UNDERGRADUATE CURRICULUM PROPOSAL COVER SHEET

Title of Proposal – Must begin with Department Abbreviation:

B.S.ChE - New Degree

Check One: ☑ Full Proposal or ☐ Information Item

Effective Date for Curricular Offering: Fall 2009

FROM: Dr. Frank Jones, Chemical Engineering Program, EMCS 437, 425-4366, Frank-Jones@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? NO

Please attach explanation if yes.

Faculty of the originating department approved this proposal on November 5, 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: Dr. Gary H. McDonald
(printed name)

signature
approve neutral disapprove*

College Curriculum Committee Date: 11/7/2008 Vote: 4 yes 0 no Signature of Chair: 

Spokespersons for Affected Departments:

FRANK JONES ChE 11/07/08
(name, department, date) signature approve neutral disapprove*

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

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

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

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

Dean/Director: J. H. Sutton
(signature)

approve neutral disapprove*

University Registrar: Linda Orth
(printed name) Comments:

signature approve neutral disapprove*

Provost: Phil Oldham
(signature)

approve neutral disapprove*

*Those who disapprove may attach an explanation

<table>
<thead>
<tr>
<th>ACTIONS on this proposal:</th>
<th>Curriculum Committee</th>
<th>Faculty Senate</th>
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<td>Date the proposal was considered</td>
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<td>Vote of the body:</td>
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<td>Accepted as information item (indicate date)</td>
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<tr>
<td>Approved with amendments (amendments indicated and transmitted to all signatories above, date):</td>
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<td>Signature of Chair:</td>
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Revised 2/15/2007
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

Chemical Engineering
Name of Department/Academic Unit

A NEW PROGRAM LEADING TO THE DEGREE OF:

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

Chemical Engineering
Title of Major

14101/UTC Code 2310
CIP/THEC Code

BSChE
Formal Degree Abbreviation

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

Fall 2008
Proposed Starting Date
II. ABSTRACT

DEGREE PROGRAM

Institution: University of Tennessee at Chattanooga

Division/Department, etc. Chemical Engineering

Program leading to Degree of: Bachelor of Science in Chemical Engineering
With a Major in: Chemical 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

<table>
<thead>
<tr>
<th>Year</th>
<th>Fall Full-Time Headcount</th>
<th>Fall Part-Time Headcount</th>
<th>Fall Full-Time Equated Students</th>
<th>Graduates</th>
<th>FTE Faculty</th>
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<td>7</td>
<td>7.7</td>
<td>8</td>
<td>3.25</td>
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</table>

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 chemical 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 fall 2008 ABET full accreditation to the 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. All programs, including the new, discipline specific chemical engineering program, received full accreditation. Chemical engineering will not be reviewed again until fall 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 Chemical Engineering program from Bachelor of Science in Engineering (BSE) to Bachelor of Science in Chemical Engineering (BSChE).
III. PROGRAM DESCRIPTION

A.1 MISSION
The educational objectives of the ChE 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 ChE Program is to provide students in chemical 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 ChE Program, and the ABET Program Criteria for Chemical Engineering, the specific educational objectives for the undergraduate program in Chemical engineering are to:

1. Produce graduates who have the ability to function as chemical engineers.
2. Produce graduates who agree that the environment at UTC was conducive to their achieving.
3. Produce graduates who are able to work effectively in multidisciplinary teams.
4. Produce graduates who are progressing toward professional registration.
5. Produce graduates who participate in professional societies.
6. Produce graduates who pursue graduate studies.
B. Chemical Engineering Curriculum

B.1 Catalog Description: The Chemical Engineering curriculum has a strong emphasis on fundamental engineering tools, the use of modern electronic instrumentation, and the design of chemical unit operations. The curriculum culminates with a process design project. Chemical Engineering faculty interests include process design and control, chemical process miniaturization, and environmental issues and impacts.

