FORM I: SUMMARY PAGE FOR PROPOSAL # CIVT102010-15

1. **Title:** CIVT 4350: Civil and Environmental Systems Engineering

2. **Submitting College:** COST

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

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

5. **Brief Summary of Proposal:**
This proposal is being submitted to increase the number of elective class options that civil engineering technology majors can take to complete their degree. Adding elective classes will assist with the issue of students having to wait longer to take required classes.

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
_____	Department of Engineering Technology	_____
_____	College of Science & Technology	_____
_____	Curriculum & New Programs Committee	_____
_____	SSU Faculty Senate	_____

FORM II - COURSE ADDITION FORM FOR PROPOSAL #CIVT102010-15

A. Course Number: CIVT 4350

B. Course Title: Civil and Environmental Systems Engineering

C. Catalog Description:
Introduction to application of systems approach and modeling techniques to problems in civil and environmental engineering.

D. Rationale: This course is created by the request of the faculty and the CIVT program Industrial Advisory Board. The course reflects the knowledge and skills that our students will need upon graduation as a result of change in global demand in civil engineering.

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

F. Credit Hours: 3 Credit Hours

G. Prerequisites: CIVT 3211, ENGT 3701, CIVT 4XXX

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
CIVT 4350 Civil and Environmental Systems Engineering

COURSE DESCRIPTION (CATALOG DATA):

Introduction to application of systems approach and modeling techniques to problems in civil and environmental engineering.

Credit Hours: 3
Prerequisites: CIVT 3211, ENGT 3701, CIVT 4XXX

EXPECTED STUDENT LEARNING OUTCOMES:

The student shall learn the principles and applications of systems analysis to to civil and environmental engineering design, optimization, decision making, economic analysis and evaluation of engineering projects. The student will have a good understanding of

* model development, evaluation and application
* use of available mathematical and computer program
* scheduling of civil and environmental engineering projects
* decision making in the face of opportunities and challenges
* economic evaluation for selection from alternative choices

CORE COMPETENCIES:

The course shall emphasize, among others, on the following core competencies:

- Quantitative reasoning and mathematics
- Scientific reasoning

TEXTBOOK: Charles S. Revelle, E. Earl Whitlatch, & Jeff R. Wright: Civil and Environmental Systems Engineering, Prentice Hall, 2004

SUPPLEMENTAL RESOURCES:

Benjamin S. Blanchard & Wolter J. Fabrycky: Systems Engineering and Analysis, Prentice Hall, 2011

Jeffrey H. Moore & Larry R. Weatherford: Decision Modeling with MS Excel, Prentice Hall, 2001

Brian Albright: Mathematical modeling with Excel, Jones and Bartlett, 2010

Andrew Ford: Modeling the Environment, Island Press, 2010

CLASS ATTENDANCE POLICY:

Credit may not be awarded if the number of absences exceeds the number of times that the class meets per week - namely 3 hours. Punctuality will be strictly enforced.

METHODS OF INSTRUCTION & ASSESSMENT:

Tutorial Sessions:

A number of tutorials (problem-solving) will be held, and each student must have his scientific calculator during all the classes. These sessions will provide ample opportunity to ask questions, to clear doubts, to improve problem-solving skills, and to understand practical applications. Computer usage will form part of these sessions.

Home assignments:
Use of library facilities and internet resources shall be incorporated. These should be submitted in time. Late submissions will not be accepted for evaluation

Course Folders:
All tutorial sheets (question papers and answer sheets), assignments and test papers shall be placed in a Course Folder. The Course Folder must be submitted on specified dates (to be announced in the class).

Tests and Final Examination:
These should be taken on the dates and times which shall be announced at least one week in advance. No make-up tests will be given except under extremely special circumstances.

GRADING POLICY:

The final grade for indicating the quality of academic work represents the student's successful performance in all the instructional areas of this Course.
The final evaluation shall be based on the following:

Home assignments and tutorials:	30%
Tests:	30%
Final examination:	40%

A	Excellent	85 - 100
B	Good	70 - 84
C	Average	60 - 69
D	Poor	50 - 59
F	Fail	< 50

ACADEMIC IRREGULARITY:

Academic honesty will be enforced as an essential component of student conduct as detailed in the University Catalog.

DISABILITY ACCOMMODATIONS:
If a student has a documented and 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.

INSTRUCTIONAL UNITS

A. Introduction to systems analysis & modeling:
Model development; types - conceptual, mathematical and computer models; model evaluation: graphical analysis, quantitative analysis, sensitivity analysis and uncertainty analysis; model application: scientific representation, expert and decision support systems, risk assessment, spatially explicit applications.
3 weeks

B. Use of computer software:
Excel spreadsheet, Stella, Vensim, etc.
1 week

C. Examples of computer model applications:
Mass balance models, water quality models; hydrological models, ocean temperature model, fauna extinction model, etc
3 weeks

D. Examples of mathematical programs:
Blending water supplies, grading a highway, manufacturing in furniture factory to maximize profit, designing a new office building, selecting projects for bidding, etc; introduction to graphical solution procedures

2 weeks

E. Scheduling models:

Bar charts, activity-on-arrow, activity-on-node; forward and backward passes, categories of floats; float calculations; critical path; precedence networks: types of relationships; percent complete approach; fast track projects; resource allocation and leveling; materials management; schedule compression and time-cost trade-off; accelerating a project; progress curves;

3 weeks

F. Decision theory:

Risk and uncertainty; decision tree analysis; utility function; marginal (prior) and conditional (posterior) probabilities; probability calculations (joint, prior and posterior probabilities); EMV of information; EMV of imperfect information; decision making in the absence of probabilities; 2 weeks

G. Models for economic evaluation:

Review of interest and interest formulae; determining economic equivalence; evaluating a single alternative; evaluating multiple alternatives; break-even economic evaluations

2 weeks

Civil Engineering Technology Program Outcomes

The educational objectives of the program are prescribed and achieved to demonstrate the following outcomes:

1. The graduate will have the engineering competence with ability to identify and analyze engineering problems and to apply knowledge, techniques and skills in creatively designing and maintaining systems for solving those problems

2. The graduate will have a good understanding of mathematics, science, technology, engineering, and computational methods and an aptitude for life-long learning for continuous improvement and to solve current and future problems at the regional and global level

3. The graduate will develop an ability to conduct experiments, analyze the data for engineering applications, and ensure quality control

4. The graduate will have the ability to function in multidisciplinary teams, assume societal and ethical responsibilities, communicate effectively, and contribute to the advancement of the art and science of engineering technology

As an ABET-accredited program, the Civil Engineering Technology program totally embraces the following Program Outcomes:

a. an appropriate mastery of the knowledge, techniques, skills, and modern tools of their disciplines
b. an ability to apply current knowledge and adapt to emerging applications of mathematics, science, engineering, and technology
c. an ability to conduct, analyze and interpret experiments, and apply experimental results to improve processes
d. an ability to apply creativity in the design of systems, components, or processes appropriate to program objectives
e. an ability to function effectively on teams
f. an ability to identify, analyze and solve technical problems
g. an ability to communicate effectively
h. a recognition of the need for, and an ability to engage in lifelong learning
i. an ability to understand professional, ethical and social responsibilities
j. a respect for diversity and a knowledge of contemporary professional, societal and global issues
k. a commitment to quality, timeliness, and continuous improvement

The Course CIVT 4XXX (Civil and Environmental Systems Engineering) lays special emphasis on the outcomes a, b, d, f, g, h, j, and k.