FORM I: SUMMARY PAGE FOR PROPOSAL # COST 2010-ELET 3302K

1. **Title:** Mechatronics

2. **Submitting College:** COST

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

4. **Effective Date:** Fall 2011

5. **Brief Summary of Proposal:**

   This course will model the performance characteristics and applications of microprocessors, analog and digital electronics to modern mechatronics systems and intelligent manufacturing – particularly smart sensors, Due to development of fiber optics and other light technology, optical engineering and fiber optics are being integrated into the course. The course will provide comprehensive and accessible coverage of the evolving field of mechatronics for electrical engineering technology students. Students will explore electrical circuits, solid state devices, digital circuits and motors – all which are fundamental to the understanding of mechatronics systems.

6. **Type of Proposal:** New course

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
__X___	Department of Engineering Technology	__11/17/10_____
_____	College of Science & Technology	_____
_____	Curriculum & New Programs Committee	_____
_____	SSU Faculty Senate	_____

FORM II - COURSE ADDITION FORM FOR PROPOSAL # COST 2010-ELET 3302K

A. Course Number: ELET 3302K

B. Course Title: Mechatronics

C. Catalog Description: The purpose of this course is to introduce students to the growing field of mechatronics and measurement systems.

D. Rationale: Mechatronics plays an important role in manufacturing of engineering products.

E. Impact on Library Holdings:

Existing:
Additions:
Deletions:

F. Credit Hours: 3 Credit Hours

G. Prerequisites: Digital Systems I ELET 3301K

H. Syllabus: Copy attached

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

J. Textbook Selection (include title, author and ISBN#): "Introduction to Mechatronics and Measurement Systems, 3rd Edition" by David G. Alciatore and Michael B. Histand, ISBN 0-07-296305-0

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

L. Bibliography:

Department of Electronics Engineering Technology

Savannah State University
ELET 3302K: Mechatronics

Name and Title: *Asad Yousuf Electronics Engineering Technology*

Location: ***Lecture-*** *Hubert A-118****; Lab –*** *Hubert A-113*

Meeting Times:

Office Location/Office Hours:
Hubert A-117; Monday - Thursday 11:40 – 12:40 and 1:00 – 3:00PM; other times by appointment

Office Telephone/E-mail:
(912)351-6490; yousufa@savannahstate.edu

Course Description:

The purpose of this course is to introduce students to the growing field of mechatronics and measurement systems. The course will provide comprehensive and accessible coverage of the evolving field of mechatronics for electrical engineering technology students. Students will explore electrical circuits, solid state devices, digital circuits and motors – all which are fundamental to the understanding of mechatronics systems.

Credit Hours:

3 credit hours

Prerequisites:
Digital Systems I ELET 3301K

Course Objectives:
The objectives of this course are:

- Gain a more complete understanding of basic electrical circuits and electronic devices.
- Learn how to understand and apply semiconductor devices.
- Learn the basics of digital electronics.
- Learn how to program and interface microcontrollers.
- Learn the theoretical and practical aspects of measurement system design.
- Learn the basics of sensor and actuator theory, design, and application.
- Become proficient with using laboratory instrumentation and with building basic circuits.
- Gain experience designing and constructing basic mechatronic systems.

Expected Student Learning Outcomes:

As an indication of successful culmination of this course, the student should be able to:
Upon completion of the Mechatronics course, a student should be able to:

1. Gain a solid grasp on the fundamentals aspects of mechatronics technology.
2. Design and analyze issues in mechatronics systems using mechanical, electronics, and computer hardware and software.
3. Understand the mechanism and applications of finite state design methods to mechatronics systems.

4. Apply mechatronics principles in the construction and troubleshoot of Mechanical and Electronics Engineering disciplines.
5. Appreciate the risks and benefits of mechatronics as to minimize human error accidents and increase productivity in the work force.

Core Competencies:

ELET 3xxx addresses the following core competencies which are measured by the methods listed below the competency.

1st Core Competency:	Reading
Measured by:	General success in class
2nd Core Competency:	Writing
Measured by:	Success in writing lab reports
3rd Core Competency:	Mathematics
Measured by:	Performance on course examinations and homework assignments which require the use of basic algebra
4th Core Competency:	Critical Thinking
Measured by:	Performance on lab reports which require analysis and evaluation of data and procedures
5th Core Competency:	Technology
Measured by:	Performance on portion of course examinations, generation of lab reports and charts using Electronic Workbench, Altera and MSWord

Required Text and Supplemental Readings:

Required Text: The primary textbook for this course is "Introduction to Mechatronics and Measurement Systems, 3rd Edition" by David G. Alciatore and Michael B. Histand, ISBN 0-07-296305-0

Software: Electronic Workbench, Altera, PBASIC and MSWORD.

Course Requirements and Methods of Assessment:

1. Each student is required to read all daily assignments and participate in class discussions.
2. Each student is required to complete and turn in **all** home assignments including the final project on time.
3. The final grade for each student represents his/her success in all of the instructional areas of this course:

3-Unit Tests:	
Test # 1	20%
Test # 2	20%
Test # 3	20%
Home Assignments and Labs	20%
Final Examination	20%
Total	100%

Examinations must be taken at the assigned time. There will be no make-up exams given unless one has an officially excused absence. This excuse must be recorded within 24 hours after student returns.