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
- Mathematics: 151/152, 161/162, 212, 245, 255
- Physics: 231/281
- Chemical Engineering: ENCH 331, 332, 430, 432, 433, 434, 435

Note: For qualified students, ENGR 495r, Departmental Honors (4 hours) may substitute for ENGR 485 (3 hours)

Graduation requirements
- 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 Chemical Engineering Curriculum
The typical Chemical Engineering curriculum is shown in Tables 1 through 3.
<table>
<thead>
<tr>
<th>Year; Semester</th>
<th>Chemical Engineering Program</th>
<th>Category (Credit Hours)</th>
<th>Engineering Topics Contains Significant Design (*)</th>
<th>General Education</th>
</tr>
</thead>
<tbody>
<tr>
<td>YEAR 1 SEMESTER 1</td>
<td>ENGR 103 Basic Engineering Science</td>
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<td>ENGR 113 Freshman Engineering Laboratory</td>
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<td></td>
<td>MATH 151 Calculus I</td>
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<td>MATH 152 Calculus I Laboratory</td>
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<td>CHEM 121 General Chemistry I</td>
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<td>CHEM 123 General Chemistry I Laboratory</td>
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<td></td>
<td>English 121</td>
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<td>YEAR 1 SEMESTER 2</td>
<td>ENGR 104 Vector Statics</td>
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<td></td>
<td>ENGR 185 Introduction to Engineering Design</td>
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<td>MATH 161 Calculus II</td>
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<td>MATH 162 Calculus II Laboratory</td>
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<td>CHEM 122 General Chemistry II</td>
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<td>English 122</td>
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<td>Year; Semester</td>
<td>Chemical Engineering Program</td>
<td>Math &amp; Basic Science</td>
<td>Engineering Topics</td>
<td>General Education</td>
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<td>SEMESTER 1</td>
<td>ENGR 246 Mechanics of Materials</td>
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<td></td>
<td>ENGR 247 Mechanics Laboratory</td>
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<td>Cultures &amp; Civilization</td>
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<td>MATH 212 Linear Algebra</td>
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<td>MATH 245 Differential Equations</td>
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<td>CHEM 351 Organic Chem I</td>
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<td>ENGR 224 Introduction to Engineering Computations</td>
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<td>ENGR 222 Probability and Statistics</td>
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<td></td>
<td>MATH 255 Multivariable Calculus</td>
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<td>PHYS 231 Elec. &amp; Magn.</td>
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<td>SEMESTER 1</td>
<td>ENGR 303 Thermodynamics</td>
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<td>ENGR 307 Fluid Mechanics</td>
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<td>CHEM 371 Physical Chem. I</td>
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<td>SEMESTER 2</td>
<td>ENGR 340 Engineering Materials</td>
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<td>ENGR 328 Control Systems</td>
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<td>ENGR 329 Control Systems Lab</td>
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<td>ENGR 352 Engr. Economy</td>
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<td>ENCH 332 Heat Transfer</td>
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<td>Engineering Topics</td>
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<td>SEMESTER 2</td>
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<td>ENCH 430 Chem. System Design</td>
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<td>ENCH 434 Chem Kinetics &amp; Reactor Design</td>
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**TOTALS-ABET BASIC-LEVEL REQUIREMENTS** | **48** | **59** | **21**

**OVERALL TOTAL FOR DEGREE** | **128 hrs** | **37.5%** | **46.1%** | **16.4%**

**PERCENT OF TOTAL** | **100 %** | **37.5%** | **46.1%** | **16.4%**

**B.4 Course descriptions for new courses proposed**

*All courses noted in the Chemical 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 procedure completed in fall 2008. Information will be presented to demonstrate that the ChE program is being evaluated by appropriate representatives and organizations with feedback being used to support program improvement. The ChE faculty is responsible for conducting the assessment process, analyzing the results, and providing feedback to the ChE program constituents.

C.1 Program Constituencies
The Chemical Engineering program objectives and outcomes reflect the values of our four most immediate constituencies:

- Chemical Engineering Advisory Board
- Chemical Engineering alumni
- Chemical Engineering students
- Chemical Engineering faculty.

The ChE Advisory Board is made up of engineers, engineering managers and academics. 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 members of the ChE Advisory Board are:
- Mr. Mehmet Mesut Ada, General Manager, Kordsa Chattanooga, Chattanooga, TN
- Dr. Pedro Arce, Professor and Chair, Department of Chemical Engineering, Tennessee Tech University, Crossville, TN
- Philip S. Ball, General Manager, W. R. Grace & Co., Chattanooga, TN
- Stephen P. French, Chattanooga Plant Manager, Invista S.a.r.l., Chattanooga, TN
- Benjamin H. Gross, Chemistry Professor Emeritus, UTC
- Michael Eugene Poe, Environmental, Health, and Safety Manager, SOFIX Corporation, Chattanooga, TN

Alumni of the ChE program provide important reflections on the content, completeness, and quality of the program informed by their professional experiences. Alumni also support the ChE program financially, hire our graduates, and participate in student design partnerships. There are roughly 200 ChE alumni.

