

PROGRAM MODIFICATION PROPOSAL

Institutional Approvals and Dates of Approval

Department of Civil & Mechanical and Nuclear Engineering:	September 03, 2014
Dean (CSMET):	September 03, 2014
Dean, Library & Information Services:	September 04, 2014
Registrar:	September 09, 2014
Provost's Office:	September 18, 2014
Educational Policies Council:	September 25, 2014
Faculty Senate:	October 7, 2014
President:	October 14, 2014
Board of Trustees:	December 4, 2014

Background Information

Provide a detailed description of the proposed modification, including its nature and purpose and centrality to institutional mission. (1500 characters)

South Carolina State University (SCSU) requests approval of a Bachelor of Science degree in Civil Engineering (BSCE). The objective of this proposal is to modify the existing ABET-accredited Civil Engineering Technology (CET) program at SCSU to Civil Engineering (CE) and to offer a BSCE to students at SCSU. In this modification, a total of 21 semester hours are removed from the current CET curriculum and a total of 24 semester hours of new courses are added.

With the need to expand our civil engineering infrastructure (roads, bridges, utilities, buildings, etc.) in order to accommodate the growing population both at the state and national levels as well as maintain our deteriorating infrastructure, the need for civil engineers and civil engineering technologists could not be higher. The proposed Civil Engineering program is designed to contribute to the amelioration of the shortage of qualified civil engineers and thus satisfy the quest for licensure of many civil engineering technologists in the State who find the current pathway to professional licensure difficult.

The mission of the College of Science, Mathematics, Engineering and Technology (CSMET) is to "...produce scientists, mathematicians, engineers and engineering technologists who are highly skilled, competent, and well prepared to enter professional careers in the public and private sector and to pursue degrees beyond the baccalaureate level in professional or graduate school". The mission of SCSU is to prepare "highly skilled, competent, economically and socially aware graduates to enable them to work and live productively in a dynamic, global society."

The proposed program does not duplicate any of the existing programs currently offered by the university. The curriculum for the proposed CE program shares a common foundation with mathematics, chemistry, physics, and common engineering subjects.

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List the objectives of the modified program. (1500 characters)

The objectives of this proposed program are:

1. To provide students with opportunities to become licensed as Professional Engineers (PE) in the state of South Carolina. After June 2020, a provision in the South Carolina state law regarding professional licensure of engineers will become effective that will prohibit B.S. Engineering Technology graduates from becoming licensed as Professional Engineers in this state, unless they receive an ABET-EAC accredited advanced degree.
2. To provide students with enhanced employment opportunities after graduation, both inside and outside of South Carolina. Many employers will not hire Engineering Technology graduates; this is especially true in the state of South Carolina. For many existing and developing job opportunities in South Carolina, graduation from an Engineering Accreditation Commission of ABET (EAC of ABET) accredited institution (as opposed to an Engineering Technology Accreditation Commission, ETAC of ABET) is a requirement for employment. Many institutions of higher learning also require this designation for those graduates who desire to pursue graduate degrees in engineering. Engineering Technology graduates will not be allowed to sit for this exam in the state of South Carolina after June 2020 since it is the preliminary and necessary step towards PE licensure.
3. To address the persistent demand for Civil Engineering graduates.
4. To provide continuing education opportunities for locally employed engineering graduates with the necessary education to prepare them for post graduate education (that insist on EAC of ABET accredited undergraduate degrees) in civil engineering or related fields.
5. To provide the technical manpower to the region, especially of minorities.

The CE program is scheduled to begin in the fall of 2016. The proposed program will admit only students who have the necessary prerequisites to meet the challenge of a rigorous program.

