

09-004

UNDERGRADUATE CURRICULUM PROPOSAL COVER SHEET

Title of Proposal – Must begin with Department Abbreviation:

BSCE - New Program

Check One: Full Proposal or Information Item

Effective Date for Curricular Offering: FALL 2009

FROM: Civil Engineering Program/Joseph Owino, 440A EMCS, X4316, Joseph-Owino@utc.edu
(proposal originator: include spokesperson's name, department, office number, telephone, e-mail)

Does this require new resources from the originating department or other department? _____
Please attach explanation if yes.

Faculty of the originating department approved this proposal on 11/05/2008 (date),
by a vote of 3 aye votes; 0 nay votes; 0 abstentions: 0 eligible voting members absent

The following have examined this proposal:

Dept Head/Director: Gary McDonald (printed name) [Signature] (signature) approve (approve) neutral (neutral) disapprove* (disapprove*)

College Curriculum Committee Date: 11/7/08 Vote: 4 yes 0 no Signature of Chair: [Signature]

Spokespersons for Affected Departments:

JOSEPH OWINO/CE/11/07/08 [Signature] (signature) approve (approve) neutral (neutral) disapprove* (disapprove*)

(name, department, date) signature approve neutral disapprove*

(name, department, date) signature approve neutral disapprove*

(name, department, date) signature approve neutral disapprove*

Dean/Director: [Signature] (signature) approve (approve) neutral (neutral) disapprove* (disapprove*)

University Registrar: Linda Orth (printed name) [Signature] (signature) _____ (Comments)

[Signature] Provost: Phil Oldham (printed name) [Signature] (signature) approve (approve) neutral (neutral) disapprove* (disapprove*)

*Those who disapprove may attach an explanation

ACTIONS on this proposal:	Curriculum Committee	Faculty Senate
Date the proposal was considered	_____	_____
Vote of the body:	_____	_____
Accepted as information item (indicate date)	_____	_____
Approved as submitted (indicate date)	_____	_____
Approved with amendments (amendments indicated and transmitted to all signatories above, date):	_____	_____
Signature of Chair:	_____	_____

I. PROPOSAL FOR THE INITIATION OF A
NEW DEGREE PROGRAM

Submitted by

University of Tennessee at Chattanooga
Institution Submitting Proposal

College of Engineering and Computer Science
Name of College, School, or Division

Civil Engineering
Name of Department/Academic Unit

A NEW PROGRAM LEADING TO THE DEGREE OF:

Bachelor of Science in Civil Engineering
Title of Degree as on Diploma

Civil Engineering
Title of Major

14101/UTC Code 2312
CIP/THEC Code

BSCE
Formal Degree Abbreviation

Bachelor of Science in Civil Engineering
Degree Designation on Student's Transcript

Fall 2009
Proposed Starting Date

II. ABSTRACT

DEGREE PROGRAM

Institution: University of Tennessee at Chattanooga

Division/Department, etc. Civil Engineering

Program leading to Degree of: Bachelor of Science in Civil Engineering

With a Major in: Civil Engineering

With Sub-Majors in: None

Proposed Start-up Date: Fall 2009 Total Credit Hours Required for Major: 128

New Courses Proposed: NONE

Number of New Courses: NONE Number of New Course Credit Hours: NONE

Estimated Headcount Enrollment, FTE's, Graduates and Faculty for New Program

Year	Fall Full-Time Headcount	Fall Part-Time Headcount	Fall Full-Time Equated Students	Graduates	FTE Faculty	
					Current	New
1 F 2007act	93	18	16.2	8	3.5	0
2 F 2008act	102	11	12.2	10	3.5	0
3 F 2009est	107	28		12	3.5	0
4 F 20010est	112	33		12	3.5	0
5 F 20011est	122	38		14	3.5	0

New Costs Generated by Program:	Year 1 NONE
	Year 2 NONE
	Year 3 NONE
	Year 4 NONE
	Year 5 NONE

Accrediting Organization: Accreditation Board for Engineering and Technology

Target Date for Accreditation: Full Six Year Period Granted in Fall 2008

RATIONALE FOR PROPOSAL

HISTORY

The Engineering program at UT Chattanooga began in 1969 with approval to grant Bachelor of Science in Engineering (BSE) degrees to graduates of a multidisciplinary academic program with "Concentrations" in various engineering disciplines. The program was accredited by the Accreditation Board for Engineering and Technology (ABET) as a "non-traditional" program in 1975. Over the next two decades the program grew steadily by establishing a niche for multidisciplinary engineering education that differentiated UT Chattanooga from more mature programs at other institutions. However, beginning in the early 1990's, engineering graduates from UT Chattanooga began to experience difficulties, particularly when seeking employment outside the immediate area of Chattanooga. Most corporate recruiters were seeking traditional engineers with discipline specific degrees. For a time, the College was able to argue that a multidisciplinary approach produced better prepared engineering graduates. During this period, the size and scope of the engineering programs at UT Chattanooga were also limited by constrained classroom space and barely adequate laboratory space. These constraints were removed with the construction in 2003 of the new Engineering Mathematics and Computer Science Building. However, the difficulties experienced by UT Chattanooga graduates did not go away and the College soon began to experience difficulty in convincing prospective students and their parents that earning a general BSE degree was better than earning a discipline specific degree. In response, the faculty began moving toward discipline specific degree programs in the late 1990's. By 2001, a revised civil engineering curriculum was in place and students were enrolled in the new program. In 2003 all existing BSE degree programs were reviewed by ABET in a regularly scheduled visit for continued accreditation as "non-traditional engineering programs." In addition, two programs, electrical engineering and mechanical engineering, were reviewed as stand-alone, traditional programs. In fall 2004 ABET reaccredited all existing BSE Engineering program while also granting full accreditation for the new electrical and mechanical engineering programs as discipline specific programs. In 2007 two additional programs, civil engineering and chemical engineering were reviewed as stand-alone, traditional programs. In fall 2008 ABET granted full accreditation for the new civil and chemical engineering programs as discipline specific programs. The best possible outcome from ABET is the designation of "next general review" that certifies accreditation for a period of six years without an interim visit or report. The new discipline specific civil engineering program, received full accreditation until the "next general review" that will occur in 2013.

REQUEST FOR DEGREE CHANGE

The College of Engineering and Computer Science requests approval to change the name of the degree offered to graduates of the newly accredited civil engineering program from Bachelor of Science in Engineering (BSE) to Bachelor of Science in Civil Engineering (BSCE).

III. PROGRAM DESCRIPTION

A.1 MISSION:

The educational objectives of the CE program are based on and consistent with the missions of the University and the College of Engineering and Computer Science. The mission of The University of Tennessee at Chattanooga is to serve as a national model of an engaged metropolitan university whose faculty, staff, and students, in collaboration with external partners, employ the intellectual resources of the liberal arts and professional programs to enrich the lives of those we serve. The Mission of the College of Engineering & Computer Science is to serve the people, businesses, and industries of our region and support their technical needs. The College exists as the region's principal resource for educational, applied research, and service programs. The mission of the CE Program is to provide students in civil engineering with the knowledge and skills required for a wide range of careers and graduate study; to provide service to the profession in our region and beyond; and to maintain a supportive environment that encourages our students and faculty to achieve.

A.2 PROGRAM OBJECTIVES:

Consistent with the missions of the University, the College of Engineering and Computer Science, the CE Program and the ABET/ASCE (American Society of Civil Engineers) Program Criteria for Civil Engineering, the educational objectives for the undergraduate program in civil engineering are to produce graduates who:

1. Have the ability to function as civil engineers.
2. Agree that UTC was conducive to their achieving.
2. Work effectively in multidisciplinary teams.
3. Are progressing toward professional registration.
4. Participate in professional societies.
5. Pursue graduate studies.

These objectives are consistent with the missions of the University, the College and the CE program because the knowledge, competencies, skills, attitudes and preparations that flow from our supportive, interdisciplinary, design oriented program.

B. CIVIL ENGINEERING CURRICULUM

B.1 CATALOG DESCRIPTION: The civil engineering program prepares civil engineering students for successful careers in industry and academia, and provides service to the civil engineering profession and to the State of Tennessee.

The civil engineering curriculum offers courses four discipline areas: Structures, Geotechnical Engineering, Transportation Engineering and Environmental Engineering. The civil program faculty has degrees in various emphasis areas of civil engineering and is committed to delivering a civil engineering curriculum that has strong emphasis on engineering analysis tools, utilization of modern, electronic instrumentation culminating with a civil engineering and interdisciplinary design experience.

B.2 COURSE REQUIREMENTS

General Education Courses

Rhetoric and Composition: English 121, 122 (6 hours)

Mathematics: Math 151/152 (4 hours)

Statistics: Engineering 222 (3 hours)

Natural Sciences: Two approved natural science courses, at least one including a laboratory component (7-8 hours)

Humanities and Fine Arts: One approved fine arts course and one approved humanities course (6 hours)

Cultures and Civilizations: One approved non-western cultures and civilizations course (3 hours)

Behavioral and Social Sciences: Economics 101 and 102 or two approved behavioral science courses (6 hours)

Major and Related Courses

Chemistry 121/123

Mathematics 151/152, 161/162, 212, 245, 255

Physics 231/281

Engineering Fundamentals: ENGR 103, 104, 113, 185, 222, 224, 246, 247, 248, 270, 271, 307, 308, 352, 385

Note: For qualified students, ENGR 495r, Departmental Honors (4 hours) may substitute for ENCE 450 (3 hours)

Civil Engineering Courses ENCE 340, 361, 362, 363, 368, 450, 461, 462, 463, 468
ENEV 331, 438, Geology: Geology 445

Technical electives: Two 3-hour 300-level or 400-level courses in approved engineering courses

128 hours (138 for co-op graduates).

Minimum 39 hours at the 300-400 level.

