West Virginia State University Board of Governors
Academic Policies Committee
Erickson Alumni Center, Weisberg Lounge
September 14, 2017
10:30 a.m. – 11:30 a.m.
Agenda

1. Call to Order and Roll Call

2. Election of Committee Chair

3. Election of Presiding Officer in Absence of Committee Chair

4. Verification of Appropriate Notice of Public Meeting 2

5. Review and Approval of Agenda 1

6. Review and Approval of Minutes of Previous Meeting 3

7. University Recommendations and Reports

    7.1 Program Approvals
        7.1.1 Computer Science, M.S. 8
        7.1.2 Engineering, B.S. 28

8. Next Meeting Date – *December 7, 2017*

9. Adjournment

West Virginia State University
Academic Policies Committee

Date!Time: 9/14/2017-- 10:30 AM

Location:

West Virginia State University
Erickson Alumni Center
Weisberg Lounge
Institute, WV

Purpose: To conduct regular business of the Committee in preparation for the September 14, 2017 Board of Governors meeting.

Notes:

This is a compliant meeting.

Meeting was approved: 9/7/2017 8:24:05 AM

West Virginia State University Board of Governors
Academic Policies Committee
Erickson Alumni Center, Weisberg Lounge
Minutes
June 15, 2017

1. **Call to Order and Roll Call**
   Mrs. Pitchford called the meeting of the West Virginia State University Board of Governors Academic Policies Committee to order at 10:31 a.m.

   Present: Dr. Guetzloff, Mr. Kelley, Mr. Konstanty, Mrs. Pitchford and Dr. Thralls. Several members of the administration, faculty and staff were also present.

2. **Verification of Appropriate Notice of Public Meeting**
   Mrs. Pitchford announced the Verification of Appropriate Notice of Public Meeting.

3. **Review and Approval of Agenda**
   Mrs. Pitchford asked for approval of the agenda. Mr. Kelley made the motion, and it was seconded by Mr. Konstanty. The motion passed.

4. **Review and Approval of Minutes of Previous Meeting**
   Mrs. Pitchford asked for approval of the minutes from the April 27, 2017 meeting. Dr. Thralls made the motion, and it was seconded by Mr. Konstanty. The motion passed.

5. **University Recommendations and Reports**

   5.1 Program Approval

   5.1.1 Engineering, B.S.

   Provost Jayasuriya presented two program approvals for the Committee. It was explained that these are program proposals and the intent to plans were previously approved by the Board. Today, the Committee would be asked to vote to recommend approval of the programs to the full Board.

   Dr. Jayasuriya explained that the Chancellor asked the University to prepare a chemical engineering degree, which is the proposed Bachelor of Science in Engineering (BSE) with a major in Chemical Engineering. He told the Committee there are two Ph.D. civil engineers on campus, and it would be easy to add a civil engineering track, if needed. He also stated that chemical engineering labs (distillation and processing) will be expensive. However, there are labs at BridgeValley Community and Technical College that would be utilized. A question was raised about what would happen if BridgeValley lost the lease on their buildings. Mr. Konstanty said that the facility on loan was good, but he would prefer to have the labs on campus. Dr. Jayasuriya assured that there is a back-up plan using Title III funds. They will need time to accumulate the equipment and see how the Chemical Engineering degree will work without spending much money. The University would need $500,000 for the labs to be on campus. Dr. Jayasuriya stated that Kevin

DiGregorio, President of the Chemical Alliance Zone, was very helpful in drafting the Chemical Engineering plan.

Mr. Konstanty inquired as to when the program would be presented to the HEPC. Dr. Jayasuriya replied there is an HEPC meeting in August. Mr. Konstanty asked if the program would begin in fall of 2018, pending approval by the HEPC, and Dr. Jayasuriya affirmed that it would. Dr. Jayasuriya clarified that following HEPC approval, the proposed program would be submitted to the Higher Learning Commission for final approval. Dr. Thralls asked if there were any archives that showed the intent to plan and approval by the Chancellor and HEPC. He also questioned if the University anticipated any issues. Dr. Jayasuriya commented that, according to the legislation that was recently passed, the HEPC cannot disapprove a program based on political climate or any other University's objections, but only on lack of documents.

Mr. Kelley inquired as to if the University formerly had a Chemical Engineering program. Dr. Guetzloff answered there was a 2+2 program with WVU Tech previously, but he did not know the details. He stated there has not been a Chemical Engineering degree during his time at the University, which began in 2000. Dr. Thralls also did not recall there being a Chemical Engineering degree. Mr. Kelley asked if it was possible to get a certification as an engineer with a Chemistry degree. Dr. Guetzloff and Mr. Konstanty both commented that it was not.

Dr. Thralls asked about the rigor of the engineering program. He stated on page 12 that the admissions requirement was to have a 2.0 average and he feels the probability of someone graduating with that as a starting point would be low. He also said that the SAT scores struck him as unusual. The Provost said that was the correct information. Those are the requirements to be admitted to the University. Once the program is established, the University will look at a different set of standards. Dr. Thralls asked if the proposal locked the University in at these current standards. Dr. Jayasuriya commented he believed that the standards could be changed in the future. Mr. Kelley asked if the Board of Governors adopted the policy who would have the authority to change the standards. Dr. Thralls said he assumed that, in the future, if there are recommendations to change, it could be amended by the Board. Mr. Kelley asked if the Board approved this could the Administration change the standards. Dr. Guetzloff commented that catalog changes could be made by the department faculty. He said those changes would not get to the Board level. Mr. Kelley inquired that if the Board of Governors approved a program that had a set standard and then the Administration changed it, would the student have the right to sue based on those changes. Dr. Guetzloff said if the changes are in the catalog that is from the faculty, as they own the curriculum that is the authority to change the standards. Mrs. Pitchford asked if the University could set different guidelines than what the HEPC has set in the future for the program. The Provost said that the University does not have different guidelines and use the ones from the HEPC. Dr. Guetzloff commented that the University could but it has not been done. Mr. Kelley asked if they approve the program and the courses, if the faculty could come in and change it. The Provost

stated that the EPC at the faculty senate could change the courses. Dr. Thralls stated he felt that if changes were needed in the future it could be an amendment to the program. Dr. Guetzloff stated that some institutions have a policy that a student must apply to the program, the University does not. If the department states that a student needed 2.5 GPA to be admitted to the program that will be in the catalog.

