

**Program Planning Summary to Offer a Four Year  
Undergraduate Degree Program In  
Civil Engineering Technology  
with Emphasis on Design**

at

South Carolina State University  
College of Science, Mathematics, Engineering, and Technology

A Cooperative Venture Between  
South Carolina State University and University of South Carolina

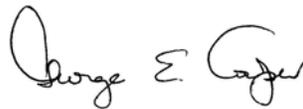
Department of Civil and Mechanical Engineering Technology and  
Nuclear Engineering

Submitted to the Director of the Division of Academic Affairs  
And Licensing  
South Carolina Commission on Higher Education

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## Program Planning Summary

<b>Institution:</b>	South Carolina State University
<b>Program Designation:</b>	Program Planning Summary for a New Program Option (B.S. in Civil Engineering Technology with Emphasis on Design – 135 credit hours)
<b>Designation of Program:</b>	Four-Year Undergraduate STEM Program (Qualified for Supplemental Palmetto Fellows Scholarship and LIFE Scholarship Award)
<b>Proposed Date of Implementation:</b>	Fall 2011
<b>Academic Unit Involved:</b>	Department of Civil and Mechanical Engineering Technology and Nuclear Engineering within the College of Science, Mathematics and Engineering Technology
<b>Delivery Mode:</b>	Traditional – Day and Evening

### Justification of Need:

According to the *Bureau of Labor Statistics Occupational Outlook Handbook, 2010-2011*, the employment outlook for all engineering fields is good. More specifically, in 2008, engineers held about 1.6 million jobs. Of this number, Civil Engineers held the highest number of positions with 278,400 jobs followed by Mechanical Engineers with 238,700 jobs. Industrial, Electrical, and Electronics Engineers ranked third, fourth and fifth with 214,800, 157,800, and 143,700 jobs, respectively.

Civil Engineers and Civil Engineering Technologists affect many aspects of our lives. Civil engineering technicians help civil engineers plan and design roads, bridges, irrigation projects, railroads, pipelines, power plants, tunnels, airfields, harbors, and water and sewage systems. Technicians sometimes work in urban renewal and community planning to improve the living conditions of cities or towns. They design and maintain the infrastructures that enhance the quality of our lives such as: road construction, airports, tunnels, water ways, and sewage lines, and much more. Civil engineers and civil engineering technologists also plan the construction of new buildings and the destruction of old ones. One of the oldest professions in the United States, civil engineering includes geo-technical, transportation, structural, construction, ocean, traffic and architectural engineers.

In an effort to meet the demands of a growing state and national population, more civil engineers and civil engineer technologists, especially with a focus on design, are needed (See *Bureau of Labor Statistics Occupational Handbook, 2010-2011, Edition Engineers*). Hence, there is a shortage in this particular area of civil engineers. This proposed degree program will help meet the needs of the state and nation for civil engineers with this type of educational training and will assist prospective civil engineer technologists with obtaining a professional licensure once they graduate instead of having to wait for a length of time.

### Anticipated Program Demand and Productivity

South Carolina State University is the only four-year institution of higher education that offers a degree in civil engineering technology. Conversely, three technical/community colleges offer the degree: Spartanburg Community College, Trident Technical College and Horry-Georgetown Technical College.

However, none of the aforementioned technical/community colleges offer the degree with an emphasis on design. Consequently, South Carolina State will be the only institution in the state to provide a workforce for the state's growing need in this area.

Furthermore, the proposed program will:

- provide hands-on experience for students who desire to know how engineering principles are applied to accomplish practical projects.
- require all students in the program to successfully complete courses that provide detailed engineering concepts, theories and practices that will help students to pass the Fundamentals of Engineering Examination commonly referred to as the FE Examination.
- enable students who successfully complete the program to receive endorsement from the State Licensing Board for Professional Engineers as having met the educational requirements to sit for and become registered professional engineers in the State of South Carolina. They cannot do so under the current program.

A survey was conducted among our current students as well as other engineering students at the institution. Some students decided to leave the program after learning that they would not become registered professional engineers. Ten of our current students have stated that they will transfer to the proposed program once it has been approved by all appropriate agencies.

The proposed program will admit only students who have the necessary prerequisites to meet the challenges of a rigorous program. As result, the program will initially admit between five and ten students in the first year and gradually increase this number as shown in the table below.