2.0 GPA in all engineering courses.

B.3 TYPICAL CIVIL ENGINEERING CURRICULUM

The typical Civil Engineering curriculum is shown in Tables 1 through 3.

Table 1: Basic-Level Curriculum Civil Engineering Program

Year; Semester	Civil Engineering Program	Category (Credit Hours)			
		Math & Basic Sciences	Engineering Topics <i>Check if Contains Significant Design (✓)</i>	General Education	Other
Year 1 1 st Semester	ENGR 103 Basic Engineering Science	3	()		
	ENGR 113 Freshman Engineering Laboratory	1	()		
	MATH 151 Calculus I	3	()		
	MATH 152 Calculus I Laboratory	1	()		
	CHEM 121 General Chemistry I	3	()		
	CHEM 123 General Chemistry I Laboratory	1	()		
	ENGL 121 Composition I		()	3	
	Behavioral & Social Science		()	3	
Year 1 2 nd Semester					
	ENGR 104 Vector Statics		3 ()		
	ENGR 185 Introduction to Engineering Design		3 (✓)		
	MATH 161 Calculus II	3	()		
	MATH 162 Calculus II Laboratory	1	()		
	MATH 212 Elementary Linear Algebra	3	()		
	ENGL 122 Composition II		()	3	
Year 2 1 st Semester	Behavioral. & Social Science		()	3	
	ENGR 224 Introduction to Engineering Computations		3 ()		
	ENGR 270 Electrical Circuits I	3	()		
	ENGR 271 Electrical Circuits I Laboratory		1 ()		
	PHYS 231 Principles of Physics – Electricity & Magnetism	3	()		
	PHYS 281 Principles of Physics Laboratory	1	()		
	MATH 245 Introduction to Differential Equations	3	()		

Table 2: Basic-Level Curriculum Civil Engineering Program (continued)

Year; Semester	Civil Engineering Program	Category (Credit Hours)			
		Math & Basic Sciences	Engineering Topics <i>Check if Contains Significant Design (✓)</i>	General Education	Other
Year 2 2nd Semester					
	ENGR 222 Probability and Statistics for Engineering	3	()		
	ENGR 246 Mechanics of Materials		3 ()		
	ENGR 247 Mechanics of Materials Laboratory		1 (✓)		
	ENGR 248 Dynamics		3 ()		
	MATH 255 Multivariable Calculus	3	()		
	Fine Arts		()	3	
Year 3 1st Semester					
	ENGR 307 Fluid Mechanics		3 ()		
	ENGR 308 Fluid Mechanics Laboratory		1 (✓)		
	ENCE 362 Transportation Engineering I		3 ()		
	ENCE 363 Structural Analysis I		3 ()		
	ENEV 331 Environmental Process Principles		3 ()		
	Culture & Civilization		()	3	
Year 3 2nd Semester					
	ENCE 361 Soil Mechanics		3 ()		
	ENCE 368 Design of Concrete Structures		3 (✓)		
	ENCE 462 Transportation Engineering II		3 ()		
	ENGR 352 Engineering Economy		3 ()		
	ENCE 340 Civil Engineering Materials		3 ()		

Table 3: Basic-Level Curriculum Civil Engineering Program (continued)

Year; Semester	Civil Engineering Program	Category (Credit Hours)			
		Math & Basic Sciences	Engineering Topics <i>Check if Contains Significant Design (✓)</i>	General Education	Other
Year 4 1 st Semester					
	GEOL 445 Hydrology		3 ()		
	ENCE 461 Foundation Analysis and Design		3 (✓)		
	ENCE 463 Structural Analysis II		3 ()		
	ENGR 385 Interdisciplinary Project I		3 (✓)		
	Culture & Civilization		()	3	
Year 4 2 nd Semester					
	ENEV 438 Water Supply and Waste Water Treatment		3 ()		
	ENCE 468 Design of Steel Structures		3 (✓)		
	ENCE 450 Civil Engineering Design Project		3 (✓)		
	Engineering Elective		3 ()		
	Engineering Elective		3 ()		
TOTALS-ABET BASIC-LEVEL REQUIREMENTS		35	72	21	0
OVERALL TOTAL FOR DEGREE	128 hrs				
PERCENT OF TOTAL		100%	27.3%	56.3%	16.4%
Totals must	Minimum semester credit hours	32 hrs	48 hrs		
satisfy one set	Minimum percentage	25%	37.5 %		

B.4 COURSE DESCRIPTIONS FOR NEW COURSES PROPOSED

Most of the courses noted in the civil engineering curriculum have been taught since 2001. No new courses are proposed.

C. EVALUATION – The process described below was developed to support the ABET accreditation process completed in fall 2007. Information will be presented to demonstrate that the CE program is being evaluated by appropriate representatives and organizations with feedback being used to support program improvement. The CE faculty will be responsible for conducting the assessment process, analyzing the results, and providing feedback to the CE program constituents.

C.1 PROGRAM CONSTITUENCIES

The Civil Engineering program objectives (attributes we expect our graduates to possess three to five years after graduation) and outcomes (attributes our graduates must demonstrate upon graduation) reflect the values of our four most immediate constituencies:

- Civil Engineering Advisory Board
- Civil Engineering alumni
- Civil Engineering professional society (ASCE)
- Civil Engineering faculty.

The CE Advisory Board is made up of engineers, engineering managers, alumni and business managers representing local, regional, and national employers of civil engineers. As such the Board provides valuable feedback regarding our program based on their observations of our students through the UTC co-op experience, through capstone student design project partnerships and through their experiences in the hiring, training and employing our graduates. The CE Advisory Board also represents local, regional, and national collaborators in ongoing faculty research.

Alumni of the CE program provide important reflections of the content, completeness and quality of the CE program; reflections based in large measure on their own professional and career experience. Alumni also support the CE program financially, hire our graduates and participate in student design project partnerships. There are approximately 225 active CE alumni from the old CE specialty program and the new CE program.

The members of the local chapter of ASCE (American Society of Civil Engineers) are comprised of active and retired civil engineering professionals and CE faculty. The chapters provide insight to promoting and enhancing the technical competency and professional well-being of civil engineers.

The CE faculty members possess an abundance of professional and academic experience essential to articulating and implementing the program mission and objectives and to sustaining the process of continuous program improvement.

Process to Establish and Review Program Educational Objectives

The process to establish the program and educational objectives of the CE program had its genesis in the 1999 revision of the College's strategic plan. Input for the revision of the

College mission, objectives and the strategic plan flowed from the College Advisory Board, industrial partners, recruiters and alumni. In 2000, subcommittees of the faculty developed and the full faculty of the College approved the strategic plan with its revised mission and objectives and the set of strategies for improving the College and its programs over the next five years. A principal component of the improvement strategy was the shift from the 'non-traditional' engineering program to discipline based programs.

The development of the Civil Engineering program began in the fall of 2001 by articulating the program's mission and educational objectives. This process incorporated the input of the College Advisory Board at the annual College Advisory Board retreat. With the advice and support of this important constituent, the CE faculty subsequently crafted a mission statement and a set of educational objectives. The CE Advisory Board met in April 2003, April 2004, April 2005, November 2006, March 2007 and June 2007 to review the Mission statement, Program Objectives and Outcomes. The Advisory Board strongly endorsed these statements and the Program's seeking accreditation for the civil engineering program. The Advisory Board strongly endorsed the comprehensive nature of the CE program objectives and recommended that an *emphasis* be placed on *economic considerations*.

The CE Advisory Board was asked to complete a survey on the relative importance of CE program skills and knowledge that they want our CE program graduate to have (called CE program Outcomes later). Table 4 summarizes the Advisory Board's most recent 2007 survey. The survey questionnaire is shown in Figure 1. The survey contains a number of questions that are relevant to the six CE educational objectives.

Educational Benchmark, Inc. (EBI) produces a standardized, national survey that is administered to alumni who graduated at engineering schools throughout the United States. In the spring of 2007, the civil engineering program used the EBI assessment tool to survey alumni (graduates for period 2000 to 2004). While the respondents were graduates with civil engineering concentrations, and while none was a graduate of the newly developed discipline based program, the survey results indicate the program objectives most representative of the CE program seeking accreditation.

The survey questionnaire is shown in Figures 2 and 3. The survey contains a number of questions that are relevant to the six CE educational objectives. The survey is scored by EBI, who also provides UTC with information collected from other participating schools, thus allowing some inter-institutional comparison. The overall result of the 2007 EBI CE assessment survey is summarized in Table 5.

Date: _____

Advisory Board Survey
The University of Tennessee at Chattanooga (UTC)
College of Engineering and Computer Science
Civil Engineering Program

The Civil Engineering program at UTC has adopted a process of assessment that involves measuring the effectiveness of the program in achieving educational objectives that support its mission. As part of this assessment effort we are asking you to complete this survey. We seek your candid evaluation of those individuals in your organization who are graduates of UTC's undergraduate civil engineering program. This survey allows you to provide an aggregate evaluation of these individuals.

The survey consists of two parts. Part 1 provides us a record of where our graduates are working and the programs they support. Part 2 provides us feedback as to how our graduates are performing in your organization. Please respond to both parts of the survey.

Thank you for participating in the Civil Engineering Program assessment process. We appreciate your contribution and your time.

Part I: Please complete the following so we can recognize where and for whom our graduates work.

Name: _____ e-mail: _____

Organization and Company: _____

Approximate # of employees you manage: _____

Approximate # of UTC CE alumni you manage: _____

Part II: For the aggregate of the UTC CE graduates who report to you, please respond to each of the following based on the given 7 point scale. Circle the most representative response.