The present ChE undergraduate students can give us immediate, “in-the-trenches” feedback on the program. Clearly they are our most important constituents.

The ChE faculty possesses an abundance of government, industrial, research, and teaching experience that is essential to articulating and implementing the program mission 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 ChE 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 general engineering program with specialties to discipline based programs. Each discipline based program was developed with the intent of getting its own accreditation.

The development of the Chemical 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 ChE faculty subsequently crafted a mission statement and a set of educational objectives. A ChE Advisory Board was formed and met in February 2007 to review the Mission statement, Program Objectives and Outcomes. The Advisory Board strongly endorsed these statements and the Program’s intent to seek individual accreditation.

In the summer of 2004 and 2007, alumni who had graduated three to five years previous were surveyed. These respondents were graduates of the chemical engineering concentration.
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 ChE 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 1, a variation of the EC2000 double loop diagram.

![Figure 1. The Two Loop Process for Continuous Improvement of the ME Program.](image)

The upper 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 ChE faculty, constituencies, the college or the university.

To ensure its faithful and ongoing execution, process tasks are assigned to the ChE Faculty as a whole under the leadership of the ChE 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 ChE 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 ChE faculty meetings.

**Spring 2009 Status for Evaluation, Feedback, and Program Improvements**
The double loop process noted above is being is now being followed with the two year cycle for program outcomes to be completed in spring 2009. The same two year cycle process will be completed again in spring 2011 with the full four year cycle process being completed in 2011. Completing this process will provide information required to demonstrate that the ChE program has completed the assessment, feedback and program improvement processes. The ChE faculty meets at regularly scheduled times to execute this process.

**D. Accreditation**
Accreditation was granted to the UTC ChE program in fall 2008 by Accreditation Board for Engineering and Technology (ABET) for a six-year period.
### IV. UTC Related Undergraduate Programs

#### Table 4. Productivity of Related Programs

<table>
<thead>
<tr>
<th>All Programs in College of Engineering &amp; Computer Science</th>
<th>Number of Graduates</th>
<th>Student Credit Hours</th>
<th>Fall Majors</th>
<th>Accredited by</th>
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<tbody>
<tr>
<td>BSE Degree - Industrial Engineering Specialization</td>
<td>05-06: 1</td>
<td>3904</td>
<td>13</td>
<td>ABET</td>
</tr>
<tr>
<td></td>
<td>06-07: 4</td>
<td>3576</td>
<td>20</td>
<td>ABET</td>
</tr>
<tr>
<td></td>
<td>07-08: 1</td>
<td>3472</td>
<td>11</td>
<td>ABET</td>
</tr>
<tr>
<td>BSCE Degree - Civil Engineering</td>
<td>05-06: 9</td>
<td></td>
<td>85</td>
<td>ABET</td>
</tr>
<tr>
<td></td>
<td>06-07: 14</td>
<td></td>
<td>78</td>
<td>ABET</td>
</tr>
<tr>
<td></td>
<td>07-08: 20</td>
<td></td>
<td>110</td>
<td>ABET</td>
</tr>
<tr>
<td>BSEE Degree - Electrical Engineering</td>
<td>05-06: -</td>
<td>2190</td>
<td>74</td>
<td>ABET</td>
</tr>
<tr>
<td></td>
<td>06-07: 9</td>
<td>2402</td>
<td>77</td>
<td>ABET</td>
</tr>
<tr>
<td></td>
<td>07-08: 2</td>
<td>2136</td>
<td>33</td>
<td>ABET</td>
</tr>
<tr>
<td>BSME Degree - Mechanical Engineering</td>
<td>05-06: 16</td>
<td></td>
<td>133</td>
<td>ABET</td>
</tr>
<tr>
<td></td>
<td>06-07: 13</td>
<td></td>
<td>137</td>
<td>ABET</td>
</tr>
<tr>
<td></td>
<td>07-08: 26</td>
<td></td>
<td>174</td>
<td>ABET</td>
</tr>
<tr>
<td>BS Degree - Computer Science</td>
<td>05-06: 21</td>
<td>6928</td>
<td>137</td>
<td>ABET</td>
</tr>
<tr>
<td></td>
<td>06-07: 12</td>
<td>4461</td>
<td>175</td>
<td>ABET</td>
</tr>
<tr>
<td></td>
<td>07-08: 15</td>
<td>3442</td>
<td>186</td>
<td>ABET</td>
</tr>
<tr>
<td>MS in Engineering - Computational Engineering</td>
<td>05-06: 0</td>
<td>0</td>
<td>8</td>
<td>ABET</td>
</tr>
<tr>
<td></td>
<td>06-07: 0</td>
<td>109</td>
<td>9</td>
<td>ABET</td>
</tr>
<tr>
<td></td>
<td>07-08: 2</td>
<td>81</td>
<td>10</td>
<td>ABET</td>
</tr>
<tr>
<td>MS in Engineering Management</td>
<td>05-06: 2</td>
<td>244</td>
<td>37</td>
<td>ABET</td>
</tr>
<tr>
<td></td>
<td>06-07: 9</td>
<td>156</td>
<td>48</td>
<td>ABET</td>
</tr>
<tr>
<td></td>
<td>07-08: 19</td>
<td>198</td>
<td>57</td>
<td>ABET</td>
</tr>
<tr>
<td>MS in Computer Science</td>
<td>05-06: 4</td>
<td>153</td>
<td>23</td>
<td>ABET</td>
</tr>
<tr>
<td></td>
<td>06-07: 5</td>
<td>102</td>
<td>28</td>
<td>ABET</td>
</tr>
<tr>
<td></td>
<td>07-08: 4</td>
<td>135</td>
<td>23</td>
<td>ABET</td>
</tr>
<tr>
<td>Ph.D. in Computational Engineering (approved in 2004)</td>
<td>05-06: 1</td>
<td>0</td>
<td>14</td>
<td>ABET</td>
</tr>
<tr>
<td></td>
<td>06-07: 1</td>
<td>26</td>
<td>14</td>
<td>ABET</td>
</tr>
<tr>
<td></td>
<td>07-08: 2</td>
<td>232</td>
<td>15</td>
<td>ABET</td>
</tr>
</tbody>
</table>
V. Demand/Need for the Program:
Modern society depends on engineers to continue expansion of the global economy that is driven, to a large extent, by innovation and technology. Chemical Engineers now make up approximately 7 percent of all engineers. Demand is expected to remain strong, well into the 21st Century. The Chemical Engineering “concentration” at UT Chattanooga has already produced about 250 graduates. Many of these graduates remain in the Chattanooga area working for companies like the Tennessee Valley Authority, Invista, Fuji and Chattem Chemical. TVA employs more engineering graduates from UT Chattanooga than from any other university. An indication of the demand for Chemical Engineers at the national level in terms of degrees awarded is shown in the Table 5. This data is taken from “Profiles of Engineering and Engineering Technology Colleges” published by the American Society of Engineering Education.