	<b>Fall</b>	<b>Spring</b>	<b>Summer</b>	<b>Total Enrollment</b>
<b>2011-2012</b>	5	5	5	5
<b>2012-2013</b>	10	10	10	15
<b>2013-2014</b>	10	10	10	25
<b>2014-2015</b>	10	10	10	35
<b>2015-2016</b>	10	10	10	45

#### **Assessment of Extent to which the Proposed Program Duplicates Existing Programs in the State**

The proposed program is unique and, therefore, will not duplicate any program in the State.

#### **Relationship of the Proposed Program to Existing Programs at the Proposing Institution**

The proposed Civil Engineering Technology program with emphasis on Design will be closely affiliated with all of the engineering technology as well as engineering programs at South Carolina State University. More specifically, no new courses will be developed at South Carolina State for this program. Instead, students enrolled in the proposed program will enroll in courses offered in the current engineering technology and engineering programs. Moreover, current faculty will teach the courses for the proposed program. The laboratory experiments will also be conducted using our current laboratory facilities.

Alternatively, the only new courses for South Carolina State students enrolled in the program will be those taught on the campus of the University of South Carolina.

#### **Relationship of Proposed Program to other Institutions via Inter-institutional Cooperation**

The proposed Civil Engineering Technology Program with emphasis on Design is a cooperative venture between South Carolina State University and the University of South Carolina. As indicated in the attached curriculum, students who choose this program will spend the first five semesters at South

Carolina State University. The sixth and seventh semesters will be spent at the University of South Carolina, while the last semester will be spent at South Carolina State University. South Carolina State University will award the degree to students who successfully complete the required 135 credit hours.

**Proposed Civil Engineering Technology Curriculum  
 135 Hours**

**First Year**

<b>Fall Semester</b>		<b>Spring Semester</b>	
E 150 English	3	E 151 English	3
M 153 Calculus	3	M 163 Calculus	3
ENGE/ET 170 Intro to Engr	3	P 254 Physics I	3
UNIV 101 Intro. To SCSU	2	P 251 Physics I Lab	1
C 150 Chemistry	3	CET 205 Computer Graphics	3
C 151 Chemistry Lab	1	CS 150 Computer Science	<u>3</u>
PE/HED/MS	<u>2</u>		<b>16</b>
	<b>17</b>		

**Second Year**

M 237 Calculus	3	M 238 Calculus IV	3
ENGR 212 Statics	3	M 403 Differential Equations	3
M 208 Statistics	3	ENGR 213 Strength of Mat	3
P 255 Physics II	3	ENGR 313 Dynamics	3
P 253 Physics Lab	1	E 250 Literature	3
PSC Geology	<u>3</u>	ET 250 Tech Comm	<u>3</u>
	<b>16</b>		<b>18</b>

**Third Year**

ENGR 417 St of Mat'l Lab	3	ECIV 320 Structural An I	3
ENGR 425 Fluid Mech	3	*ECIV 340 Intro. Trans.	3
ET 310 Eng Comp	3	*ECIV 350 Intro. Environ.	3
CET 311 Plane Surveying	3	*ECIV/ESM Elective <sup>A</sup>	3
ENGR 450 Eng Materials	3	*ECIV Lab**	1
H 250/251	<u>3</u>	*ECIV 362 Water Res. Mgmt	<u>3</u>
	<b>18</b>		<b>16</b>

**Fourth Year**

*ECIV 330 Intro Geotech	3	CET 315 Construction	3
*ECIV L330 Intro Geotech Lab	1	CET 460 Senior Project	3
*ECIV CE Elective*	3	Liberal Arts Elective	3
*ECIV E Elective*	3	ET 255 Eng Economics	3
*ECIV CE Elective*	3	EAET 410/411 Ethics	3
*ECIV CE Elective*	<u>3</u>	ETS 250 AMS	<u>3</u>
	<b>16</b>		<b>18</b>

\*Courses to be taken at University of South Carolina (USC)

**Total New Costs Associated with Implementing the Proposed Program**

At implementation, no new cost will be incurred. However, a new full-time faculty position with expertise in Structures will be hired to teach some of the third year courses. The faculty position will cost South Carolina State University \$75,000, which will be paid from FTE-generated revenue from students enrolled in the program.