UTC CE graduates	Low							High
1. demonstrate the ability to design a system, component, or process to meet desired needs	1	2	3	4	5	6	7	
2. demonstrate effective mastery of technical skills	1	2	3	4	5	6	7	
3. demonstrate interpersonal skills necessary to succeed	1	2	3	4	5	6	7	
4. effectively function in multidisciplinary environments	1	2	3	4	5	6	7	
5. easily adapt to various environments	1	2	3	4	5	6	7	
6. adapt effectively to changing environments	1	2	3	4	5	6	7	
7. actively pursue continued education	1	2	3	4	5	6	7	
8. pursue graduate work	1	2	3	4	5	6	7	
9. have passed the FE exam and are progressing toward P.E. registration	1	2	3	4	5	6	7	
10. demonstrate effective written communication skills	1	2	3	4	5	6	7	
11. demonstrate effective oral communication skills	1	2	3	4	5	6	7	
12. enhance the effectiveness of your organization	1	2	3	4	5	6	7	
13. demonstrate ability to use reference materials to support project design	1	2	3	4	5	6	7	
14. demonstrate ability to understand ethical responsibility	1	2	3	4	5	6	7	
15. demonstrate ability to understand the impact of engineering solutions in a global/societal context	1	2	3	4	5	6	7	
16. meet a high level of overall satisfaction	1	2	3	4	5	6	7	

Figure 1 CE Advisory Board Survey Questionnaire, page 1 of 1.

EBI Engineering Alumni Assessment

Please record your responses by carefully darkening the circle that corresponds to your answer with a #2 pencil or black ink (no mechanical pencils). One response per item.

College/University: _____
(Please Print Clearly)

A. Population Code (leave blank if not provided):
 1 2 3 4 5 6 7 8 9 10

B. Gender:
 Male Female

C. U.S. Ethnic Group or Nationality:
 Multiracial American Hispanic American
 African American White American
 Native American Non-U.S. Citizen or Permanent Resident
 Asian American

D. Current Employment Status:
 Employed full-time Not employed, pursuing academic degree
 Employed part-time Not employed, not seeking employment
 Not employed, seeking employment

E. I graduated from the engineering program:
 Within the last 12 months Within the last 37 to 48 months
 Within the last 13 to 24 months Over 48 months ago
 Within the last 25 to 36 months

F. If employed full-time, what is your current annual salary (including bonuses):
 Below \$35,000 \$75,000 to \$84,999
 \$35,000 to \$44,999 \$85,000 to \$94,999
 \$45,000 to \$54,999 \$95,000 or more
 \$55,000 to \$64,999 Not employed full-time
 \$65,000 to \$74,999

G. What was your primary academic major (emphasis) in the engineering program (Choose only one):
 Aerospace Eng Mgt Other
 Agricultural Environmental
 Architectural Geo/Mining
 Bioengineering Industrial
 Ceramic Manufacturing
 Chemical Marine/Ocean/Naval
 Civil Materials/Metallurgical
 Computer Mechanical Eng
 Computer Sci/Software Nuclear
 Construction Petroleum
 Electrical/Electronic Info Tech
 Eng Mechanics Other Eng Tech

H. Do you contribute financially to the engineering school? (either directly or through the university)
 No Yes: Annually Yes: Periodically

CURRENT POSITION

I. Type of function (choose only one):
 Consulting Operations/Maintenance
 Customer Service/Support Product Support
 Development Product Design
 Education Research
 Finance Software Development
 Management Systems Support
 Manufacturing/Production Testing
 Marketing/Sales Other
 Network/Systems Support Not Applicable

J. My current position is:
 Within my engineering field Outside engineering
 Within another engineering field I am not employed

K. Size of organization (number of employees):
 50 or less 1,001 to 2,500 Not Applicable
 51 to 150 2,501 to 5,000
 151 to 500 5,001 to 10,000
 501 to 1,000 over 10,000

RESPONSE KEY FOR QUESTIONS 1 to 10

not at all (1) 2 3 4 5 6 7 8 9 10 not applicable

ENGINEERING EDUCATION

To what extent did your engineering degree:

- Expand your career options (1) 2 3 4 5 6 7 8 9 10
- Provide access to alumni (1) 2 3 4 5 6 7 8 9 10
- Provide access to employers (1) 2 3 4 5 6 7 8 9 10
- Assist you in selecting a career (1) 2 3 4 5 6 7 8 9 10
- Assist you in obtaining a job (1) 2 3 4 5 6 7 8 9 10
- Increase your earning potential (1) 2 3 4 5 6 7 8 9 10
- Enhance your upward mobility (1) 2 3 4 5 6 7 8 9 10
- Provide knowledge necessary to succeed (1) 2 3 4 5 6 7 8 9 10
- Provide interpersonal skills necessary to succeed (1) 2 3 4 5 6 7 8 9 10
- Provide technical skills necessary to succeed (1) 2 3 4 5 6 7 8 9 10

RESPONSE KEY FOR QUESTIONS 11 to 13

very satisfied (1) 2 3 4 5 6 7 8 9 10 not applicable
 moderately satisfied (2) 3 4 5 6 7 8 9 10
 slightly satisfied (3) 4 5 6 7 8 9 10
 neutral (4) 5 6 7 8 9 10
 slightly dissatisfied (5) 6 7 8 9 10
 moderately dissatisfied (6) 7 8 9 10
 very dissatisfied (7) 8 9 10

OVERALL SATISFACTION WITH CAREER CHOICE

What is your satisfaction with your:

- Decision to be an engineer (1) 2 3 4 5 6 7 8 9 10
- Choice of engineering discipline (1) 2 3 4 5 6 7 8 9 10
- Choice of employer/graduate school (1) 2 3 4 5 6 7 8 9 10

THE BOTTOM LINE: Overall Satisfaction with your engineering education

14. Overall, how well did your undergraduate engineering degree program prepare you for success in your current position?

very poor (1) 2 3 4 5 6 7 exceptional

15. To what extent did your engineering educational experience fulfill your expectations?

far below (1) 2 3 4 5 6 7 far above

16. When you compare the cost (time, expense, effort and lost income) to the contribution (salary, mobility) the degree has made to your success, how do you rate its overall value?

very poor (1) 2 3 4 5 6 7 exceptional

17. How inclined are you to recommend your Engineering program to a close friend?

not at all (1) 2 3 4 5 6 7 extremely

(OVER)

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Figure 2 CE EBI Alumni Assessment, page 1 of 2

		RESPONSE KEY FOR QUESTIONS 18 to 51											
Not at all		moderately					extremely					not applicable	
①		②	③	④	⑤	⑥	⑦					⑧	
		How IMPORTANT are these abilities to your job or graduate school performance:										How well did your engineering education prepare you in these areas:	
18. - 19.	Ability to design experiments	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫
20. - 21.	Ability to conduct experiments	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫
22. - 23.	Ability to analyze and interpret data	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫
24. - 25.	Ability to design a system, component, or process to meet desired needs	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫
26. - 27.	Ability to function on multidisciplinary teams	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫
28. - 29.	Ability to identify or formulate engineering problems	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫
30. - 31.	Ability to solve engineering problems	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫
32. - 33.	Ability to understand ethical responsibilities	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫
34. - 35.	Ability to understand the impact of engineering solutions in a global/societal context	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫
36. - 37.	Ability to use modern engineering tools	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫
38. - 39.	Ability to communicate using oral progress reports	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫
40. - 41.	Ability to communicate using written progress reports	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫
42. - 43.	Ability to pilot test a component prior to implementation	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫
44. - 45.	Ability to use reference materials to support project design	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫
46. - 47.	Ability to recognize the need to engage in lifelong learning	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫
48. - 49.	Ability to apply knowledge of science	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫
50. - 51.	Ability to apply knowledge of mathematics	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫

If your school asked additional questions, record your responses below. If not, leave blank.

SCHOOL SPECIFIC QUESTION RESPONSES

- | | |
|-----------------------------|-----------------------------|
| 52. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫ | 57. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫ |
| 53. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫ | 58. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫ |
| 54. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫ | 59. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫ |
| 55. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫ | 60. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫ |
| 56. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫ | 61. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫ |

86890

Please return your completed survey in the enclosed envelope.
Thank you for your feedback!

Figure 3 CE EBI Alumni Assessment, page 2 of 2.

Table 4 Summary of the 2007 CE Advisory Board Survey Results

CE Advisory Board Survey Questions	(% OF RESPONDENTS							Mean
	1 = Low	2	3	4	5	6	7 = High	
UTC CE graduates ...								
1. demonstrate the ability to design a system, component, or process to meet desired needs	0.0	0.0	0.0	0.0	0.00	100.0	0.0	6.0
2. demonstrate effective mastery of technical skills	0.0	0.0	0.0	0.0	0.00	66.7	33.3	6.3
3. demonstrate interpersonal skills to succeed	0.0	0.0	0.0	0.0	33.3	66.7	0.00	5.7
4. effectively function in multidisciplinary environments	0.0	0.0	0.0	0.0	100.0	0.0	0.0	5.0
5. easily adopt to various environments	0.0	0.0	0.0	0.0	66.7	33.3	0.0	5.3
6. adapt effectively to changing environments	0.0	0.0	0.0	0.0	100.0	0.0	0.0	5.0
7. actively pursue continued education	0.0	0.0	0.0	0.0	0.0	100.0	0.0	6.0
8. pursue graduate work	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
9. have passed the FE exam and are progressing toward PE registration	0.0	0.0	0.0	0.0	0.0	66.7	33.3	6.3
10. demonstrate effective written communication skills	0.0	0.0	0.0	0.0	33.3	66.7	0.0	5.7
11. demonstrate effective oral communication skills	0.0	0.0	0.0	0.0	66.7	33.3	0.0	5.3
12. enhance the effectiveness of your organization	0.0	0.0	0.0	0.0	66.7	0.0	33.3	5.7
13. demonstrate ability to use reference materials to support project design	0.0	0.0	0.0	0.0	0.0	100.0	0.0	6.0
14. demonstrate ability to understand ethical responsibility	0.0	0.0	0.0	0.0	0.0	100.0	0.0	6.0
15. demonstrate ability to understand the impact of engineering solutions in a global/societal context	0.0	0.0	0.0	0.0	66.7	33.3	0.0	5.3
16. meet a high level of overall satisfaction	0.0	0.0	0.0	0.0	0.0	100.0	0.0	6.0

Table 5 Summary of Civil Engineering EBI Educational Objectives Assessment Results

Objective	UTC CE Mean Score**	All* Participating schools	Comparison* (UTC CE/All)
CE Program will produce graduates who:	Goal: ≥ 5.0		
1. Have the ability to function as civil engineers.	5.6	5.3	106%
2. Who agree that UTC was conducive to their achieving	5.7	5.4	106%
3. Work effectively in multidisciplinary teams	5.8	5.7	102%
4. Are progressing toward professional registration	6.2	5.7	109%
5. Participate in professional societies	6.2	5.7	109%
6. Pursue graduate studies.	6.2	5.7	109%

On June 14, 2007 the CE advisory Board and the CE faculty met to discuss the results of the 2- and 4-year assessment cycles. The Board fully endorsed the CE faculty proposals. The board was notified of the revised results via the telephone.