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

It can be seen in the above table that approximately 7 percent of all degrees awarded over the past six years have been to Chemical Engineers. Note that Engineering (General) degrees are only just over 1 percent of all engineering degrees awarded. These are BSE-type degrees.

Over the years, the Advisory Board for the College discussed the need for discipline specific degree programs. A historical perspective of their involvement is captured in Figures 10-12
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.

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, Aestec, 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 2. Correspondence from Dr. Cox to Dr. Kazemersky, page 1 of 3.

15
urying 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 3. 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 4. Correspondence from Dr. Cox to Dr. Kazemersky, page 3 of 3
VI. Estimated size of Program

A. Estimates of headcount and full-time equated enrollment and number of graduates are given in Table 6. The numbers for “year 1 2008” are the actual numbers for AY 2007-08. All other values in Table 8 are projections.

<table>
<thead>
<tr>
<th>Program Year</th>
<th>Full-Time Major Headcount Fall</th>
<th>Part-Time Major Headcount Fall</th>
<th>Total FTE Enrollment Fall</th>
<th>Total Graduates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1 2008</td>
<td>49</td>
<td>7</td>
<td>51</td>
<td>6</td>
</tr>
<tr>
<td>Year 2 2009</td>
<td>50</td>
<td>7</td>
<td>52</td>
<td>6</td>
</tr>
<tr>
<td>Year 3 2010</td>
<td>51</td>
<td>7</td>
<td>53</td>
<td>7</td>
</tr>
<tr>
<td>Year 4 2011</td>
<td>52</td>
<td>7</td>
<td>54</td>
<td>7</td>
</tr>
<tr>
<td>Year 5 2012</td>
<td>53</td>
<td>7</td>
<td>55</td>
<td>8</td>
</tr>
</tbody>
</table>

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 basic assumption to estimate the size of the program is not an assumption but an actual count of the students in the ChE program as of fall 2008 – 56 total students as shown in line 1 of Table 8. Reasons for projected increases are: the recent hiring of a full time recruiting coordinator for the College; 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; and 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. The Chattanooga Manufacturers Association has already committed to provide matching scholarships for new transfer students that come from Chattanooga State.