Dr. Thralls asked Dr. Jayasuriya and his staff to carefully examine program specific requirements. If they are higher than what the Board has approved, it should be specified or there should be a proviso in the admission policy which grants the department the authority to raise the requirements for legal reasons. Mrs. Pitchford commented that the University should strongly counsel potential students going into the program that have a GPA that may make it difficult for them to succeed. Mr. Konstanty suggested that when the program comes to the Board for review, can it be added what the admission standards are and whether they have been changed by the faculty and if the Board needs to adopt the changes. Dr. Jayasuriya approved of the suggestion. Dr. Thralls feels there will be few programs implemented in the future where admission standards will be higher and changes will be made. Mr. Kelley asked if the policy has a provision that states that the faculty has the right to raise the standards for accreditation purposes and such. Mr. Konstanty replied to either do that, or that the Provost needs to bring the changes to the Board when the changes happen through the faculty senate. Mrs. Pitchford asked for clarification if the Board would approve or ratify the changes the faculty makes in admission standards. Mr. Konstanty feels the Board should have the opportunity to ask questions about it, but cannot imagine it would be something to ratify or approve as the faculty had debated it and thought it was the right thing to do.

Mr. Konstanty moved for approval of the program proposal for the B.S. in Engineering with a major in Chemical Engineering with the caveat that in the future if the admission standards deemed that 2.0 GPA was too low and needed to be raised, that it comes back to the Board for approval. Dr. Thralls seconded the motion. Dr. Guetzloff brought up students that are admitted provisionally due to their ACT/SAT scores, which can sometimes be lower than what is deemed appropriate in the catalog. Mr. Konstanty stated he feels that the use of the word ‘appropriate’ in the ACT/SAT score requirement is intentional to be ambiguous and vague. The motion carried by unanimous vote.

5.1.2 Sports Studies, M.S.

Dr. Jayasuriya stated that the Sports Studies, M.S. is one of the fastest growing degrees and feels it is appropriate to look at a master’s degree in this area. There is great interest from students in this program. Mr. Konstanty commented that the proposal was very well put together. He mentioned that on page 52 under 6.3 ‘Program Need Justification Relationship to Institution Goals Objectives’ – he was pleased with the list of the people included. He asked if Earl Lloyd could also be listed with the fact that he was the first African American to be in the NBA. Dean Carney and Dr. Jayasuriya agreed. Dr. Guetzloff commented that the Tuskegee

Airmen should also be listed. Dr. Thralls commented the admissions standards on page 43 are very specific.

Mr. Kelley inquired what would a student who obtains this master's degree earn in the field. Dr. Settle answered the salary could be anywhere between $30,000 to $50,000 depending on what jobs they acquire. He mentioned a former student of West Virginia State University is making six figures in a related field. He also stated that the National Coaching Association now mandates that any coach on the collegiate level (Divisions I, II, or III) coming in at the head coaching level must have a master's degree. Dr. Settle commented that if the student does the strength and conditioning program they would make a higher salary. He feels that the master's degree will be sought after by people in the education field, specifically the health education and physical education programs. He stated the master's degree program is more science based than skill based. He also said that many people who have their B.S. would come back to get their master's so they could obtain a higher salary and to be certified in their field.

Mr. Kelley asked what other institutions in the state offer this degree. Dr. Settle answered that there is no Master's in Sport Studies in the area. He pointed out there is a Master's of Athletic Coaching at WVU but it only focuses on coaching methodology. Dr. Settle explained that the Master's in Sports Studies would be a broad, general approach and will satisfy needs in all areas of sport related employment.

Mr. Kelley moved for the adoption of the program proposal for the Master of Science in Sports Studies. Mr. Konstanty seconded the motion. Dr. Thralls commented that this was a very well developed proposal and the program has great potential. Dr. Settle mentioned that the department will seek to have the program nationally recognized once approved by the HEPC. He also stated that the Sports Studies, B.S. is the only program in the state recognized by the National Strength and Conditioning Association (NSCA). Mrs. Pitchford asked if all the Master's level programs require a minimum of 2.5 GPA. Dr. Jayasuriya said that some are higher, but that is the minimum. The motion carried by unanimous vote.

Mr. Konstanty commented that two internship opportunities, one with the Barnes Agency in Huntington and one with Energy Corporation America (ECA) in Charleston, placed two West Virginia State University students. Joseph Gregg was selected for the ECA, and Brianna Lawrence was selected for the Barnes Agency. He wished happy congratulations to the students.

6. **Next Meeting Date**
   TBD

7. **Adjournment**

With there being no further business, a motion was made by Mr. Kelley and seconded by Mr. Konstanty to adjourn the meeting. The motion passed. The meeting adjourned at 11:15 a.m.

Respectfully submitted,

Betsy L. Allen

WEST VIRGINIA STATE UNIVERSITY

APPROVAL FOR A NEW PROGRAM
MASTER OF SCIENCE IN
COMPUTER SCIENCE

SEPTEMBER 2017

Institution: West Virginia State University
Date: September 1, 2017
Action Required: Approval of new degree program
Title of Degree: Master of Science in Computer Science
Location: West Virginia State University
Effective Date: August 15, 2018
Summary: This proposal is for a new degree program at West Virginia State University: A Master of Science in Computer Science.