In the spirit of continuous improvement of the CE program mission and educational objectives, input from the constituents will be sought periodically, analyzed by the CE faculty, with results submitted to the CE Advisory Board for their consideration followed by appropriate curriculum revisions if needed every four years in a six year cycle. Upon the affirmative vote of the CE program faculty, changes to program mission and educational objectives will be proposed, discussed and voted on by the College faculty

Program Curriculum and Processes to Ensure Achievement of the Program Objectives

Achievement of Educational Objectives is measured in terms of the assessment and evaluation processes in place in the College and in the CE program. Educational Objectives are directly linked to measurable Program Outcomes. Achievement of the higher-level objectives is gauged (1) externally via feedback from constituent groups just discussed and (2) internally by the degree that specific targets are satisfied. Assurances that the Educational Objectives are achieved are provided through a process of continuous curriculum improvement aimed at attainment of the Program Outcomes. The process of continuous curriculum improvement is described in Figure 4, a variation of the EC2000 double loop diagram.

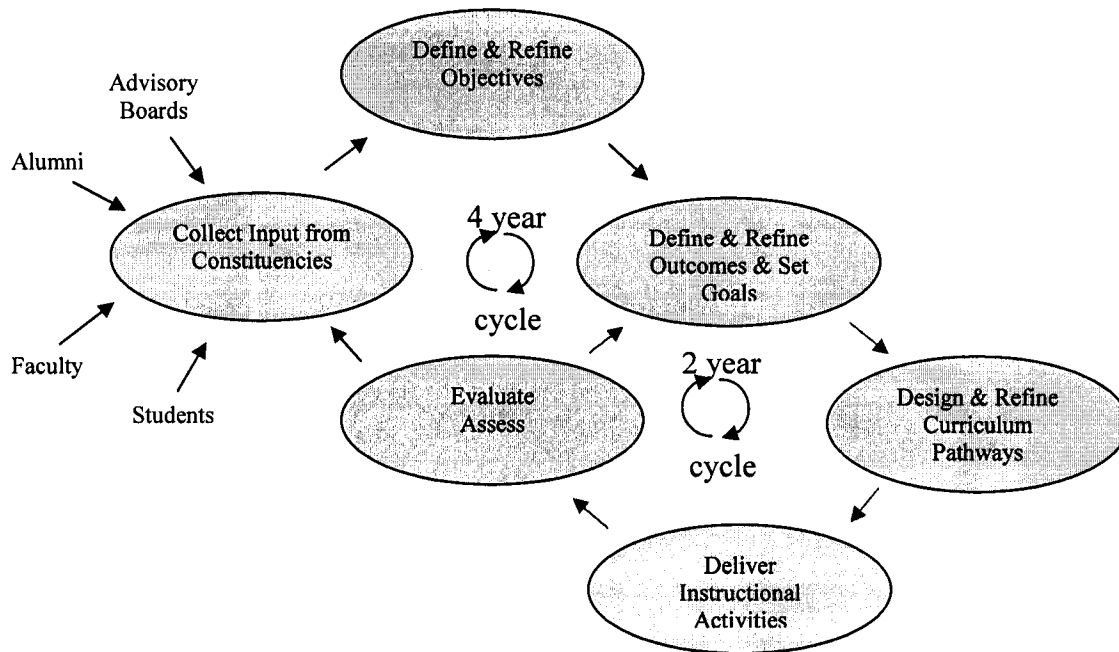


Figure 4 The Two Loop Process for Continuous Improvement of the CE Program.

The outer loop, enhancing educational objectives (Criterion 2), will follow a four year cycle while the lower loop, refining program outcomes (Criterion 3), will follow a two year cycle. While the process provides at least two iterations of refinement and assessment of program outcomes prior to revisiting educational objectives, it remains flexible and permits considerations as deemed necessary by the CE faculty, the constituencies, the college or the university.

To ensure its faithful and ongoing execution, process tasks are assigned to the CE Faculty as a whole under the leadership of the CE ABET coordinator, or where appropriate, to individual faculty who are in turn held responsible and accountable through the University's Faculty Evaluation and Development by Objectives (EDO) process, annual review of faculty progress, establishment of goals and attainment of objectives. Because of their deliberative nature, the CE faculty as a whole is responsible for the process tasks associated with Defining and Refining Objectives, Determining Outcomes, Setting Criteria and Designing Curriculum Pathways. The faculty as a whole is also responsible for all assessment tasks in the round robin of course folder evaluations. Because of their "data collection" nature, tasks have been assigned to individual faculty for collection of constituent input, evaluation and assessment. Assessment results developed by individual faculty members are presented, reviewed, and approved at CE faculty meetings.

Spring 2008 Status for Evaluation, Feedback, and Program Improvements

The double loop process noted above is being followed with the two year cycle part related to program outcomes being completed in spring 2009. The same two year cycle process will be completed again in fall 2010 with the full four year cycle process being completed in 2011. Completing this process will provide information required to demonstrate that the CE program has completed the assessment, feedback and program improvement processes required to sustain CE program improvements.

The CE faculty will be meeting at regularly scheduled times during academic year 2008 to use feedback materials noted earlier in refining the curriculum and instructional delivery methods required to make CE program improvements.

D. ACCREDITATION: Accreditation for the full six year period was granted for the CE program in fall 2008 by Accreditation Board for Engineering and Technology (ABET) on initial request.

IV. UTC RELATED UNDERGRADUATE PROGRAMS

Table 6. Productivity of Related Programs

Three Year Summary 05-06, 06-07, 07-08					
All Programs in College of Engineering & Computer Science		Number of Graduates	Student Credit Hours	Fall Majors	Accredited by
BSE Degree - Industrial Engineering/Environmental Chemical Specialization	05-06	4	1136	34	ABET
	06-07	8	1259	50	
	07-08	7	1394	44	
BSChE Degree - Chemical Engineering	05-06	3	261	21	ABET
	06-07	4	390	30	
	07-08	6	471	33	
BSEE Degree - Electrical Engineering (Approved in 2006)	05-06	10	1312	74	ABET
	06-07	12	1081	77	
	07-08	3	1009	33	
BSME Degree - Mechanical Engineering (Approved in 2006)	05-06	16	1046	133	ABET
	06-07	13	1294	137	
	07-08	26	1607	174	
BS Degree - Computer Science	05-06	21	1751	137	ABET
	06-07	12	1682	175	
	07-08	15	2257	186	
MS in Engineering	05-06	1	238	15	
	06-07	0	268	17	
	07-08	2	202	24	
MS in Engineering Computational Engineering	05-06	0	45	8	
	06-07	0	69	9	
	07-08	2	71	10	
MS in Engineering Management	05-06	2	362	37	
	06-07	9	469	48	
	07-08	19	681	57	
MS in Computer Science	05-06	4	244	23	
	06-07	5	201	28	
	07-08	4	192	23	
Ph.D. in Computational Engineering (Approved in 2004)	05-06	1	149	14	
	06-07	1	143	14	
	07-08	2	188	15	

V. DEMAND/NEED FOR THE PROGRAM:

Modern society depends upon a steam stream of engineers to continue expansion of the global economy that is driven, to a large extent, by engineering and technology. Civil engineers now make up approximately 25 percent of all engineers. Demand is expected to remain strong, well into the 21st Century. The civil engineering “concentration” at UT Chattanooga has produced approximately 220 graduates, many of whom remain in the Chattanooga area working for companies like the Tennessee Department of Transportation (TDOT) and Tennessee Valley Authority.

An indication of the demand for Civil Engineers at the national level can be seen in the following data from 2007 edition of “Profiles of Engineering and Engineering Technology Colleges” published by the American Society of Engineering Education.

Bachelor's Degrees	2002	2003	2004	2005	2006	2007
Aerospace	1,711	2,011	2,232	2,371	2,722	2,788
Architectural	513	627	590	722	631	625
Biological/Agricultural	556	603	601	635	646	659
Biomedical	1,315	1,628	2,019	2,410	2,917	2,969
Chemical	5,529	5,233	4,801	4,521	4,452	4,551
Civil	8,066	8,192	8,142	8,247	8,935	9,402
Civil/Environmental				212	291	445
Computer	4,720	5,746	5,838	5,455	4,901	4,046
Comp. Sci. (inside Eng.)	6,842	8,649	9,156	8,419	7,330	6,446
Electrical	11,402	11,994	12,500	12,459	11,915	11,467
Electrical/Computer	2,597	2,782	2,700	2,924	2,825	2,425
Engineering (General)	1,069	1,105	1,138	1,179	1,176	1,246
Engineering Management	227	296	302	303	238	274
Eng. Science & Eng. Physics	489	451	501	383	431	460
Environmental	465	516	576	522	437	454
Industrial/Manufacturing	3,575	3,769	3,790	3,647	3,664	3,503
Mechanical	13,247	13,801	14,182	14,947	16,063	16,701
Metallurgical & Materials	838	859	817	840	909	963
Mining	112	96	85	92	120	119
Nuclear	145	135	202	275	342	402
Other Engineering Disciplines	3,106	2,422	2,488	2,724	2,902	2,942
Petroleum	257	250	233	315	339	428
Total	66,781	71,165	72,893	73,602	74,186	73,315

It can be seen in the above table that approximately 12 percent of all degrees, awarded over the past six years have been to Civil Engineers and that degrees awarded to Civil Engineers has steadily increased over the past six years from 8,066 in 2002 to 9,402 in

2007. Note that Engineering (General) degrees represent less than 1.5 percent of all engineering degrees awarded for this period. Both trends are expected to continue.