C. Demand
Demand for Chemical Engineers is expected to remain strong for the foreseeable future. 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 provides $3.75 billion in funding over 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 BSChE program at UTC, primarily because of the substantial hands-on laboratory experiences required for learning and accreditation.

**Comparable Programs in Tennessee**
Undergraduate engineering enrollments in fall 2007 for universities in Tennessee are given in Table 7.

<table>
<thead>
<tr>
<th>Institution</th>
<th>F/T</th>
<th>P/T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tennessee State University</td>
<td>449</td>
<td>108</td>
</tr>
<tr>
<td>Tennessee Technological University</td>
<td>1,252</td>
<td>105</td>
</tr>
<tr>
<td>UT Chattanooga</td>
<td>416</td>
<td>83</td>
</tr>
<tr>
<td>UT Knoxville</td>
<td>1,780</td>
<td>87</td>
</tr>
<tr>
<td>UT Martin</td>
<td>230</td>
<td>15</td>
</tr>
<tr>
<td>University of Memphis</td>
<td>410</td>
<td>93</td>
</tr>
<tr>
<td>Vanderbilt</td>
<td>1,263</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>5800</td>
<td>491</td>
</tr>
</tbody>
</table>

Most of the engineering students enrolled at UT Chattanooga are Tennessee residents from the counties that make up the Chattanooga metropolitan area with about half coming from Hamilton County alone. UT Chattanooga also enrolls many engineering students who live at home in order to keep down expenses. It might 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 strain 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 BSChE degree is unlikely to have a negative impact on any other institution in Tennessee.
VII. Faculty

A. Current Chemical Engineering faculty members are listed in Table 8

<table>
<thead>
<tr>
<th>Name of Faculty</th>
<th>Highest Degree Earned</th>
<th>Total Years Teaching Experience</th>
<th>Years Teaching in this Institution</th>
<th>Area of Degree Specialty</th>
<th>Full-Time or Part-Time in Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jim Henry</td>
<td>Ph.D.</td>
<td>36</td>
<td>29</td>
<td>ChE</td>
<td>FT</td>
</tr>
<tr>
<td>Frank Jones</td>
<td>Ph.D.</td>
<td>17</td>
<td>9</td>
<td>ChE</td>
<td>FT</td>
</tr>
<tr>
<td>Trish Thomas</td>
<td>Ph.D.</td>
<td>2</td>
<td>2</td>
<td>ChE</td>
<td>FT</td>
</tr>
<tr>
<td>Jim Cunningham (emeritus)</td>
<td>Ph.D.</td>
<td>35</td>
<td>35</td>
<td>ChE</td>
<td>PT</td>
</tr>
</tbody>
</table>

Total FTE Current Faculty in Program: 3.25

B. Faculty resumes are in the appendix.

C. No new faculty members are required.
VIII. Administration/Organization
The BSChE program will be administered by the Mechanical, Chemical, Civil, Environmental and Industrial Engineering Department under the administrative structure shown in Figure 5.

Figure 5. Administrative Structure

University of Tennessee, Board of Trustees
Dr. John Peterson, President
University of Tennessee

University of Tennessee at Chattanooga
Dr. Roger Brown, Chancellor

Academic Affairs
Dr. Philip B. Oldham, Provost and Vice Chancellor for Academic Affairs

College of Engineering and Computer Science
Dr. Will Sutton, Professor and Dean

Mechanical, Chemical, Civil, Electrical, Environmental and Industrial Engineering
Dr. Michael Jones, Director

Department of Computer Science and Engineering
Dr. Andy Novobilski, Head

Engineering Management & Graduate Programs
Dr. Neslihan Alp, Director

Chair of Excellence in Computational Engineering
Dr. Harry McDonald

Graduate School of Computational Engineering and the SIM Center
Dr. David Whitfield, Associate Dean and Director

Freshman Engineering & Advising
Dr. Gary McDonald, Director

Chair of Excellence in Management & Technology
Dr. Ronald Cox
Dr. Mike Jones is presently the Director of the Chemical Engineering Program. *No addition administrative duties will be associated with changing the name of the degree from BSE to BSChE.*

IX. **Library Resources**
   A. The Lupton Library on the UT Chattanooga campus provides adequate support for the engineering program as evidenced by the recent accreditation by ABET.