§1. Introduction

§§ 1.1 Contents of the Proposal

This document contains the proposal for a master's degree in computer science at West Virginia State University (WVSU). Following this introductory section, and except for the appendices, the parts of the document are numbered to correspond to sub-item numbers HEPC Procedural Rule Title 133, Series 11. Section 32 contains the description of the proposed program, including the objectives, CIP identification code, catalog description and outcomes. Section 3 discusses "Program Need and Justification" and includes data on existing programs in West Virginia as well on projected employment opportunities for graduates of this program. Section 4, along with Appendix A (Forms 1 and 2), contains information on "Program Implementation and Projected Resource Requirements." Section 5 discusses the evaluation procedures for the proposed program. Finally, Appendix B contains (tentative) course descriptions for the new courses needed for the program.

§2 Program Description

§§ 2.1 Program Objectives

The general objectives of this program are:

- Provide students with an advanced understanding of those concepts of computer science, which will enable them to adapt to and function in any current computing environment.
- Allow students with a WVSU bachelor's degree in computer science to easily continue their studies to obtain a master's degree.
- Allow area information technology and computer science professionals to obtain advanced training in the discipline.

In support of the general objectives, the specific objectives of the program are:

1. Further students' understanding of algorithm analysis, computer architecture and the theory of computing.
2. Teach students parallel and distributed computing theory and application.
3. Explore modern areas of computing, such as machine learning and data science.
4. Provide opportunities for research in computer science.

§§2.2 Program Identification

The proposed CIP code for this degree is 11.0701 – Computer Science: "A general program that focuses on computers, computing problems and solutions, and the design of computer systems and user interfaces from a scientific perspective. Includes instruction in the principles of computational science, and computing theory; computer hardware design; computer development and programming; and applications to a variety of end-use situations." (**Source**:

National Center for Education Statistics, U.S. Department of Education, *Classification of Instructional Programs (CIP 2000)*, on the Internet at http://nces.ed.gov/pubs2002/cip2000/ciplist.asp?CIP2=11 (visited August 28, 2017).)

§§2.3 Program Features

§§§ 2.3.1 Admissions and Performance Standards

Admissions: To be admitted to this program, the student must satisfy these requirements:

1. Have an undergraduate degree in computer science or a closely related discipline;
2. Submit scores for the GRE General Test totaling at least 295 for the Verbal Reasoning and Quantitative Reasoning sections, with at least a score of 149 on the Quantitative Reasoning section;
3. For international students for whom English is not their primary language, a minimum TOEFL score of 60 or a minimum IELTS score of 5.0;
4. Two letters of recommendation;
5. Approval of the Computer Science Graduate Committee.

Students lacking some of the above requirements may be granted conditional admission by the Computer Science Graduate Committee.

Performance: To receive this degree, the student must satisfy the standard University requirements for graduation (Source: West Virginia State University *2016-2017 Catalog*):

1. A quality point average of 3.00 (average of "B") on all work attempted with the exception of courses with grades of "P", "K", "W", "WP" and "AUD."
2. A cumulative average of 3.00 in major courses.
3. Completion of the total number of hours required in the curriculum elected.
4. The necessary residence requirement for a degree.
5. Payment of all outstanding financial obligations to the University.
6. Participation in Commencement.

§§§ 2.3.2 Program Requirements

The catalog description for this program:

Master of Science in Computer Science

A. Thesis option

30 hours required for graduation.

Core – 9 hours
CS 605*; CS 610*; CS 515*
Electives – 15 hours
CS 530*, CS 540*, CS 645*, CS 510*, CS 611*, CS 612*, CS 613*, CS 615*, CS 609*, CS 505*, CS 599, CS 697*, CS 597*.

Thesis – 6 hours
CS 699

B. Non-thesis option

36 hours required for graduation.

Core – 9 hours
CS 605*; CS 610*; CS 515*

Electives – 21 hours
CS 530*, CS 540*, CS 645*, CS 510*, CS 611*, CS 612*, CS 613*, CS 615*, CS 609*, CS 505*, CS 599*, CS 697*, CS 597*.

New Courses (see Appendix B for descriptions)

- CS 505 (2 credits) Library Research
- CS 510 (3 credits) Advanced Operating Systems
- CS 515 (3 credits) Theory of Computation
- CS 530 (3 credits) Advanced Database Management Systems
- CS 540 (3 credits) Network Programming
- CS 597 (1-3 credits) Internship
- CS 599 (1-4 credits) Special Topics
- CS 605 (3 credits) Analysis of Algorithms
- CS 609 (3 credits) Advanced Software Engineering
- CS 610 (3 credits) Advanced Computer Architecture
- CS 611 (3 credits) Computer Security
- CS 612 (3 credits) Parallel and Distributed Computing
- CS 613 (3 credits) Computer Graphics
- CS 615 (3 credits) Machine Learning and Data Mining
- CS 645 (3 credits) Real-Time Embedded Systems
- CS 697 (1-3 credits) Directed Student Research
- CS 699 (1-9 credits) Thesis Preparation

§§2.4 Program Outcomes

Upon completion of the program, students will be able to:

1. Demonstrate an understanding of concepts of computer architecture, operating systems and programming.
2. Solve computing problems using mathematical principles, computational theory and algorithmic principles.
3. Given program specifications, implement well-designed and well-tested computer programs.
4. Demonstrate knowledge of current technologies, protocols, applications and tools for computing practice.

5. Communicate effectively to both users and practitioners of computing.
6. Work both collaboratively and independently on computing projects.

Based on these outcomes, we expect our graduates to have the skills necessary to succeed in today's world and the basic skills needed for lifelong learning to continue succeeding in tomorrow's world. At a more specific level, we would expect students to be able to compete successfully for more senior system administration and programming jobs.

§3. Program Need and Justification

§§3.1 Relationship to Institutional Goals/Objectives

At West Virginia State University, "Our mission is to meet higher education and economic development needs of the state and region through innovative teaching and applied research." (*WVSU Mission Statement*). As computer science is one of the engines of the new economy, a computer science program at WVSU will produce graduates well prepared to find employment and will attract companies looking for technologically skilled workers to the state.