Locally, the demand for Civil Engineering has been high, with approximately 25% of all UT Chattanooga engineering graduates for the past six years earning their BSE degrees with a Concentration in Civil Engineering. This indicates strong interest in the discipline by enrolled students. Local hiring of BSE graduates with the Civil Engineering Concentration has been strong. For example, many of our students have been hired by Tennessee Department of Transportation (TDOT) and by the Tennessee Valley Authority which has its corporate engineering headquarters in Chattanooga. A recent report from TVA indicates that more than 20 percent of their engineers are graduates of UT Chattanooga, more than those from any other single institution.

Over the years, the Advisory Board for the College has been engaged in discussions of the efficacy of moving to discipline specific degree program. A historical perspective of their involvement is captured in Figures 4-6 which is letter from Dr. Ronald B. Cox, who served as Dean of the College from 1979 through 1998, to Dr. Phil Kazemersky who served as Interim Dean until 2004.



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February 20, 2003

Dr. Phil Kazemersky
Acting Dean
College of Engineering and Computer Science
University of Tennessee at Chattanooga

RE: Brief Historical Perspective of Engineering Advisory Board
and Central Issues

Dear Dr. Kazemersky:

I am pleased to provide a brief historical perspective of the Engineering Advisory Board and issues raised during the period from 1970 through 1996. Shortly after the creation of the College of Engineering (then called the School of Engineering) in 1969, the most pressing issue was to recruit highly qualified faculty to develop the curriculum and to provide instruction. In the year or two before an "official" advisory board was formed, there were industrial advisors from TVA, DuPont and Combustion Engineering. These senior managers were keenly interested in there being a "high quality" engineering school in place.

Around 1971, a formal Advisory Board was created which had senior executive representatives from the major companies (and prospective major employers) as members. Such companies and agencies included: TVA, Combustion Engineering, DuPont, Astec, Bell Systems, Campbell Engineering, and other representative consulting engineering firms. Early in the deliberations of the board (and for several years) the primary issues had to do with expanding the curriculum to meet reasonable industrial demands for engineering graduates. Associated with such interests were the requirements for more laboratory facilities and equipment, laboratory support personnel, and general enhancement of the budget to support a growing program.

From the onset of the creation of the engineering program, the structure was one of having a basic ("non-traditional") engineering program which offered options or concentrations in areas such as mechanical engineering and electrical engineering. The degree itself was a B.S. degree in Engineering. This was done for two reasons. First, it was organizationally more efficient (i.e. there was no requirement to have separate management and separate facilities for each program) and, secondly, it provided some differentiation from other programs in the state (primarily that of the UT Knoxville program).

By 1974, the Advisory Board had begun to question the adequacy of the existing facilities (Grote Hall) and the lack of graduate degrees being offered at Chattanooga. New and expanded facilities were being proposed and justified during the mid 70's at the

Figure 4. Correspondence from Dr. Cox to Dr. Kazemersky, page 1 of 3.

urging of the Advisory Board. Also, graduate (M.S.) degrees were developed and approved. The Cooperative Engineering Program (begun in 1970) was expanded.

As the first graduates of UTC's engineering program began to seek employment (1973-1974), they were well received. Employers expressed a high degree of satisfaction with their overall capability to function well in the engineering environment. Most graduates, however, were employed in the Chattanooga region where the college, its faculty, and the program were well known. As graduates began to seek employment outside the region, numerous questions began to be asked by prospective employers regarding the B.S. Engineering degree and how it differed from the traditional engineering degree (i.e. B.S. Mechanical Engineering). It became clear to the Advisory Board members, the faculty, and others, that not having the traditional degree at UTC was a barrier to our graduates being considered for employment at many organizations (especially those not having direct knowledge of the program).

During the 80's, concentrations were available in mechanical, electrical, civil, industrial, chemical, nuclear, and environmental engineering. An engineering management program was also created. The School absorbed the Computer Science Department. Later, to express more accurately the comprehensive nature of the program offerings, the School became known as the College of Engineering and Computer Science. As a result, The Advisory Board became more interested in, and recommended, the creation of discipline-based degrees and the formation of separate departments.

Although the existence of an interdisciplinary core program with a concentration in a discipline had its merits, it was viewed by many (including the Advisory Board) as being different but not desired. The college successfully developed perhaps the best integrated, interdisciplinary design program (in an undergraduate engineering program) in the country. Its professional development emphasis was recognized nationally by the American Society of Mechanical Engineers in the mid 1980's (only the second time in the 40 year history of the award it had gone to a university). Still, the program structure (non-disciplinary accreditation) caused a lack of understanding and uncertainty to exist in the minds of many prospective employers. Additionally, a similar uncertainty and lack of understanding existed in the minds of prospective students and their parents. Never has the goal of "different but better" been convincing to most of our constituents (although in many ways it is true). The Advisory Board struggled with this dilemma for years.

Seemingly, marketing attempts to point out the advantages and differences of the UT Chattanooga program only served to heighten the awareness of students and prospective students that UTC's program was different, but there was little, if any, success in convincing the market that the program was better. The Advisory Board members and other industrial consultants recommended that UTC would be better served in the marketplace (both on the recruiting side and the placement side) if its engineering programs were in the "mainstream." So, if a company were to be recruiting an electrical engineering graduate, a UTC graduate would automatically be competitive if he or she had an electrical engineering degree (or if he at least graduated from an ABET accredited electrical engineering program). Thus, the graduate would not have to explain (if he got to that stage) how his "engineering" program qualified him as an "electrical" engineer.

Figure 5. Correspondence from Dr. Cox to Dr. Kazemersky, page 2 of 3

For more than a century engineering programs have been characterized by disciplines. As universities around the nation began to offer various programs, they were offered and positioned by discipline (ME, EE, etc.). Consequently, national accreditation was sought and granted by discipline. This "disciplinary" distinction has been pervasive. Today, only a handful of engineering programs (of which UTC's is one) are accredited under the umbrella of "non-tradition" programs offering the designation of "engineering" as opposed to "mechanical engineering," "electric engineering," etc.

The Advisory Board members were keenly aware of the fact that more than 99 percent of the engineering degrees awarded were disciplinary in nature. They also were aware of the fact that when companies determined their projected manpower needs, such needs were expressed by discipline (for example: 5 ME's, 3 EE's, etc.). Consequently, recruiters set out year-to-year to find and hire the needed number of ME's or EE's. This, said the Advisory Board, worked against the UTC graduate.

Recognizing that UTC was in a competitive environment both for the recruiting of students and the placement of students, the Advisory Board members, faculty, alumni representatives, and friends have favored accreditation by discipline. This was the case throughout the 80's and 90's. Associated with this position was the recommendation of the establishment of departments (to reflect the existence of the disciplines).

In the late 90's, under a new chancellor, the university system accepted the college's recommendation for change and efforts were begun to move toward disciplinary program accreditation and departmentalization. Such action is currently underway.

The Advisory Board members have always sought to bring the view of the broader engineering community to the attention of the university faculty and administration. They have also been supporters of the programs (speaking favorably of the programs and helping graduates). Finally, they have been aware of, and have recommended, the need for improved institutional support in the areas of funding, staffing, and facilities.

Sincerely,

Ronald B. Cox Ph.D., MBA, P.E.
Burkett Miller Chair of Excellence

Figure 6. Correspondence from Dr. Cox to Dr. Kazemsky, page 3 of 3

VI. ESTIMATED SIZE OF PROGRAM

A. ESTIMATES

Estimates of headcount and full-time equated enrollment and number of graduates are given in Table 8.

TABLE 8 SIZE OF PROGRAM				
Program Year	Full-Time Major Headcount Fall	Part-Time Major Headcount Fall	Total FTE Enrollment Fall	Total Graduates
Year 1 2007	93	18	109	8
Year 2 2008	102	11	113	10
Year 3 2009	107	20	127	12
Year 4 2010	112	25	137	12
Year 5 2011	122	30	152	14

Provide yearly estimates as follows: Associate Degrees = 3 years; Bachelor's Degrees = 5 years; Master's Degrees = 3 years; Doctoral Degrees = 4 years.

B. ASSUMPTIONS

The above projections are conservative. The only firm assumption is that awarding the BSCE degree will eliminate the negative stigma associated with being unable to award a discipline specific degree. Not included is any positive impact from the recent hiring of a full time recruiting coordinator for the College. The projects also do not include any significant increase in enrollment from the newly funded "Project Lead The Way" which is a joint program with the Tennessee Department of Education aimed at encouraging more K-12 students to study engineering. Likewise, the projections do not include a significant increase in enrollment due to the new articulation agreement that has been reached with Chattanooga State Technical Community College to allow a seamless 2 + 2 plan of study for their pre-engineering students. The College intends to seek additional articulation agreements with other Community Colleges. Recruiting of transfer students will likely be enhanced by ten \$1,000 scholarships provided by the University of Chattanooga Foundation. These scholarships are matched by corporations and the College gift account, making it possible to offer full tuition scholarships to as many as 10 new transfer students. However, the projections given in Table 8 do not depend upon any of these positive developments. On the up-side, the program has capacity to enroll even more students, perhaps as many as 200, without needing additional space or faculty members.