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Assessment of Need

Provide an assessment of the need for the program modification for the institution, the state, the region, and beyond, if applicable. (1500 characters)

Civil Engineers have an incredibly diverse range of career options. Career opportunities can be found in many areas such as the geotechnical field, transportation, geomatics, structures, construction, water resources, environmental studies, site civil design, etc. Graduates from the Civil Engineering program at South Carolina State University will be qualified to meet the needs of the local as well as national civil engineering firms, municipalities, counties, state and federal governments. Moreover, as part of a Historically Black College or University (HBCU), this program would contribute to addressing issues of diversity in the Civil Engineering community while continuing to foster excellence in education for both the minority and majority populations of the State of South Carolina. The CET program has been accredited by ABET/ETAC since 1983 and SCSU is the only public HBCU in the state that offers an accredited Bachelor of Science degree in Civil Engineering Technology (BSCET). Demands placed on CE professions have increased dramatically as the need for construction of new as well as maintenance and rehabilitation of infrastructure have increased.

There is a shortage of engineers nationally and in South Carolina. South Carolina State University, with its deep roots in the African-American community, is certain to attract and nurture to graduation young people who would otherwise not have considered a career in engineering. It is highly probable that SCSU will attract federal and foundation support not available to other universities in the state of South Carolina. The national Bureau of Labor Statistics projects 53,700 new jobs for Civil Engineers between 2012 and 2022 and a job growth rate of about 20% nationally for all engineers. This is higher than the average for all engineering disciplines. The growth rate and demand for Civil Engineers in South Carolina is higher because of the influx of new as well as maintenance and rehabilitation of infrastructure such as bridges, roads, and other civil engineering projects. A diverse work force is demanded in the profession, and some civil engineering entities will not hire Engineering Technology graduates at all especially in South Carolina.

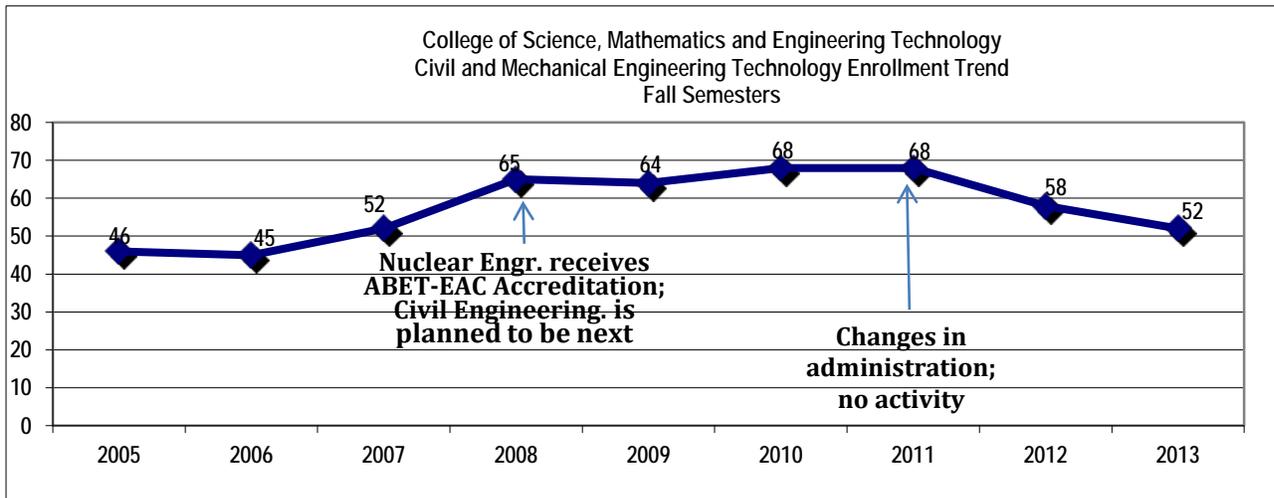
After June 2020, a provision in South Carolina state law regarding professional licensure of engineers will become effective that will prohibit Engineering Technology graduates from becoming licensed as Professional Engineers in this state. This implies that any Engineering Technology major who graduated with a B.S. degree after 2012 cannot ever become licensed as a PE in this state with just that degree. This change in policy will greatly disenfranchise CET graduates who are often equally qualified and deserving of being able to earn a professional engineering license as their CE graduate contemporaries. The CET program at SCSU has a history of producing high quality engineering professionals who are a credit to their organizations and to the engineering profession. It is imperative that the modification of the existing CET program at SCSU to an CE program be allowed so that future high quality engineering professionals who are graduates will have a fair opportunity to attain professional advancement and professional licensure if they so desire.