Further evidence on the suitability of this program for WVSU may be found in the *West Virginia State University Vision 2020*. Goal II (p. 15):

Develop new and reconfigure existing academic programs to be responsive to student, stakeholder and community needs.

Strategy C under this goal states is "Expand Master of Science (MS) and/or Master of Arts (MA) offerings at the University with at least one in STEAM by 2020." (STEAM stands for Science, Technology, Engineering, Agriculture and Mathematics.)

A master's degree program in computer science undoubtedly contributes towards achieving this goal. Furthermore, as discussed below in *§§3.5*, computer science is one of the fastest growing employment areas in the country. Finally, computer science is emblematic of "high-tech industry."

§§3.2 Existing Programs

Only Marshall University and West Virginia University among the universities in West Virginia have a Master of Science in Computer Science degree program. It should be pointed out that, as the table below shows, the specific kind of computer science program WVSU plans to offer (as categorized by the CIP code), will be different from all other programs except those at West Virginia University. It should also be noted that many of the computer science programs at other institutions are actually Management Information System programs, an area more closely related to business administration than computer science.

Table 1: Baccalaureate Computer Science Programs in West Virginia

Institution	Institution Type	CIP Code(s)	Description
Marshall University	Public	11.0401	Information Systems
		11.1099	Technology Management
		11.0701	Computer Science
West Virginia University	Public	11.0903	Software Engineering
		11.0701	Computer Science

Special features of West Virginia State University that make it desirable for such a program are:

- WVSU is a historically black university, and, hence, has always had a mission to educate minorities and other underrepresented populations.
- WVSU is the largest undergraduate university in the Charleston metropolitan area and thus is conveniently located for computer professionals in the area who wish to continue their education.

§§2.3 Program Planning and Development

Formal development of this proposal began in fall 2016. The Intent to Plan was approved by the WVSU Board of Governors on March 6, 2017, and by HEPC Chancellor Paul L. Hill on April 20, 2017. Work on the actual proposal began in August 2017.

§§2.4 Clientele and Need

The expected clientele for this program will mainly come from graduates of the B.S. in Computer Science at WVSU, which includes;

- Minorities;
- Underrepresented populations;
- Non-traditional students,
- Students who are first in their families to attend college.

This will also include workers who want more advanced training in computer science.

The needs that will be met by this program may be broken down into *societal*, *occupational*, *educational* and *public service* needs. The societal needs met would include:

- providing an educated citizenry;
- preparing students to enter the workforce;
- providing continuing education or retraining to current workers;
- preparing people to deal with technological change caused by the continuing massive infusion of computing into society; and
- increasing economic development in the service area of WVSU by attracting companies looking for a well-educated, technologically-skilled workforce.

In regards to occupational needs, the *Occupational Outlook Handbook* from the U.S. Bureau of Labor Statistics states (Computer and Information Technology category):

> *Employment of computer and information technology occupations is projected to grow 12 percent from 2014 to 2024.*

Certain computer occupations are expected to grow even faster, such as software developers, for which jobs are expected to grow 17 percent from 2014 to 2024.

Furthermore, for the Computer and Information Technology category:

> *These occupations are expected to add about 488,500 new jobs, from about 3.9 million jobs to about 4.4 million jobs from 2014 to 2024, in part due to a greater emphasis on cloud computing, the collection and storage of big data, more everyday items becoming connected to the Internet in what is commonly referred to as the "Internet of Things," and the continued demand for mobile computing.*

This suggests the need for qualified computer professionals, which this program would produce.

Note that these jobs have a median salary of $82,860, which is higher than the median salary for all occupations.

The main research need expected to be met by this program would be to provide technical infrastructure support to the institutional land-grant activities.

Finally, the two main public service needs met by this program would be;

- Educating the citizens of West Virginia,
- Serving as a source of technical expertise.

It is difficult to estimate student demand for a program that does not exist, but anecdotal evidence from students currently working towards an undergraduate degree at WVSU suggests that many would be interested in continuing their studies at the graduate level to obtain a M.S. in Computer Science. A brief, informal survey of students and faculty/staff of WVSU was conducted. The actual data can be found in Table 2 below, but the significant results are that 100 percent of the computer science majors (B.S.) surveyed said they wished to continue on and earn a M.S. degree in Computer Science while 71 percent of the Applied Math Majors (B.S.) surveyed indicated they would like to pursue a M.S. degree in computer science. In addition, there is also demand for a M.S. degree in Computer Science from students in other majors and from faculty/staffs as well. As seen in in Table 2, 13 students from other majors and five faculty/staff members indicated that they wanted a M.S. degree in Computer Science. It is also noticed in Table 2 that among all people surveyed who want a M.S. degree in Computer Science, 69 percent prefer a traditional degree program while 31 percent prefer an online degree program.

Table 2: Survey of Students and Faculty/Staffs of WVSU

Major	Number Surveyed	Number Who Want a M.S. in Computer Science	Number Who Don't Want a M.S. in Computer Science	Number Who Prefer a Traditional Program	Number Who Prefer an online Program
Business – Management Information Systems (B.S.)	5	4	0	1	3
Computer Science (B.S.)	31	31	0	26	5
Mathematics – (B.S.)	7	5	1	5	0
Other major (B.S. or M.S.)	56	13	5	6	7
None of the above (Faculty/Staff included)	13	5	8	2	3
Total:	**112**	**58**	**14**	**40**	**18**

§§3.5 Employment Opportunities

Detailed figures on employment growth in computer science:

	2014	2024		
	Employment	Employment	Percent change	Employment change
Computer occupations	1,011.8	1,257.8	24.3	246.0
Computer and information research scientists	4.7	5.7	21.2	1.0
Computer and information analysts	177.7	237.4	33.6	59.7
Computer systems analysts	155.8	207.7	33.3	51.9
Information security analysts	21.9	29.7	35.7	7.8
Software developers and programmers	528.9	629.1	18.9	100.2
Computer programmers	126.1	99.3	-21.2	-26.8

Software developers, applications	243.6	318.8	30.9	75.3
Software developers, systems software	129.4	169.4	30.9	40.0
Web developers	29.8	41.5	39.4	11.7
Database and systems administrators and network architects	118.3	150.3	27.1	32.0
Database administrators	18.3	23.0	26.0	4.8
Network and computer systems administrators	62.5	81.9	30.9	19.3
Computer network architects	37.5	45.4	21.2	7.9
Computer support specialists	154.4	201.5	30.5	47.1
Computer user support specialists	118.7	158.2	33.3	39.5
Computer network support specialists	35.7	43.3	21.2	7.6
Computer occupations, all other	27.8	33.7	21.2	5.9

Source: Bureau of Labor Statistics, U.S. Department of Labor, *Occupational Outlook Handbook* (visited August 23, 2017).