C. DEMAND

Civil Engineering represents the third largest segment of engineering, with approximately 12 percent of all engineering enrollment. Most of the 330 colleges of engineering in the US offer BSCE degrees. Demand for civil engineers is expected to remain strong for the foreseeable future, driven partly by the sharp decline since 9/11 in immigration of degreed civil engineers from abroad. In addition, there is a growing recognition that the United States needs to increase investment in engineering education in order to respond to the global competition coming from China and India where more than 1,000,000 students are now studying engineering, compared to less than 400,000 in the United States. This is reflected in the "National SMART" program sponsored by Senator Frist that will provide \$3.75 billion in funding over the next five years for low-income students who major in "physical, life, or computer sciences, mathematics, technology or engineering. On-line courses and distance learning programs offered by other universities are unlikely to have a significant negative impact on enrollment in the BSCE program at UTC, primarily because of the substantial hands-on laboratory experiences required for learning and accreditation.

C1. COMPARABLE PROGRAMS IN TENNESSEE

Undergraduate engineering enrollments 2007 for universities in Tennessee are given in the following table.

Table 9. Engineering Enrollment data for Tennessee Universities

Institution	F/T	P/T
Tennessee State University	449	108
Tennessee Technological University	1,252	105
UT Chattanooga	416	83
UT Knoxville	1,780	87
UT Martin	230	15
University of Memphis	410	93
Vanderbilt	1,263	0
Total	5,800	491

Most of the engineering students enrolled at UT Chattanooga are Tennessee residents from the counties that make up the Chattanooga metropolitan area, with 57 percent coming from Hamilton County alone. UT Chattanooga enrolls more part time students than any other Tennessee engineering program in Tennessee. UT Chattanooga also enrolls many engineering students who live at home in order to keep down expenses. It would be a financial hardship for these students to attend any of the comparable institutions in Tennessee. The nearest out-of-state engineering program is at George Tech in Atlanta. Tuition for Tennessee residents attending Georgia Tech would be a financial handicap for students as well as a drain on the state's future pool of engineering talent. UT Martin is the only other university in Tennessee that awards BSE degrees. Allowing UT Chattanooga to award the BSCE degree is unlikely to have a negative impact on any other institution in Tennessee.

VII. FACULTY

A. Currently employed faculty members are listed in Table 10

TABLE 10 CURRENT FACULTY					
Name of Faculty	Highest Degree Earned	Total Years Teaching Experience	Years Teaching in this Institution	Area of Degree Specialty	Full-Time or Part-Time in Program
Fomunung, Ignatius	Ph.D.	9	3	CE	FT
Foster, Edwin	Ph.D.	40	40	CE	FT
Goulet, Ronald	Ph.D.	10	10	CE	PT
Owino, Joseph	Ph.D.	21	9	CE	FT
Total FTE Current Faculty in Program: 3.5					

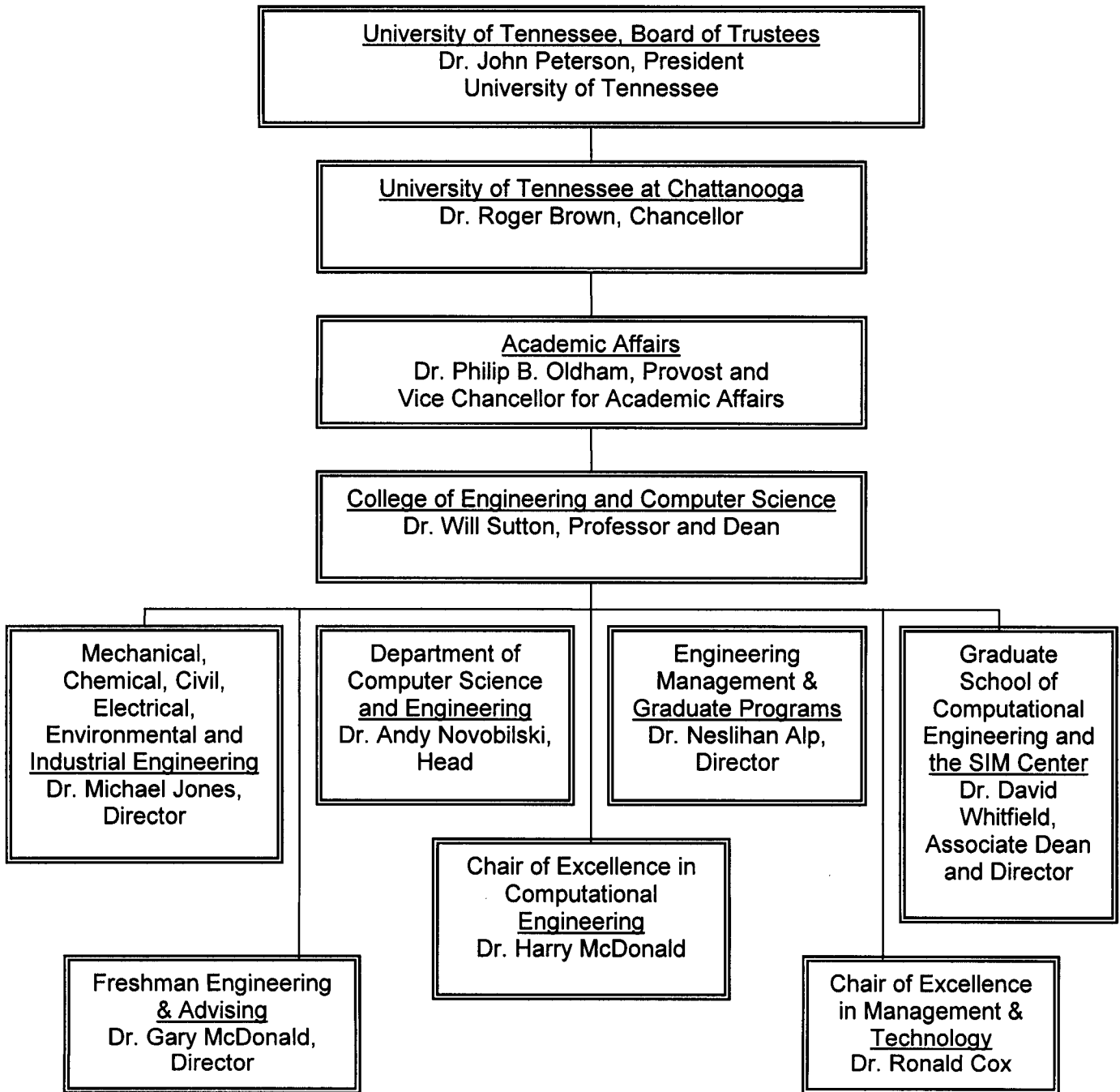
B. Faculty resumes for the above faculty members are in the appendix.

C. No new faculty members are required.

VIII. ADMINISTRATION/ORGANIZATION

The BSCE program will be administered by the Mechanical, Chemical, Civil, Environmental and Industrial Engineering Department under the administrative structure shown in Figure 7. Dr. Mike Jones will provide supervision. **No addition administrative duties will be associated with changing the name of the degree from BSE to BSCE.**

Figure 7. Administrative Structure



IX. LIBRARY RESOURCES

- A. The Lupton Library on the UT Chattanooga campus provides adequate support for the engineering program as evidenced by the recent re-accreditation by ABET.
- B. **No additional library funding will be required to support changing the name of the degree from BSE to BSCE.**

X. SUPPORT RESOURCES

In summer 2003 the College of Engineering and Computer Science at UT Chattanooga moved into the new Engineering, Mathematics, and Computer Science (EMCS) building. This 200,000 square foot, state-of-the-art facility provides adequate space and equipment for all existing programs, with room to grow. **No additional space or equipment will be required to support changing the name of the degree from BSE to BSCE.**

XI. COST/BENEFIT

There are no costs associated with changing the name of the degree from BSE to BSCE. Immediate, tangible benefits will accrue to graduates of the newly named program. Long term benefits will accrue to UT Chattanooga by making it easier to recruit new students by removing the confusion and perhaps stigma associated with being unable to award discipline specific degrees. From a financial standpoint, the increased enrollments likely to occur due to the change will make it possible to leverage the recent investment of more than \$28 million in the new EMCS building.

XII. COSTS/PRODUCTIVITY OF RECENTLY-INITIATED PROGRAMS

The Graduate School of Computational Engineering is the only new academic program approved by THEC for the College of Engineering and Computer Science during the past decade. This program is ahead of projections for graduate student enrollment and the related SimCenter is ahead of projections for external funding.

Table 11. Programs Approved by THEC for the Previous Ten Years

Program	Approved/ Implemented	Year 1				Year 2			
		Fall Enrollment		Annual Graduates		Fall Enrollment		Annual Graduates	
		Proj.	Act.	Proj.	Act.	Proj.	Act.	Proj.	Act.
BS Electrical Engineering	7/27/2006/ Fall 06	65	3	16	6	70	35	17	3
BS Mechanical Engineering	7/27/06/ Fall 06	110	0	16	6	115	98	17	23
PhD Computational Engineering	1/29/2004/ Fall 04	6	15	0	1	8	14	1	1

XIII. CONSULTANT - Not applicable.

CIVIL ENGINEERING FACULTY RESUMES

SUMMARY VITA – Edwin P. Foster, Ph.D., P.E.