The proposed modification is expected to create an increase in enrollment. South Carolina State University's internal data strongly shows that the university will experience increased enrollment in engineering disciplines as shown in the existing Nuclear Engineering program at SCSU. The table below shows how the Nuclear Engineering Program at SCSU increased its enrollment between 2008 and 2012 even as the overall university's enrollment decreased during that time.

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Year	SC State Fall Enrollment	Nuclear Enrollment
2008	4888	30
2009	4538	36
2010	4362	49
2011	4326	53
2012	3807	55
2013	3461	55

The diagram below shows the increase in enrollment for the Civil Engineering Technology Program after an announcement was made that there was a plan to offer Civil Engineering at SCSU.



Both the Nuclear and Civil Engineering Technology Programs enrollment examples indicate a clear student demand and interest in engineering at this university. The implementation of the Civil Engineering program at SCSU should create the same trend in enrollment increases.

The alignment of academic training with current and predicted market demands in the areas related to this discipline will attract many high performing students that are interested in pursuing careers in science and mathematics. This increase in enrollment should be visible in both the number of in-state students as well the number of out-of-state students.

Will the proposed modification impact any existing programs and services at the institution?

Yes

No

If yes, explain. (1000 characters)

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List of Similar Programs in South Carolina

Program Name	Institution	Similarities	Differences
Civil Engineering	Clemson University	Both universities offer the same program.	¹ (1) Geographic distance between the two institutions indicate that they serve different regions of the state. (2) SCSU's emphasis on minority recruitment
Civil Engineering	USC	Both universities offer the same program.	¹ (1) SCSU's emphasis on minority recruitment
Civil Engineering	Citadel	Both universities offer the same program.	¹ (1) SCSU's emphasis on minority recruitment (2) Distinctly different recruitment & different student populations
		¹ While SCSU recruits and serves all students, as an HBCU, its student body is predominantly African American. The University serves a different geographical region when compared to Clemson University, and does not compete for students with USC or the Citadel even though all three universities are within one and one-half hours away from each other. Further, the great need for civil engineers in the state and nation as noted in the data from the Bureau of Labor Statistics, indicates that the state's public higher education institutions need to produce many graduates to fill the civil engineering needs that currently exist and those that will exist in the future.	

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Description of the Program

Projected New Enrollment						
Year	Fall		Spring		Summer	
	Headcount	Credit Hours	Headcount	Credit Hours	Headcount	Credit Hours
2015-2016	5	75	5	75	0	0
2016-2017	10	150	10	150	0	0
2017-2018	15	225	15	225	0	0
2018-2019	20	300	20	300	0	0
2019-2020	21	315	21	315	0	0

Curriculum

Attach a curriculum sheet identifying the courses required for the program.

Curriculum Changes

Note: Complete this table only if there are changes to the curriculum.

Courses Eliminated from Program	Courses Added to Program
M 152 Pre-Calculus (3 cr)	¹ PSC 202 – Physical Geology (3 cr)
CS 150 – Computer Technology (3 cr)	¹ M 237 – Calculus III (3 cr)
M 250 – Linear Algebra (3 cr)	¹ M 403 – Differential Equations (3 cr)
CET 312 – Route Surveying (3 cr)	¹ CET 318 – GPS & Control Survey. (3 cr)
CET 412 – Codes & Regulations (3 cr)	¹ CET 428 – Hydrology & Drainage (3 cr)
CET 420 – Water & Sewage (3 cr)	¹ CET 419 – Foundation Engineering (3 cr)
Open Elective (3 cr)	¹ CET 424 – Elements of GIS (3 cr)
	¹ TRP 530 – Transportation Planning (3 cr)

¹Courses already in the SCSU's catalog

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**CURRICULUM LEADING TO THE DEGREE OF BACHELOR OF SCIENCE IN
CIVIL ENGINEERING
AT SOUTH CAROLINA STATE UNIVERSITY
134 CREDIT HOURS**