A brief survey in August 2017 of job postings on the Internet suitable for graduates of this proposed program found listings for 15 jobs in the Charleston area and more than 1,000 listings nationwide.

§§3.6 Program Impact

We expect that mainly the B.S. in Computer Science will be affected by the proposed program, though there may also be some effect on the B.S. in Business Administration – Management Information Systems option.

The B.S. in Computer Science is a rapidly growing degree program at WVSU. The M.S. in Computer Science program would not negatively affect this program, since they draw from different populations, and may in fact aid it in recruiting by attracting students interested in both undergraduate and graduate level computer science and by allowing undergraduates to enroll in some of the graduate courses, increasing the course options for the B.S. in Computer Science.

§§4.7 Cooperative Arrangements

The initial cooperative arrangements would include sharing of equipment and computer labs and classrooms used by the B.S. in Computer Science at WVSU.

As the program develops, we would explore further opportunities for collaborative activities, such as:

- Encouraging students to participate in internships through WVSU's Cooperative Education Office.
- Creating a cooperative arrangement with WVU and/or Marshall University to increase the possible course offerings for our students by allowing them to take courses from faculty at those universities either by distance learning or on-site.

§§4.8 Alternatives to Program Development

No alternatives were considered.

§4. Program Implementation and Projected Resource Requirements

§§4.1 Program Administration

Initially, the program will have a director responsible for scheduling, assessment, program review, etc. and a Computer Science Graduate Committee responsible for admission to the program, oversight and approval of thesis research and the thesis itself, and program development.

§§4.2 Program Projections

See Appendix A, Form 1.

§§4.3 Faculty Instructional Requirements

Currently WVSU has one faculty member with a terminal degree in computer science. We would anticipate hiring one to two more such faculty as the program develops.

§§4.4 Library Resources and Instructional Materials

Given the need for students in a graduate program, particularly for those doing research, to have access to current developments in their discipline, the library holdings at WVSU related to computer science will need to be significantly increased. This will entail purchasing an institutional memberships in the Association for Computing Machinery and the IEEE Computer Society (these memberships will include subscriptions to these organizations' print and electronic journals), as well as acquiring up-to-date books and subscribing to other journals. However, we would not try to accomplish this all at once, but rather would try to build up the library to an accreditable level over several years. The acquisition of selected texts and membership in the ACM and the IEEE Computer Society would be an immediate goal. Subscription to other journals would wait until a second faculty member with a terminal degree in computer science was hired.

§§4.5 Support Service Requirements

We anticipate needing to convert an existing classroom to a computer lab/computer classroom to provide instructional space needed by the program.

§§4.6 Facilities Requirements

As noted in *§§4.5* an existing classroom will probably need to be renovated.

§§4.7 Operating Resource Requirements

See Appendix A, Form 2.

§§4.8 Source of Operating Resources

The source for most the projected operating resources needed for this program will be the re-allocation of current institutional resources. In particular, we expect current faculty to be used for teaching and administration of the program during its first three years, with a new faculty person added in the fourth year. Expenses such as repairs and equipment that we have assumed the program will immediately have are actually an accounting division of expenses currently borne by the Mathematics Department.

Additional funds will be needed as the program grows for library resources (see *§§4.4* above) and computer hardware and software. The funds for these items will probably come out of Title III grants, though some of the software will be available under WVSU's site license for Microsoft products at no additional cost and free software will be used when appropriate.

§5. Program Evaluation

§§5.1 Evaluation Procedures

In a technical program such as computer science, assessment occurs continuously, based on how students perform. However, for purposes of data collection, some specific assessment mechanisms will be used:

1. An initial assessment test (to be written by program faculty) will be administered to all students in one of the core classes. This will provide the program with data on incoming students abilities.

2. All students will create a portfolio of their important projects and other materials as they progress through the program, to be submitted to the Computer Science Graduate Committee upon completion. Rubrics will be developed for scoring this portfolio for assessment purposes.

3. Students pursuing the thesis option of this program will, of course, submit and defend a research thesis as part of their graduation requirements. Rubrics will be developed for scoring this thesis for assessment purposes.

4. This program will be part of the standard review process for programs at West Virginia State University. As part of this process, quantitative data on majors, graduates, courses taught, etc. will be generated and recorded.

§§5.2 Accreditation Status

The standard accrediting agency for computer science programs is the Accreditation Board for Engineering and Technology, Inc., 111 Market Place, Suite 1050, Baltimore, MD 21202. However, this agency is primarily concerned with accrediting undergraduate programs in engineering and technology. Hence, specialized outside accreditation of this program will not be available, though it will fall under WVSU's general accreditation by the Higher Learning Commission.