Professor

Years on Faculty: 30 (original appointment 09/79)

Degrees:

B.E. Civil Engineering , Vanderbilt University, 1964

M.S. Structural engineering, Vanderbilt University, 1966

Ph.D. Structural engineering, Vanderbilt University 1974

University Experience:

Assistant Professor & Coordinator of Civil Engr. UT-Nashville 1968-74

Associate Professor & Coordinator of Civil Engr. UTN 1974-79

Assoc. Professor hired to develop a Civil Engr. concentration, UTC (1979-1983)

Assoc. Professor & Director of Civil, Industrial, & Engineering Management (1983-1984)

Professor & Director of Civil, Industrial, & Engineering Management (1984-1993)

Professor & Director of Civil Engineering (1993-1996)

Professor & Director of Civil Engr., Recruiting & Alumni Activities UTC (1996-2000)

Professor and Director of Engineering Recruiting & Alumni Affairs (2000-2002)

Professor & Director of Engr. Graduate Program UTC (2002-2006)

Professor of Civil Engineering (2006-Present)

Other Related Experience:

American Bridge (U S Steel) - Field Engr. on Vehicle assembly bldg., Cape Kennedy, 1964

Brown Engineering - Structural Analysis of launch tower, F1 rocket engine, Huntsville 1965

University of Illinois - Research Assistant on finite element analysis, 1966

Vanderbilt University - Teaching Assistant, 1967

Avco Aerostructures Division - Finite element analysis of plates in bending, Nashville 1968

NASA Langley - Computer analysis of space structures, Hampton VA, summer 1977,78

Consulting and Patents (last five years):

McKee Foods Corp., Mr. David Ryder, Collegedale, TN, Conveyor belt structural calculations

Structural engineering consulting on roof and floor designs, alterations, structural evaluations for safety, etc.

AR-Knits, American Research & Knitting, Cleveland, TN 2001, UT Center of Industrial Services

Lear Corporation, Dayton, TN, 2003, die dolly structural investigation

Tecumseh Products Company, Dunlap, TN, 2004, Concrete parking lot consulting

States in which Registered: Tennessee (inactive), Georgia (active)

Principal Publications/Presentations of Last Five Years:

“The Proposed CE Program at UTC”, Chattanooga Branch of ASCE, Sept.19, 2000

“Accrediting the New Civil Engineering Program at UTC”, Chattanooga Branch of ASCE, 7/16/02

“Encouraging Professionals to Teach University Level Classes” ASEE Southeast Section Annual Meeting,

Chattanooga, TN, April 3-5, 2005 (with Steve Meyer)
“Having Fun with Concrete Structural Design Utilizing TK Solver Software” Southeast Section Annual Meeting, Chattanooga, TN, April 3-5, 2005
“The Impact on Students of Freshman Design Projects Supporting Advanced Courses”, ASEE Annual Meeting, Hawaii, June 24-27, 2007, (Cecelia Wigal-first author, Ignatius Fomunung, Ronald Goulet)
“TK-Solver Concrete Design”, American Design Drafting Technical Training Conference, Chattanooga, TN, April 16-19, 2007

Scientific and Professional Society Memberships:

ASCE – Tennessee Section President 1996
ASEE – Chairman, Civil Engineering Division, ASEE Southeast Region, 1982, 1986, 1993

Honors and Awards:

Listed in: USA, Who's Who in Engineering; England, International Who's Who in Engineering
Teaching Excellence Award given by TSPE Student Chapter, 1973
Outstanding Teaching Award from the Univ. of TN National Alumni Association, 1977
Univ. of TN/Chattanooga Engineering Professor of the Year, 1984 & 1987
Chattanooga area “1996 Engineer of the Year”, awarded at Engineering Week banquet
Received NSF Fellowship 1964-65, NASA Summer Fellowship 1978,79
Member Tau Beta Pi - National Engineering Honor Society
Nominated by two UTC graduates for “Who’s Who Among America’s Teachers”

Institutional Service in the Last Five Years (committee assignments, etc.):

Faculty Advisor for ASCE Student Chapter 1981-Present
Coordinated and taught in Civil PE Review course 1997-2001
Coordinated the FE Review course 1997-2001
Director UTC Graduate Engineering Program 2001-2006
UTC Graduate Council member 2001-Present
UTC Engineering Curriculum Committee 1998-Present
Obtained UTC site license for TK-Solver software, value \$1000/year, 1999-Pres.
Chairman Engineering Library acquisitions 1999-Pres

Professional Service in the Last Five Years:

President American Society of Civil Engineers - Tennessee Section 1996
President American Society of Civil Engineers - Nashville Section 1979, Vice Pres., Sec-Treas., Board of Directors - Nashville Section, District Nine Council member
TN Society of Professional Engineers, Chattanooga, Treasurer 1985,86 Secretary 1987
American Society for Engr. Education, Chair Civil Engr., Southeast Section 1982,86,93,94

Professional Development Activities Last Five Years:

7-16,17,18-01 - Univ. of Colorado Eighth Faculty Enhancement Workshop, “Fundamentals of

Concrete

Technology”

4-7,8,9 2002 - Univ. of FL, Gainesville, American Society for Engineering Education + ABET Assessment

Workshop.

10-18-02 (also 2003,4,6) - ASCE, Smyrna, TN, ASCE TN Section annual meeting

Aug 2-4, 2004 - The Engineering & Economics of Reinforced Concrete Buildings, Portland Cement

Association, Skokie, IL,

Aug 5-6, 2004 - Design of Concrete Bridges by the AASHTO LRFD Specifications, Portland Cement

Association, Skokie, IL,

3-18-03, ASCE, Chattanooga, Chattanooga Riverfront Proposed Development

5-20-03, ASCE, Chattanooga, Mark Harrison, PE, PG, EA & Groundwater Remediation System Design

10-18-03, ASCE, Nashville, National ASCE meeting

6-15-04, ASCE, Chattanooga, President of the ASCE Tennessee Section, Ken Berry. Ken discusses the TN

State Capital which recently became an ASCE Civil Engineering Landmark.

8-17-04, ASCE, Chattanooga, Chattanooga's ITS by Steve Meyer of Volkert & Assoc.

9-21-04, ASCE, Chattanooga, Roundabout Applications, John VanWinkle

9-24-04, ASCE, Smyrna, TN, ASCE TN Section annual meeting & conference

10-19-04, ASCE, Chattanooga, High Speed Trains For TN, Brian Whitaker, Arcadais

11-16-04, ASCE, Chattanooga, The Construction Viewpoint on Design Plans, David Young of Volkert

8-17-04, ASCE, Chattanooga, Runway Construction @ Hartsfield-Jackson Airport

4-4to5-05, ASEE, UT-Chattanooga, Annual conference

8-23-05, ASCE, Chattanooga, Runway Construction at Hartsfield-Jackson Airport

9-20-05, ASCE, Chattanooga, Industrial Hygiene Issues in Real Estate/Property

10-18-05, ASCE, Chattanooga, Engineering Studies at UTC by Dean Bailey

11-11-05, UTC, Seminar “Recruiting Graduate Students”

11-15-05, ASCE, Chattanooga, New Standards – Air Pollution Control Board

3-21-06, ASCE, Chattanooga, Contech PVC Pipe for Sanitary Sewers

10-13-06, Smyrna, TN, ASCE TN Section Annual meeting & conference

SUMMARY VITA – Ignatius Fomunung, Ph.D.

Associate Professor

Years on Faculty: 3 (original appointment 08/2005)

Degrees:

B.E. Civil Engineering, Southeast University, Nanjing, China, 1987

M.S. Physics, Clark Atlanta University 1995

M.S. Transportation engineering, Georgia Institute of Technology, 1996

Ph.D. Civil engineering, Georgia Institute of Technology, 2000

University Experience:

Assistant Professor of Physics, Spelman College, (1999-2000)

Assistant Professor of Civil Engr. Clark Atlanta University (2000 – 2005)

Associate Professor of Civil Engr., UTC (2005 – Present)

Other Related Experience:

Center for Theoretical Studies of Physical Systems (CTSPS) at CAU - Research Associate, Atomic and Molecular Physics, Summer 2000.

Consulting and Patents (last five years):

Principal Publications/Presentations of Last Five Years:

Shauna Hallmark, Randall Guensler, Ignatius Fomunung, “*Characterizing On-road Variables that affect Passenger Vehicle Modal Operation*” **Transportation Research D 7 (2002), 81-98**
Adjo Amekudzi, and Ignatius Fomunung (2003) *Transportation and Brownfields Development: Review and Analysis of Current Practice*, TRB 03-3508, CD ROM, 2003 **Transportation Research Board Annual Meeting, Washington, DC.**

Adjo Amekudzi, and Ignatius Fomunung, *Integrating Brownfields Redevelopment with Transportation Planning* **Journal of Urban Planning and Development (JUPD) Vol. 130 No. 4 (2004), 204 -212.**

Cecelia Wigal, Ignatius Fomunung, Ronald Goulet “The Impact on Students of Freshman Design Projects Supporting Advanced Courses”, **ASEE Annual Meeting, Hawaii, June 24-27, 2007,**

Scientific and Professional Society Memberships:

ASCE

ASEE

Honors and Awards:

San Hao Xuecheng, Nanjing Institute of Technology, PRC 1986

Sigma Pi Sigma National Physics Honor Society, 1995

EXCEED Teaching Fellowship, *American Society of Civil Engineers Excellence in Civil Engineering Education Fellowship*, 2003

Institutional Service in the Last Five Years (committee assignments, etc.):

Faculty Advisor for NSBE Student Chapter 2006-Present
UTC Faculty Senate
Faculty Handbook Committee
UTC Publications Committee

Professional Service in the Last Five Years:

Volunteer Math Tutor – Howard High School in collaboration with the UTC GEAR –UP program
Activate Chattanooga Forum
Safe Routes to School Partner.
Active Living Network
NASA Research Summit, Orlando Florida, July 16-19, 2003 Steering Committee Member
NSF – Proposal Review Panelist, 2006

Professional Development Activities Last Five Years:

Council on Undergraduate Research (CUR) Proposal Writing Institute, Juniata College, Huntingdon, PA. Summer 2002
Second Annual Scholarly Technical Assistance Workshop for NASA Faculty Awards for Research Principal Investigators and Their Students, QEM Network, Albuquerque, NM, October 18-19, 2002
National Science Foundation, Introducing Faculty to Materials Science and Engineering, University of Alabama, Tuscaloosa, June 1-20, 2003
American Society of Civil Engineers' Excellence in Civil Engineering Education (ExCEED) Teaching Workshop. University of Northern Arizona, August 10-15, 2003
Third Annual Scholarly Technical Assistance Workshop for NASA Faculty Awards for Research Principal Investigators and Their Students, QEM Network, Atlanta, GA, September 26-27, 2003
American Concrete Pavement Association Professor's Seminar: Design, Construction, and Rehabilitation of Concrete Pavements, at Portland Cement Association, Skokie, Il., May 31 to June 2, 2006

SUMMARY VITA – Joseph O. Owino, Ph.D., P.E.
UC Foundation Associate Professor

Years on Faculty: 9 (original appointment 08/01/99)

Degrees:

B.S. Civil Engineering, The University of the District of Columbia, 1977

M.S. Civil Engineering, Howard University, 1980

Ph.D. Civil and Environmental Engineering, Georgia Institute of Technology, 1998

Other Related Experience:

Adjunct Professor (1999) Civil and Environmental Department, Georgia Institute of Technology, Atlanta, GA.