   B. *No additional library funding will be required to support changing the name of the degree from BSE to BSChE.*

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, equipment or support personnel will be required due to changing the name of the degree from BSE to BSChE.*

XI. **Cost/Benefit**
*There are no costs associated with changing the degree name from BSE to BSChE.* Immediate, tangible benefits will accrue to graduates of the newly named program through better employment possibilities. A longer term benefit for UTC is easier recruitment of new students by removing the confusion and perhaps stigma associated with being unable to award discipline specific degrees. Any increased enrollments are a financial advantage.

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 last ten years. This program is ahead of graduate student enrollment and the related SimCenter is ahead of projections for external funding.

At UTC, both the Mechanical and Electrical Engineering programs changed their degree names from BSE to BSME and BSEE in 2004. Their undergraduate student numbers are up significantly.

XIII. **Consultant** - Not applicable.
APPENDIX 1: CHEMICAL ENGINEERING FACULTY RESUMES

SUMMARY VITA - James R. Cunningham, Ph.D., P.E.

Emeritus Professor

Years on Faculty: 35 (original appointment 08/73)
State Registered: Tennessee (1975)

Degrees

- Louisiana State University  Chemical Engineering  B.S., 1963
- University of Florida  Chemical Engineering  M.E., 1970
- University of Florida  Chemical Engineering  Ph.D., 1972

Other Related Experience

- Post Doctorate Research Associate (NSF) - University of Florida, Chemical Engineering Department, October 1972 to September 1973.
- Graduate (Research) Assistant - University of Florida, Chemical Engineering Department, September 1970 to October 1972.
- Graduate (Teaching) Assistant - University of Florida, Chemical Engineering Department, September 1968 to September 1969.
- Egress Systems Mechanic - Staff Sergeant (E5), United States Air Force, Strategic Air Command, 306 Bomb Wing, Field Maintenance Squadron, McCoy AFB, January 1964 to January 1968.

Consulting and Patents

- Desoto, Inc., Judd Road, Chattanooga, Tennessee, Report Title: Caustic Waste Neutralization, May 1984 to July 1984, Developed the methodology for controlling the pH of wastewater.
- Nation Hosiery Mills, Inc., Chattanooga, Tennessee, Report Title: A Hot Water Heating System Utilizing Indirect Cooldown Water, December 1975 to January 1976, Developed a heating system employing the re-use of energy from water warmed during the cooldown of the dye liquor and knitted goods.
- Pittsburg Knitting Mills, Inc., South Pittsburg, Tennessee, Report Title: Indirect
Cooldown Water Recovery and Condensate Recovery, November 1975 to January 1976, Developed a heating system employing the re-use of water warmed during the cooling of the dye liquor and knitted goods.

Scholze Tannery, Inc., Chattanooga, Tennessee, Sponsor: Tennessee Valley Authority, Division of Environmental Planning, Report Title: Solid Waste Materials Reclamation Study, September 1974 to February 1975, A survey of the solid wastes at the Scholze Tannery was performed, with recommendations for reclamation. A drying process for the reclamation and re-use of the lime slurry was proposed.


Forensic and expert witness projects with local attorneys.

Principal Publications of Last Five Years
None.

Scientific and Professional Society Memberships
American Institute of Chemical Engineers
American Society for Engineering Education
Chattanooga Engineers Club (Past President)
Order of the Engineer
Tau Beta Pi

Honors and Awards
1981-82 Engineering Teacher of the Year
1981-82 Norbert Koch Faculty Service Award
1988-89 Engineering Professor of the Year
1991 Outstanding Engineering Teacher Award
1993-94 Engineering Faculty Award
1994 Cole Outstanding Engineering Teacher Award
1996-97 Outstanding Engineering Faculty Award
1997 Cole Outstanding Engineering Teacher Award
2002-03 Outstanding Engineering Faculty Award
2006 Cole Outstanding Engineering Teacher Award
2006 Faculty of the Year, Joint Council of CECS Student Organizations
2006 Engineer of the Year, Chattanooga Area National Engineers Week

Institutional Service in the Last Five Years (committee assignments, etc.)
Chair of the Engineering Undergraduate Curriculum Committee, 4 years.
Chair of the Engineering Assessment Committee, 5 years.
Member of the Engineering Rank and Tenure Committee, 5 years.
Member of the Physics and Geology Rank and Tenure Committee, 3 years.
Member of the University Undergraduate Curriculum Committee, 3 years.
Member of the Athletics Committee, 3 years.
Member of the University Facilities Use Committee, 5 years.

Professional Service in the Last Five Years
State of Tennessee Water Quality Control, 5 years
Member of the Community Advisory Panel for W. R. Grace, 5 years.