Appendix A

Title 133, Form 1:

Five Year Projection of Program Size

	First Year (2018)	Second Year (2019)	Third Year (2020)	Fourth Year (2021)	Fifth Year (2022)
Number of Students Served through Course Offerings of the Program:					
Headcount	6	16	23	30	30
FTE	5	15	21	28	28
Number of student credit hours generated by courses within the program (entire academic year)	90	270	378	504	504
Number of Majors:					
Headcount	6	16	22	27	27
FTE majors	5	15	20	25	25
Number of student credit hours generated by majors in the program (entire academic year):	90	270	360	450	450
Number of degrees to be granted (annual total):	0	3	10	12	17

Method for predicting the numbers:

Number of Students Served Through Course Offerings of the Program

Headcount: The figure for 2018 is based on the survey data of current WVSU students (see Table 2, *supra).* For the following years, we assume that the program attracts an additional 1-5 students each year to the courses.

FTE: Assumed to be headcount minus one or two students.
Number of student credit hours: Each computer science course is three credit hours, full-time is 9 credit hours per semester, so this figure is 18 times FTE.

Number of Majors
Headcount: The figure for 2018 is based on the survey data of current WVSU students (see Table 2, *supra).* For the following years, we assume that the program attracts an additional one to five students each year to the courses.
FTE Majors: Again, assumed to be headcount minus one or two students.
Number of student credit hours: Again, 18 times FTE.
Number of degrees granted: For 2018 (the first year of the program), we assume no student has completed the two-year program, so there are no graduates. For the second year, we conservatively assume one student has completed the program. Thereafter, we assume the program continues growing and by the fifth year, increased enrollment in the program leads to eight students graduating.

Title 133, Form 2:

Five Year Projection of
Total Operating Resources Requirements

	First Year (2018)	Second Year (2019)	Third Year (2020)	Fourth Year (2021)	Fifth Year (2022)
A. **FTE Positions**					
1. Administrators	0	0	0.25	0.25	0.25
2. Full-time Faculty	1	1	1.75	1.75	1.75
3. Adjunct Faculty	0	0	0	0	0
4. Graduate Assistants	0	0	2	4	4
5. Other Personnel:					
a. Clerical Workers	0	0	0	0	0
b. Professionals	0	0	0	0	0
Note: Includes percentage of time of current personnel					
B. **Operating Costs** (Appropriated Funds Only)					
1. Personnel Services:					
a. Administrators	0	0	20,000	20,000	20,000
b. Full-time Faculty	80,000	80,000	140,000	140,000	140,000
c. Adjunct Faculty	0	0	0	0	0
d. Graduate Assistants	0	0	5000	10,000	10,000
e. Non-Academic Personnel					
Clerical Workers	0	0	0	0	0
Professionals	0	0	0	0	0
Total Salaries	80,000	80,000	165,000	170,000	170,000
2. Current Expenses	0	0	0	500	500
3. Repairs and Alterations	500	500	500	500	500
4. Equipment:					
Educational Equipment	1,000	1,000	1,000	1,000	1,000
Library Books	2,000	2,000	2,000	2,000	2,000
5. Nonrecurring Expense (specify)	1,000	1,000	1,000	1,000	1,000
Total Costs	84,500	84,500	169,500	175,000	175,000

Five Year Projection of
Total Operating Resources Requirements

	First Year (2018)	Second Year (2019)	Third Year (2020)	Fourth Year (2021)	Fifth Year (2022)
C. **Sources**					
1. General Fund Appropriations (Appropriated Funds Only)	81,500	81,500	81,500	81,500	81,500
_X_ Reallocation _____ New funds					
2. Federal Government (Non-appropriated Funds Only)	3,000	3,000	88,000	93,500	93,500
3. Private and Other (specify)	0	0	0	0	0
Total All Sources	84,500	84,500	169,500	175,000	175,000

Method for predicting the numbers:

FTE Positions

Administrators: We assumed the current math chair and CS program director will do the administrative work for the program for the first three years, then in fourth year a faculty person will be hired with an appropriate terminal degree in computer science who will take over the administrative duties for the master's degree program, which will take approximately 25 percent of his/her time.

Full-time faculty: We assumed that for the first two years that the current full-time CS faculty member will teach graduate computer. In the fourth year the new faculty member mentioned above will spend 50 percent of the time teaching graduate computer courses.

Adjunct faculty: We assumed that no adjunct faculty will be used by the program.

Graduate assistants: We assumed that no graduate assistants will be used for graduate CS courses, but will be used for undergraduate courses.

Other personnel: We assumed that clerical support will be provided by the Mathematics & Computer Science Department.

Operating Costs

Personnel Services: We assumed the annual cost (salary and benefits) to be $80,000 for a full-time faculty member.

Current expenses: Since current faculty are being used for first three years, there will be no added expenses. In the fourth year with a new faculty member, we assume extra expense for office supplies, etc.

Repairs and Alterations: The program will assume its share of these expenses immediately.

*Educational Equipmen*t: The program will assume its share of these expenses immediately.
Library Books: We assume the standard WVSU book acquisition budget for programs of approximately $1,000 per year plus an extra $1,000 per year to upgrade the library to an accreditable level.
Nonrecurring Expenses: The program will assume its share of these expenses immediately.

Sources
We assume the expenses for Educational Equipment, nonrecurring expenses and one-half of the library books will be paid out of Title III funds, while the other expenses will be paid by re-allocating current funds, the reasoning being that in the first three years, current faculty are used while in the fourth year a new computer science faculty person is hired as a new position.

Appendix B

New Course Descriptions

- CS 505 (2 credits) Library Research
  Extensive library research techniques in a particular Computer Science area. Staff assigns a topic and supervises the project. A maximum of two credits of CS 505 may be counted toward a Master's in Computer Science.

- CS 510 (3 credits) Advanced Operating Systems
  Advanced topics in operating systems, such as: multi-tasking, synchronization mechanisms, distributed system architecture, client-server models, distributed mutual exclusion and concurrency control, agreement protocols, load balancing, failure recovery, fault tolerance, cryptography, multiprocessor operating systems.

- CS 515 (3 credits) Theory of Computation
  Finite automata theory, including determinism vs. nondeterminism, regular expressions, non-regular languages, and algorithms for finite automata. Context free languages including grammars, parsing, and properties. Turing machines and their functions. Undecidability. Computational complexity, including the classes P and NP.

