:		Date
_____	Department of Engineering Technology	_____
_____	College of Science & Technology	_____
_____	Curriculum & New Programs Committee	_____
_____	SSU Faculty Senate	_____

FORM II - COURSE ADDITION FORM FOR PROPOSAL #CSCI102010-06

A. Course Number: ELET 3501

B. Course Title: Control Systems

C. Catalog Description:
Analysis and design of linear feedback control systems are studied. Nyquist's and Routh's stability criteria, Bode plots, transient behavior, types are presented. The root-locus method and block diagram representation and simplification are also included. Classroom instruction will be enhanced by laboratory work.

D. Rationale: Adding the course as an option in the major grid will give students more opportunities to customize their senior level major classes and will reduce the bottle neck in class offerings.

E. Impact on Library Holdings:
Existing:
Additions:
Deletions:

F. Credit Hours: 3 Credit Hours

G. Prerequisites: Senior standing

H. Syllabus: Copy attached

I. Similarity to, or Duplication of, Existing Courses: N/A

J. Textbook Selection (include title, author and ISBN)

K. Grading (letter grade, pass/fail, S/U etc.): A - F

L. Bibliography:

Savannah State University
Department of Engineering Technology & Mathematics

Title: ELET 3501 Section 1
Control Systems
2010 – Fall Semester

Instructor & Title: **Alex Kalu, Professor**

Office Location: CAWTES (Hubert – A) Room 108
Office Hours: Tuesdays & Thursdays 11AM – 3PM; Fridays TBA
Telephone: (912) 358 4285
Fax:
E-Mail: kalua@savannahstate.edu

Course Credit Hours: 3.0
Class Location: CAWTES (Hubert – A) Room 119
Class Time: 6:00 – 7:15 PM, TR

COURSE DESCRIPTION: This course presents the fundamental principles of control engineering form the classical transfer function viewpoint. It is designed as an introductory course in conventional control theory for engineering technologists. Linear control Systems modeling, analysis and design are studied from the transfer function approach. The state variable technique is also used in relating and interpreting system concepts. Systems characteristics in both time and frequency domains and the s-plane are treated. Control Systems design is introduced in the course, while system analysis is covered in greater depth.

PREREQUISITES: ELET 3111, MATH 2111

STUDENT LEARNING OUTCOMES: A student who successfully completes the course will be able to:

1. Discuss the properties of a linear system and state the requirements for system linearity
2. Determine the transfer function for a given system
3. Determine the output of a system for a given input, based on the transfer function concept.
4. Determine the transfer function from the input output differential equation, and vise versa.
5. Determine the step response of a system from the impulse response, and vise versa.
6. Determine and plot the poles and zeros for a given transfer function in the s-plane
7. Determine a transfer function from an s-plane pole-zero plot.
8. Use convolution integral to determine system's response from the impulse response and the input excitation
9. Define stable, unstable, and marginally stable system
10. Determine system relative stability from pole-zero plot
11. Apply the Routh-Horwitz criterion in system stability analysis
12. Construct the root locus of a given system
13. Determine the closed loop poles of a system from its root locus plot
14. Construct the bode plot for an open loop transfer function
15. Determine system response performance specifications
16. Perform linear, time-invariant feedback system stability analysis based on Nyquist criterion
17. Classify linear systems

COURSE OBJECTIVES: The purpose of this course is to introduce the student to the field of control engineering. Its objective is to produce students who can participate fully in a team of engineers during systems modeling, analysis and design.

REQUIRED TEXTS AND MATERIALS: Nise, Norman S., Control Systems Engineering, Addison-Wesley, Latest edition

PEDAGOGICAL APPROACH:

Attendance – Students are expected to be present at all class meetings. Any student that misses more than two (2) class periods may receive an F (failing) grade in the class.

- Punctuality – Students who come to class 10 minutes later than the beginning of lecture may be regarded as being absent for that class period

Academic honesty – The University Policy on academic honesty shall govern students' behavior in this class. Students involved in any manner of academic dishonesty may receive an F (failing) grade in the class.

- Exam retention policy followed by the faculty member – Graded test and exam papers will be returned to the instructor after review by students.
- Make-up exams – There will be no penalty imposed on makeup examinations if the instructor, after due considerations of the circumstances, grants such a makeup.
- Work submission policy including penalties – Late home-works, and other required work may not be accepted. Home works must be turned in at the beginning of the class period on the due date.
- Withdrawal from class – Students are advised to have the instructor sign a withdrawal/drop form if they choose to withdraw from the class, and to do so before the deadline stipulated by the University.
- Class participation policy – Students are encouraged to participate fully in class and to be active learners. Grades may be given for class participation.
- Policy regarding advance preparation for class – Students are advised to come to class prepared by completing the recommended reading assignments.
- Group projects – Any group project shall reflect the full participation of every member of the group. Students who do not participate fully in their group project will not be rewarded with a grade for the project.

GRADE DETERMINATION:

- An hour test will be given at the completion of each unit of instruction or at certain breakpoints as determined by the instructor. The instructor may at his discretion drop the lowest score on each student's tests.
- There may be unannounced quizzes
- Students are required to complete ALL works (home works, etc) assigned by the instructor. Failure to turn in any required work will be interpreted as a failure to meet all the requirements for passing the course.
- The final grade will be determined from student's performance on tests, including the final examination, and other graded works. An average score between 70 – 79 = C; 80 – 89 = B; and 90 and above = A; provided that the student met all other requirements of the course.

<u>REQUIRED DISIBILITY Statement</u>

Students who require academic adjustments in the classroom due to a disability must first register with Savannah State University Disability Services. Following registration and within the first two weeks of class, please contact the instructor to discuss appropriate academic accommodations. Appropriate arrangements can be made to ensure equal access to this course (1999: Access News).

Or

Any student who feels s/he may need an accommodation based on the impact of a disability should contact me privately to discuss your specific needs. Please contact the Office of Counseling and Disability Services in King Frazier Annex, Room 233 or call 912-356-2202 to coordinate reasonable accommodations for documented disabilities. Appropriate arrangements can be made to ensure equal access to this course.

COURSE OUTLINE AND READING ASSIGNMENTS

The following outline and readings may change as the course progresses, as the instructor deems necessary given student interests and needs. You are to read the assignments prior to the date in the course outline, present a thoughtful question to enhance dialogue, and be prepared to offer salient points to class discussion.

Date	**Topic**
Week 1	Introduction to Control Systems
Week 2	Introduction to Control Systems
Week 3	Mathematical Background Review
Week 4	Mathematical Background Review
Week 5	Mathematical Models of Physical Systems
Week 6	Time Domain Analysis
Week 7	Time Domain Analysis
Week 8	Transfer Function of Linear Systems
Week 9	Pole Zero Plots
Week 10	The Routh-Hurwitz Criterion
Week 11	Bode Plot/System Response Performance Specifications
Week 12	Bode Plot/System Response Performance Specifications
Week 13	Bode Plot/System Response Performance Specifications
Week 14	The Root Locus Method
Week 15	The Root Locus Method
Week 16	The Nyquist Criterion