Professional Development Activities in the Last Five Years
Attended instructional retreats on problem-based learning sponsored by UTC Walker Teaching Resource Center, 5 years.
Audited Geology 445 Hydrology (3)
Attended ABET Commission Summit, October 2006.
SUMMARY VITA – James Henry, Ph.D., P.E.

Professor

Years on Faculty: 29 (original appointment 08/01/80)
State in which registered: Louisiana

Degrees:
B.A. Rice University, 1964
B.S. Chemical Engineering, Rice University, 1964
M.A. Princeton University, 1966
Ph.D. Chemical Engineering, Princeton University, 1970
Post-Doctoral, Yale University, 1971

Other Related Experience:
Visiting Academic University of Edinburgh, Scotland; 1988
Fulbright Professor, University of Jordan, Amman, Jordan
Associate Professor of Chemical Engineering, Tulane University, New Orleans, LA (1976-1980)
Associate Professor and Teaching Intern, Prairie View A. and M. University and Woodrow Wilson Foundation

Consulting and Patents:
Consultant: University of Tennessee Space Institute, Tullahoma
Consultant: Tennessee Valley Authority, Chattanooga
Consultant: W.J. Kidde, New Orleans
Consultant: Burk & Associates, New Orleans
Consultant: ICI International, Chattanooga
Consultant: US Power, Philadelphia, PA
Consultant: Southern Champion Tray, Chattanooga
Consultant: Fillauer, Chattanooga

Principal Publications of last 5 years:
"Using the Modern Ch E Laboratory at a Distance", ASEE Annual Meeting, 2002
"International cooperation in control engineering education using online experiments: Enabling technology and learning systems", Henry and Herbert Schadel, Berlin, 2002
"Chemical Engineering Experimentation over the Internet", Henry and Nuttall, AIChE Annual Meeting, 2003
"Real or Simulation: Experiences Using Computer Simulation versus Remote Operation for Process Control", Henry and Zollars, ASEE Annual Meeting, 2004
"PDAs, Cell-phones.... What's next?", Henry, AIChE Meeting, 2004
"Enhancing Classroom Demonstrations and Home Assignments with Remote Experiments ", Henry, Long and Gadzke, AIChE Meeting, 2004
"Introducing Reality into Process Control Classes", Henry and Zollars, ASEE Annual Meeting, 2005
"Real Labs at a Di stance", Henry, AIChE Annual Meeting 2005.
"Expanding the Frontiers for Chemical Engineers in Green Engineering Education", Henry and others, IJEE, 2007

Scientific and Professional Society Memberships:
American Society of Engineering Education
American Institute of Chemical Engineers
Tau Beta Pi
Sigma Xi

Honors and Awards:
Fulbright Scholar, 1987-1988
Outstanding UTC Engineering Faculty, 2001

Institutional and Professional Service in the Last Five Years:
College and University committees
ASEE, Chemical Engineering Division, Director,
Velsicol Chemical Community Advisory Panel,

Professional Service in the Last Five Years:
Director, Chemical Engineering Division, ASEE
Professional Development Activities in the Last Five Years:
UTC, Instructional Excellence Retreat, 2002
UTC, Instructional Excellence Retreat, 2003
SUMMARY VITA – Frank Jones, Ph.D., P.E.

UC Foundation Professor

Years on Faculty: 9 (original appointment 08/01/00)
State in which Registered: Tennessee, #108794

Degrees:
M.S. Chemical Engineering, Drexel University, 1986.
Ph. D. Chemical Engineering, Drexel University, 1991.

Other related experience:
Louisiana Tech University, Assistant Professor, 8/94 - 6/00.
Louisiana Tech University, Visiting Assistant Professor, 12/91 – 6/94.
Adjunct Assistant Professor, summers of 1992, 93.

Consulting and Patents: None.

Principal Publications of Last Five Years:
- (Accepted) Frank Jones, Rob Bailey, Stephanie Wilson, and Jim Hiestand, “The Effects of Engineering Design on Heterogeneous Biocatalysis in Microchannels.” In press at Applied Biochemistry and Biotechnology.
- Alp, Neslihan; Jones, Frank; Bailey, Rob; and Hiestand, Jim; “Use of Taguchi Methods to Optimize the Design of Biomicroreactors,” Institute of Industrial Engineers (IIIE) Annual Conference (peer-reviewed) Proceedings, pp. 108-113, May 20-24, 2006, Orlando, FL.
- Frank Jones, Scott Forrest, Jim Palmer, Zonghuan Lu, John Elmore, and Bill Elmore,


**Grant Funding:**

- **Riverbend Technology Institute.** Funds granted in fall 2006 to support undergraduate student researcher Stephanie Wilson to work on the biomicroreactors project. **Amount awarded = $1,200.**

- **CEACSE (Center of Excellence in Applied Computational Science and Engineering).** "Computational Studies of Microbioreactor Design." PI. **Amount awarded = $37,780.** January 2006 to June 2007.