- CS 530 (3 credits) Advanced Database Management Systems
  Transaction management; query processing and optimization; organization of database systems, advanced indexing, multi-dimensional data, similarity-based analysis, performance evaluation, new database applications.

- CS 540 (3 credits) Network Programming
  Socket and client-server programming, remote procedure calls, data compression standards and techniques, real-time protocols (e.g: chat, etc, web-related programming (CGI, Java/Java Script, HTTP, etc.,) network management (SNMP-based management, dynamic/CORBA-based management).

- CS 597 (1-3 credits) Internship
  Participation in private corporations, public agencies or non-profit institutions. Students will be required to have a faculty coordinator as well as a contact in the outside organization, to participate with them in regular consultations on the project, and to submit a final report to both. On completion of internship, the outside contact should provide the faculty coordinator with a letter evaluating student's performance during the internship period. At most three credits can be accepted towards the M.S. degree.

- CS 599 (1-4 credits) Special Topics

An in-depth study of special topics proposed by members of the Computer Science graduate faculty. Open to graduate students.

- CS 605 (3 credits) Analysis of Algorithms
  Techniques for designing efficient algorithms, including choice of data structures, recursion, branch and bound, divide and conquer, and dynamic programming. Complexity analysis of searching, sorting, matrix multiplication, and graph algorithms. Standard NP-complete problems and polynomial transformation techniques.

- CS 609 (3 credits) Advanced Software Engineering
  Advanced design methods including formal methods, component-based design, design with patterns and frameworks, and architectural-based designs. Modern software processes such as Extreme Programming and Cleanroom software development. Issues and problems associated with large-scale software project failures and techniques for preventing them.

- CS 610 (3 credits) Advanced Computer Architecture
  Design methodology; processor design; computer arithmetic: algorithms for addition, multiplication, floating point arithmetic; microprogrammed control; memory organization; introduction to parallel architectures.

- CS 611 (3 credits) Computer Security
  Principles and practice of Computer Network Security. Cryptography, authentication protocols, public key infrastructures, IP/www/E-commerce security, firewalls, VPN, and intrusion detection.

- CS 612 (3 credits) Parallel and Distributed Computing
  General concepts in the design and implementation of parallel and distributed systems, covering all the major branches such as Cloud Computing, Grid Computing, Cluster Computing, Supercomputing, and Many-core Computing.

- CS 613 (3 credits) Computer Graphics
  Graphics hardware; graphics primitives; two-dimensional and three-dimensional viewing; basic modeling, input and display devices, data structures, architectures, primitives, and geometrical transformations appropriate to computer graphics.

- CS 615 (3 credits) Machine Learning and Data Mining
  Fundamentals of machine learning including rote learning, learning from examples, learning from observations, and learning by analogy; knowledge acquisition for expert systems. Information processing techniques and mathematical tools to assemble, access, and analyze data for decision support and knowledge discovery.

- CS 645 (3 credits) Real-Time Embedded Systems

An overview of the unique concepts and techniques needed to design and implement computer systems having real-time response requirements in an embedded environment. It contrasts the concepts and techniques of real time and embedded systems with those of more traditional computer systems. Topics include: Basic concepts of real time and embedded systems, hardware features, programming languages, real time operating systems, synchronization techniques, performance optimization and current trends in real time and embedded systems such as incorporating internet connectivity.

- CS 697 (1-3 credits) Directed Student Research
  An independent research topic designed by the student with the assistance of a graduate faculty advisor who supervises the project. The topic should be acceptable to the advisor and the chair. Limited to specific problems in the Computer Science field. A maximum of three credits of CS 697 may be counted toward a Master's in Computer Science. Variable contact hours.

- CS 699 (1-9 credits) Thesis Preparation
  An independent research project designed by the student with assistance from the Thesis advisor and acceptable to the Thesis committee. Variable contact hours. Course is graded pass/fail only.

WEST VIRGINIA STATE UNIVERSITY

APPROVAL TO ADD A NEW OPTION/CONCENTRATION TO EXISTING BACHELOR OF SCIENCE IN ENGINEERING PROGRAM

SEPTEMBER 2017

Checklist

6.1. The cover page should include the following:
- Name of Institution
- Date
- Category of Action Required
- Title of Degree or Certificate
- Location
- Effective Date of Proposed Action
- Brief Summary Statement

6.2. Program Description
- 6.2.a. Program Objectives
- 6.2.b. Program Identification
- 6.2.c. Program Features
  - 6.2.c.1. Admissions and Performance Standards
  - 6.2.c.2. Program Requirements
- 6.2.d. Program Outcomes
- 6.2.e. Program Content
  - 6.2.e.1. The content and length of the proposed academic program
  - 6.2.e.2. A coherent general education component
  - 6.2.e.3. The minimum requirement for general education

6.3. Program Need and Justification
- 6.3.a. Relationship to Institutional Goals/Objectives
- 6.3.b. Existing Programs
- 6.3.c. Program Planning and Development
- 6.3.d. Clientele and Need
- 6.3.e. Employment Opportunities
- 6.3.f. Program Impact
- 6.3.g. Cooperative Arrangements
- 6.3.h. Alternatives to Program Development

6.4. Program Implementation and Projected Resource Requirements
- 6.4.a. Program Administration
- 6.4.b. Program Projections
- 6.4.c. Faculty Instructional Requirements
- 6.4.d. Library Resources and Instructional Materials
- 6.4.e. Support Service Requirements
- 6.4.f. Facilities Requirements
- 6.4.g. Operating Resource Requirements
- 6.4.h. Source of Operating Resources

6.5. Program Evaluation
- 6.5.a. Evaluation Procedures
- 6.5.b. Accreditation Status

Full Proposal (§133-11-6)

6.1. Coverletter (§133-11-6.1)

Name of Institution: West Virginia State University (WVSU)