Methods of Instruction:

Lecture, hands-on laboratory exercises, problem solving sessions, and discussion are the primary means of instructing students in this course. Students are encouraged to record the lecture and save them on IPod

Laboratory:

1. The students will be divided into teams. Each team is required to identify a team leader. Leadership can alternate throughout the semester. Teams will alternate their responsibilities of getting all equipments set and ready for the designated assignment as well as cleaning the lab after the assignment is completed.
2. Upon the completion of the laboratory exercise, students are required to submit a written report in accordance with the handouts presented for that lab. The lab report is due the following week unless prior arrangement is made.
3. The lab hours will be utilized for:
   Hands- on laboratory exercises
   - Introduction to resistor codes, breadboard, and basic measurements
   - Instrument familiarization and basic electrical relations
   - Familiarization with Oscilloscope
   - Digital circuits- counter and LED display
   - Programming a PIC microcontroller
   - A/D conversion
   - Strain gage
   - Vibration measurement with an accelerometer

Grading Policy:

A	90 – 100
B	80 – 89
C	70 - 79
D	60 – 69
F	< 59

Class and Lab Attendance Policy:

SSU Policy:

Savannah State University endeavors to provide optimum conditions for student learning. Class attendance is, therefore, required of students to ensure that they will be exposed to the many classes, laboratories, and related experiences provided for their benefit. Extenuating circumstances may at times make it difficult for students to attend every class meeting. Students who are unable to attend a class should notify the professor in a timely manner and arrange the conditions under which any required work may be made up. Credit may or may not be awarded for any course if the number of absences exceeds the number of times that the class meets per week. Students who exceed the allowed number of absences in any course may receive a grade of "F" or be administratively withdrawn. Students who are withdrawn at or before mid-semester will receive a grade of "W"; students withdrawn after mid-semester will receive a grade of "WF"

Instructor Policy:

1. Attendance is mandatory. Each student is required to be on time. **Any student who is absent for more than 5-hours during the semester will be given an "F" grade**.
2. Students cannot miss any lab. In case of an extreme emergency an excused absence can be granted to the student. However, it is the responsibility of the student to get in touch with the team members in order to redo the lab. The missing lab and lab report must be completed within a week.

Academic Honesty Policy:

Academic honesty will be enforced according to the policy in the handbook. Refer to Student Affairs: Academic Irregularity

Statement on Disabilities:

If a student has a documented and or declared disability, reasonable accommodations will be provided if requested by the student according to the recommendations of the office of Counseling and Disability Services (CDS): (912) 356-2285 / (912) 303-1650 / (912) 356-2202

Course Schedule:

Course Matrix

Timeline	Lecture Topics	Reading	Homework	Labs Tests
Week 1 Week 2	Course Introduction Electric fundamentals Electric circuit fundamentals; input and output impedance; AC circuits; semiconductors; diodes	Chapter 1 & 2 ; 2.1 – 2.4 Chapter 2 & 3 2.6 -2.10	Chapter 1 & 2 Problems Chapter 2 & 3 Problems	No Labs this week Lab 1 Lab 2 Test 1
Week 3 Week 4	Diodes; Transistors; Digital Electronics; number codes; combinational logic Design of logic networks; sequential logic; flip-flops	Chapter 6 6.1 – 6.5 6.6 – 6.9	Chapter 6 Problems	Lab 3 Lab 4
Week 5 Week 6	Flip-flop applications; Counters; Timers; Oscillators; Microcontroller PIC PIC Basic Pro PIC Examples	6.10 – 6.13 7.1 – 7.4 7.5 - 7.9	Chapter 6 & 7 Problems	Lab5 Lab 6
Week 7 Week 8 Week 9	Measurement systems characteristics; Fourier series; Frequency response System response; 2nd order systems response; modeling analogies; operational amplifiers; circuit analysis	4.1 – 4.7 4.8 – 4.11; 5.1 – 5.4	Chapter 4 & 5 Problems	Lab 7
Week 10 Week 11	Operational amplifier; data acquisition; digital to analog, analog to digital conversion Switches; Potentiometer; LVDT; Digital encoder	5.5 – 5.14; Ch 8 9.1, 9.2	Chapters 5 & 8 Problems Chapter 9 Problems	Lab 8 Lab9
Week 12 Week 13	Motor fundamentals; Stepper Motor Control Stress/Strain introduction; Strain gages; Wheatstone bridge; Strain gage rosette; Strain gage lab analysis	Chapter 9 & 10 9.3, 9.5	Chapter 9 &10 Problems	Lab 10
Week 14 Week 15	Signature analysis; Piezoelectric accelerometers; Temperature measure; Thermocouple relations; Comprehensive	Chapter 9	Chapter 9 Problems	Lab 11
Week 16	Review	All Chapters	All Chapter Problems	

*All dates are tentative and may be changed