FRESHMAN

First Semester			Credits	Status	Second Semester			Credits	Status
E-150	English I (NP)	3	_____	E-151	English II (E 150)	3	_____		
M 153	Calculus I (M 152)	3	_____	M 163	Calculus II (M 153)	3	_____		
ET 150	Basic Cad (NP)	3	_____	CET 205	Com. Aided Draft. (ET 150)	3	_____		
ENGR 170	Intro. Engr. (NP)	3	_____	C-150	Chemistry (NP)	3	_____		
UNIV-101	Intro. to Univ. Comm. (NP)	2	_____	C-151	Chemistry Lab (NP)	1	_____		
PE-150 or HED-151	(NP)	2	_____	PSC 202	Physical Geology (NP)	3	_____		
		<u>16</u>				<u>16</u>			

SOPHOMORE

First Semester			Credits	Status	Second Semester			Credits	Status
E 250 or E 251	Literature (M 153)	3	_____	P 255	Physics II (P 254)	3	_____		
M 237	Calculus III (M 153)	3	_____	P 253	Physics Lab.(P 254/251)	1	_____		
P-254	Physics I (M 153)	3	_____	ET 250	Tech. Comm. (E 150/E 151)	3	_____		
P-251	Physics I Lab. (M 153)	1	_____	M 403	Diff Equ (M 237)	3	_____		
ET 255	Engr. Econ. (M 152)	3	_____	ENGR 213	Str of Mat. (ENGR 212)	3	_____		
ENGR 212	Statics (M 152)	3	_____	A 250 or MU 250 or Drama 254	(NP)	3	_____		
		<u>16</u>				<u>16</u>			

JUNIOR

First Semester			Credits	Status	Second Semester			Credits	Status
Soc-250 or Psy 250	(NP)	3	_____	EET 230	Circuit Ana. (M 153)	3	_____		
ET 310	Engr. Computing (NP)	3	_____	ETS 250 or HHU 250	(NP)	3	_____		
H 250 or H 251	History (NP)	3	_____	ENGR 313	Dynamics (ENGR 212)	3	_____		
CET 319	Theo. of Struc.(ET 213/M153)	3	_____	CET 320	Highway Engr. (CET 311)	3	_____		
CET 311	Plane Survey. (M 152)	3	_____	CET 315	Construction (JST)	3	_____		
ET 421	Thermo. (M 163/P254/P251)	3	_____	CET 318	GPS & Contr Surv (CET 311)	3	_____		
		<u>18</u>				<u>18</u>			

SENIOR

First Semester			Credits	Status	Second Semester			Credits	Status
CET 413	Struc. Design (CET 319)	3	_____	CET 414	Struc. Design (CET 319)	3	_____		
ENGR 417	Mat. Test. Lab. (ET 213)	3	_____	CET 419	Foundation Engr (CET 418)	3	_____		
CET 418	Soil Mechanics (ET 213)	3	_____	CET 428	Hydrology & Drainage (CET 415)	3	_____		
CET 415	Fluid Mech. (ET 313)	3	_____	CET 460	Sr. Project (SST)	3	_____		
CET 459	Sr. Proj. Prop. (SST)	1	_____	TRP 530	Transp. Planning	3	_____		
Restricted Elective (Select One)		3	_____	CET 424	Elements of GIS	3	_____		
EAET 410	Engineering Ethics OR								
EAET 411	Role of Engineers (SST)								
		<u>16</u>				<u>18</u>			

LEGEND: TFD – Transferred, CE – Credit By Examination, E- Exempt

NB Students who are exempt from any course must take other approved course(s) in order to complete total credit hour requirement.

() Prerequisites / NP- No Prerequisites/ COR-Co-requisites / SST-Senior Standing / JST-Junior Standing

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Faculty

Provide a brief explanation of any additional institutional changes in faculty and/or administrative assignment that may result from implementing the proposed program modification. (1000 characters)

The existing faculty of the current CET program at SCSU will be used to implement the program modification for the CE program.