Lecturer (1986 – 1992) Civil and Environmental Department, University of Nairobi, Nairobi, Kenya.

GTA (1994 – 1998) Civil and Environmental Department, Georgia Institute of Technology, Atlanta, GA.

Shell Offshore Inc., New Orleans, LA (1983-1986)

Shell Oil Company, Houston, TX (1981-1983)

Byrd, Tallamy, McDonalds and Lewis, Arlington, VA (1980-1981)

Electrack Inc., Beltsville, MD (1980)

States in which Registered: Tennessee

Consulting and Patents:

None

Principal Publications of Last Five Years:

Jacobs, L.J., and Owino, J.O, “Effects of Aggregate Size on the Attenuation of Rayleigh Waves in Cement-Based Materials,” *Journal of the Acoustical Society of America*, Vol. 125, No.6, pp 637-647, 2000.

J. Owino, R. Goulet, Bringing Reality to the Mechanics of Materials Lab – Experiential Problem Based Learning, to be presented at the *ASEE 2001 Southeastern Section Meeting*, April 2003.

R. Goulet, J. Owino, Experiential problem-based learning in the Mechanics of Materials Laboratory, Proceedings of the *2002 ASEE Annual Conference and Exhibition*, Montreal, Province of Quebec, June 2002.

J. Owino, E. Foster, Revising a Civil Engineering Curriculum at University of Tennessee at Chattanooga, presented at the *ASEE 2001 Southeastern Section Meeting*, April 2001.

R. Goulet, J. Owino, The mini-lab round robin: the alternative to demonstration labs, presented at the *ASEE2001 Southeastern Section Meeting*, April 2001.

Scientific and Professional Society Memberships:

American Society of Engineering Educators (ASEE)
American Society of Civil Engineers (ASCE)
National Society of Black Engineers (NSBE)

Awards and Honors:

“Exceptional Merit” Faculty Performance Award in 2002-2003
Outstanding Faculty Award for 2002, CECS, UTC, April 2002
Cole Outstanding Engineering Teacher Award of the year in Engineering Award, CECS, UTC,
November 2001
Amoco/CETL Teaching Excellence Award, May 1998, Georgia Institute of Technology.

Institutional Service in the Last Five Years:

Faculty Senator, elected to Faculty Senate (2001 – present)
Faculty Representative, elected member, Grades Appeal Committee (2002 – present)
Faculty Representative, elected member, Admissions Committee (2001 – present)
Member, NCAA Self-Study Committee (2001 – present)
Member, CECS Graduate Committee (2001 – present)
Member, CECS Assessment Committee (2001 – present)
Member, CECS Petitions Committee (2002 – present)
Member, Search Committee, Associate Provost for Academic Affairs (2002 – present)
Member, Search Committee, Dean of the CECS (2002 – present)

Professional Service in Last Five Years:

Chair of Civil Engineering Division, ASEE SE Section

Professional Development Activities in the Last Five Years:

Research Activities:
Development of Finite Element Modeling
Experiential Learning in the Mechanics of Materials Lab
Nondestructive evaluation of structural materials
Health Monitoring of Infrastructure

Conferences and Meetings attended:

ASEE
NSBE

Other Activities:

Attended a series of teaching workshops held by the University and at Carnegie Mellon.
Attended an ANSYS and a GTSTRUDL structural engineering software training classes.

SUMMARY VITA – Ronald U. Goulet, Ph.D., P.E.
Associate Professor

Years on Faculty: 10 (original appointment 08/01/98)

Degrees:

B.S. Civil Engineering, Northwestern University, 1976

Ph.D. Mechanical Engineering, University of New Hampshire, 1997

Other Related Experience:

Consultech, Chattanooga, TN and Maine; 1987 to present.

Dravo-Wellman div. of Dravo Corp., Pittsburgh, PA, 1984-86

Hydro Ash Corp., Pittsburgh, PA, 1980-84

United Conveyor Corp., Deerfield, IL, 1979-80

Polytechnic Inc., Chicago, IL, 1975-79

States in which registered: Maine

Principal Publications of Last Five Years:

R. Goulet, Medieval Engines of Siege Warfare and Modern Engineering Tools, Proceedings of the 2003 ASEE Annual Conference and Exhibition, Nashville, TN, June 2003, conditional acceptance, manuscript revised 3/17/03.

R. Goulet, J. Owino, Bringing Reality into the Mechanics of Materials Lab, Proceedings of ASEE 2003 Southeaster Section Meeting, April 2003, manuscript accepted 1/15/02.

M. Ianotti, L. Crosby, P. Stafford, G. Grayson, R. Goulet, Effects of Plate Location and Selection on the Stability of Mid-Shaft Clavicle Fractures, American Academy of Orthopaedic Surgeons, poster presentation P154, 69th Annual Meeting, Dallas, TX, Feb. 13-17, 2002.

R. Goulet, J. Owino, Experiential problem-based learning in the Mechanics of Materials Laboratory, Proceedings of the 2002 ASEE Annual Conference and Exhibition, Montreal, Province of Quebec, June 2002, manuscript accepted 1/15/02.

C. Wigal, R. Bailey, R. Goulet, Capstone Design Course with Industry Collaboration, ASEE 2001 Southeastern Section Meeting, April 2001.

R. Bailey, C. Wigal, R. Goulet, Peer Evaluation in Senior Engineering Design, ASEE 2001 Southeastern Section Meeting, April 2001.

R. Goulet, J. Owino, The mini-lab round robin: the alternative to demonstration labs, ASEE 2001 Southeastern Section Meeting, April 2001.

P. Stafford, M. Ianotti, R. Goulet, Effects of Plate Location and Selection on the Stability of Mid-Shaft Clavicle Fractures, 19th Annual Mtg, MidAmerican Orthopaedic Assoc, 4/20/01.

M. Ianotti, B. Norris, R. Goulet, Biomechanical Effect of Pelvic Internal or External Fixation on Vertical Shear Pelvic Fracture, 19th Annual Mtg, MidAmerican Orthopaedic Assoc, 4/20/01.

D. Argo, M. Ianotti, R. Goulet, P. Nowatarski, A Comparative Analysis of Intramedullary Nailing of Proximal Tibia Shaft Fractures, 19th Annual Mtg, MidAmerican Orthopaedic Assoc, 4/20/01.

P. Stafford, M. Ianotti, R. Goulet, Effects of Plate Location and Selection on the Stability of Mid-Shaft Clavicle Fractures, presented at the Annual Mtg, of the Tennessee Orthopaedic

Association, 8/24/00.

M. Ianotti, B. Norris, R. Goulet, Biomechanical Effect of Pelvic Internal or External Fixation on Vertical Shear Pelvic Fracture, presented at the Annual Mtg, of the Tennessee Orthopaedic Association, 8/24/00.

D.A. Mendelsohn, T.S. Gross, R.U. Goulet, M. Zhouc, Experimental-Computational Estimation of Rough Fracture Surface Contact Stresses; Proceedings of the 1997. Symposium on Integrated Experimental-Computational Modeling of Advanced Materials, Evanston, IL, Jun 29-Jul 2 1997 v A249 n 1-2 Jun 30 1998.

R. U. Goulet, An Experimental Investigation of the Effect of Elastic Modulus and Yield Strength on Fracture Surface Interference in Mode II Loaded Cracks, PhD Thesis, University of New Hampshire, defended April 18, 1997.

Scientific and Professional Society Memberships:

American Society of Mechanical Engineers

American Society for Engineering Education

American Society of Safety Engineers (past associate member)

Honors and Awards:

Member, Sigma Xi Research Society

Faculty Scholarship, Grants and Research, UTC for 2000.

Engineering Research Award, CECS, UTC for 1999.

Institutional Service in the Last Five Years (committee assignments, etc.):

Resident Research Committee, UT Department of Orthopaedic Surgery, active

Steering Committee of Bridges to Engineering Science and Technology, active

UTC Engineering Graduate Curriculum Committee, active

ME ABET Committee, active

UTC Honor Court, active

UTC Faculty Council, 1999-2001

UTC Committee of Committees 1999-2001

UTC Communication Task Force 1998-2000

Professional Service in the Last Five Years:

Secretary Chattanooga Chapter of ASME

Annual PDH speaker for Chattanooga Chapter of ASME

Regular presenter to Chattanooga Engineers Club

Professional Development Activities in the Last Five Years:

Ethics Across the Curriculum, Summer Workshop; Center for the Study of Ethics in the Professions; Illinois Institute of Technology, Chicago, August 2002.

Strategies for Learning: Instructional Excellence Retreat, Watts Bar, TN, May, 2000.

Oral Communication: Instructional Excellence Retreat, Watts Bar, TN, May, 1999.