- **Faculty Research Grant** for Spring 2005. Title: "Simulation Study of the Effect of Flow Patterns on Conversion in a Microbioreactor." **Amount awarded = $2,650.**


- **Faculty Research Grant** for Spring 2004, "Simulation Studies of Microbioreactors." **Amount awarded = $3,000.** With Rob Bailey. This grant is awarded in conjunction with a Benwood award for unlimited parallel software appropriate for the supercomputer at Oak Ridge National Lab. **Amount awarded = $2,000.**


**Scientific and Professional Society Memberships:**

American Institute of Chemical Engineers (AIChE), American Chemical Society (ACS), Sigma Xi, Phi Lambda Upsilon (an honorary chemical society), American Society for Engineering Education (ASEE), Council on Undergraduate Research (CUR).

**Honors and Awards:**

- **Media reports concerning my research:**
  - Honors graduate Stephanie Wilson appeared on the UTC website and in *The Chattanooga Times Free Press* (headline: "UTC graduate Wilson earns research award," December 30, 2006, page E-3) for winning a national research award from the AIChE for her work with my research group.

- **Awards:**
  - **Engineering Research Award.** Presented by the UTC College of Engineering and
Computer Science, November 30, 2001 (Faculty Honors Day).

- **Engineering Research Award.** Presented by the UTC College of Engineering and Computer Science, November 21, 2003 (Faculty Honors Day).
- **Exceptional Merit.** Awarded in yearly faculty evaluation for research in 2005-06.
- **UC foundation Associate Professorship.** Awarded 08/06.

**Institutional Service in the Last Five Years (committee assignments, etc):**
- Chair of ABET Accreditation Committee for Chemical Engineering (Department, 2007). Purpose: obtain *initial* accreditation for the CHE Program.
- ABET Accreditation Committee for ENGR. (College, 2001-present)
- Engineering Petitions Committee. (College, 2001-present)
- Faculty Research Committee. (University, 2005-present)
- MS in Engineering Committee (College, 2001-05)
- Taught FE review courses in Chemical Processes and Municipal Water.

**Professional Service in the Last Five Years:**

I have been a **Peer Reviewer** for the following professional journals:

- Environmental Science and Technology
- Separation Science and Technology
- International Journal of Heat and Mass Transfer
- Journal of Membrane Science
- Applied Biochemistry and Biotechnology
- American Society of Engineering Education

**Professional Development Activities in the Last Five Years:**

Attended numerous professional conferences and made 17 presentations since 2002 on my research and educational activities.
SUMMARY VITA - Tricia A. W. Thomas, Ph.D.

Visiting Assistant Professor

Years on Faculty: 2 (original appointment 08/2006)

Degrees:
   B. S. Chemical Engineering, English and Chemistry minors, Tennessee Technological University, 1993
   B. S. Physical Sciences, Freed-Hardeman University, 1993
   Ph. D. Chemical Engineering-Bioengineering, Carnegie Mellon University, 1998

Other Related Experience:
   GTA (1993-1997) Department of Chemical Engineering, Carnegie Mellon University, Pittsburgh, PA
   UTA (1989-1991) Department of Science and Mathematics, Freed-Hardeman University, Henderson, TN
   MeadWestvaco, Charleston, SC (1998-2005)
   Argonne National Laboratory, Argonne, IL [internship] (1990)

Consulting and Patents
   MeadWestvaco: Technical, patent, and marketing consulting for divisions located in Charleston, SC; Covington, VA; Raleigh, NC (2005-2007)

Principal Publications of Last Five Years:
   None

Scientific and Professional Society Memberships:
   None

Awards and Honors:
   NSF Science and Technology Center Graduate Fellowship (1996-1997)
   Phi Kappa Phi Fellowship
   General Electric Fellowship (1993-1994)

Institutional Service in the Last Five Years:
   None

Professional Service in the Last Five Years:
   None

Professional Development Activities in the Last Five Years:
   None
Attended UTC Instructional Excellence Retreat
Completed UTC training on Blackboard software