Faculty Rank	Degrees
Associate Professor	PhD Civil Engineering: GeoMatics & Geotechnical M.A.Sc. Civil Engineering B.Sc. Civil Engineering
Associate Professor	PhD Civil Engineering: Geotechnical M.Sc. Civil Engineering B.Sc. Civil Engineering
Assistant Professor	PhD Civil Engineering: Structural M.Sc. Civil Engineering B.Sc. Civil Engineering
Assistant Professor	PhD Civil Engineering: Transportation M.Sc. Civil Engineering B.Sc. Civil Engineering

Resources

Identify any new library/learning resources, new instructional equipment, and new facilities or modifications to existing facilities needed to support the modified program. (2000 characters)

There are no additional requirements on the physical plant since there is adequate space and facilities to support the Civil Engineering program in its current location in Engineering & Computer Science Complex.

The \$4,000 annually designated for library as shown in the Financial Support table is needed keep abreast of new publications in the field.

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Financial Support

Estimated New Costs by Year						
Category	1st	2nd	3rd	4th	5th	Total
Program Administration						
Faculty and Staff Salaries (Overload or Adjunct)						
Graduate Assistants						
Equipment						
Facilities						
Supplies and Materials	3,000	3,000	3,000	3,000	3,000	15,000
Library Resources	4,000	4,000	4,000	4,000	4,000	20,000
Other*						
Total	7,000	7,000	7,000	7,000	7,000	35,000
Sources of Financing						
Category	1st	2nd	3rd	4th	5th	Total
Tuition Funding	50,440	100,880	151,320	201,760	211,848	716,248
Program-Specific Fees						
State Funding (i.e., Special State Appropriation)*						
Reallocation of Existing Funds*						
Federal Funding*						
Other Funding*						
Total						
Net Total (i.e., Sources of Financing Minus Estimated New Costs)	50,440	100,880	151,320	201,760	211,848	716,248

¹The tuition (and fees) is calculated at the rate of \$5,044 per student per semester.

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Budget Justification

Provide a brief explanation for the other new costs and any special sources of financing (state funding, reallocation of existing funds, federal funding, or other funding) identified in the Financial Support table. (1000 characters)

Note: Institutions need to complete this budget justification *only* if any other new costs, state funding, reallocation of existing funds, federal funding, or other funding are included in the Financial Support table.

The existing faculty, staff, and infrastructure of the current BSCET program at SCSU will be used to implement the new BSCE program. There will be no required additional costs in terms of faculty, buildings, or other resources in order to create the new BSCE program at SCSU. The funds for supplies and upkeep of library resources have been included in the budget to ensure that the program keeps abreast of trends in the field.

Evaluation and Assessment

Will any the proposed modification impact the way the program is evaluated and assessed?

Yes

No

If yes, explain. (1000 characters)

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Will the proposed modification affect or result in program-specific accreditation?

Yes

No

If yes, explain; if the modification will result in the program seeking program-specific accreditation, provide the institution's plans to seek accreditation, including the expected timeline for accreditation. (500 characters)

The current program has been and is currently accredited by the Engineering Technology Accreditation Commission (ETAC) of ABET. After the modification is implemented, the accrediting body will switch from ETAC of ABET to Engineering Accreditation Commission (EAC) of ABET. ABET accreditation will be pursued. The BSCE program is expected to be EAC of ABET accredited within four years of CHE approval.

Will the proposed modification affect or lead to licensure or certification?

Yes

No

If yes, explain how the program will prepare students for licensure or certification. (500 characters)

In South Carolina, graduates of an ABET EAC accredited program may apply for licensure from the State Board of Professional Engineers and Land Surveyors. The graduates do this by first taking the Fundamentals of Engineering exam (FE) either during their last semester before graduating or very shortly after. Then they work in the field for a minimum of four years and apply to take the Professional Engineering (PE) exam. After successful completion of these requirements they may become licensed as Professional Engineers. The engineering department at SCSU is planning on creating a series of workshops which will aid the students in passing the FE exam.

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Teacher or School Professional Preparation Programs

Is the proposed modified program a teacher or school professional preparation program?

Yes

No

If yes, complete the following components.

Area of Certification

Attach a document addressing the South Carolina Department of Education Requirements and SPA or Other National Specialized and/or Professional Association Standards.