Date: September 2017

Category of Action Required: Approval to add a New Option/Concentration to existing Bachelor of Science in Engineering Program

Title of Degree or Certificate: Bachelor of Science in Engineering (BSE)

Location: Institute, West Virginia

Proposed Implementation Date: Spring 2018

Brief Summary Statement:
West Virginia State University is proposing the addition of a new option/concentration (Civil Engineering) to its existing, approved Bachelor of Science in Engineering (BSE) Program. The program aligns with the objectives of the institution in providing student-centered instruction and to prepare students to meet the engineering needs of the Kanawha Valley, the state and the nation, as well as to prepare them for future graduate study. In addition, it supports the land-grant mission of the University to meet the higher educational and economic development needs of the state and region through innovative teaching and applied research. A curriculum summary sheet for the proposed program is included in Appendix IV. Graduates of the proposed Civil Engineering option/concentration will complete in 127 hours. The degree contains University-required general education courses, college level mathematics and basic science courses, courses in engineering topics and civil engineering emphasis courses. All appropriate committees within the institution have approved the proposed program. The proposed new program will require minimal additional resources. The program complies with the Engineering Accreditation Committee (EAC) of the ABET, Inc., which is the principally recognized accrediting body for undergraduate engineering degrees.

6.2. Program Description

a) Program Objectives (§133-11-6.2.a)

The primary objectives of the proposed Bachelor of Science in Engineering (BSE) program are as follows:

(1) Emphasize the fundamental applied roots of engineering with a heavy emphasis on practical/experiential/hands-on learning;

(2) Produce graduates that are experts at planning, design, construction or operation of engineering systems, solving problems and bringing proper insights to design and research teams;

(3) Produce graduates that are proficient in the use of 21st Century design, analysis and measurement tools and software;

(4) Produce graduates with soft-skills, including; (a) professionalism, (b) communications, (c) team building, (d) societal, global and ethical awareness, and (e) dedicated continuous learners that companies require of 21st Century Engineers;

(5) Provide professional service to the state, the region and the nation.

Based upon national accreditation (EAC of ABET) criteria and faculty review committee, 11 Program Level Outcomes (PLO) have been established in section D [Program Outcomes (§133-11-6.2.d)] of this report. The outcomes are denoted by letters a, b, c, d, e, f, g, h, i, j, and k. Table 1 shows where these outcomes will be taught and how those will be assessed.

Table 1: Program Objectives and Assessment

Course Number and Title	PLO Assessed	PLO Measure
ENGR 101: Engineering Problem Solving I	d,h,f,c,k,g,b	Exam, Report, Presentation
ENGR 102: Engineering Problem Solving II	k,e,a	Exam, Report
ENGR 241: Statics	a,e	Exam, HW
ENGR 243: Mechanics of Materials	a,e	Exam, HW
*ENGR 2xx: Engineering graphics/CAD	c,g,k	Report, Lab, Exam
*ENGR 3xx: Thermodynamics	a, e, k	Exam, Report, Lab
*ENGR 2xx: Dynamics	a,e	Exam, HW
*ENGR 4xx: Senior Design Projects	d,e,g,h,i,k	Report, Presentation
*ENGR 3xx: Fluid Mechanics	a,e,k,b	Exam, Report, Lab
*CE 2xx: Surveying	a,i,k,e	Report, Lab, Exam
*CE 3xx: Civil Engineering Materials	a,c,k,b,d	Exam, Report, Lab
*CE 3xx: Structural Analysis I	a,e,g,b	Exam, HW
*CE 3xx: Intro to Geotechnical Engineering	b,e,g	Exam, Lab, Report
*CE 3xx: Intro to Environmental Engineering	b,h,j	Exam, Report
*CE 3xx: Intro to Transportation Engineering	a,c,e,g	Exam, HW
*CE 4xx: Steel Design	a,c,e,g,i	Exam, HW
*CE 4xx: Reinforced Concrete Design	c,i	Exam, HW
*CE 4xx: Environmental Engineering Design	a,c,e,k,j	Exam, Report, HW
*CE 4xx: Pavement Design	j,a,e,c,k	Exam, HW
*CE 4xx: Construction Method	a,e,g,j,k	Exam, HW

*New courses are identified with asterisks

b) Program Identification (§133-11-6.2.b)
The proposed CIP code for this degree is 14.0101 –Engineering, General: "A program that generally prepares individuals to apply mathematical and scientific principles to solve a wide variety of practical problems in industry, social organization, public works, and commerce. Includes instruction in undifferentiated and individualized programs in engineering." (Source: National Center for Education Statistics, U.S. Department of Education, Classification of Instructional Programs (CIP 2010), on the Internet at https://nces.ed.gov/ipeds/cipcode/cipdetail.aspx?y=55&cipid=88198 (visited May 25, 2017).)

C) Program Features (§133-11-6.2.c)

c.1) Admission and Performance Standards (§133-11-6.2.c.1)
West Virginia State University is committed to implementing the highest-quality BSE with a major in Civil Engineering program possible. There will be no provisional admission to the BSE program for any student. All students entering the program will have a minimum cumulative high school GPA of 2.0 and appropriate ACT or SAT scores.

Admission Standards
The WVSU BSE program will be committed to admitting students on a competitive basis. The applicants will be evaluated according to the following rubric:

1. Academic Record
    a. High School GPA – a minimum overall 2.0 on 4.0 point scale
        i. Acceptable previous work from an accredited college or university
    b. Appropriate ACT or SAT scores
    c. Successful TOEFL scores for those whose native language is not English

Performance Standards
To receive this degree, the student must satisfy the standard college requirements for graduation (Source: West Virginia State University *2016-2017 Catalog*):

1. A cummulative grade point average of 2.0 (i.e., a C average) on all work attempted with the exception of developmental courses and courses with grades of P, K, W, and AUD.
2. A cummulative grade point average of 2.0 in major courses.
3. Completion of the total number of hours required in the curriculum elected.
4. The necessary residence requirement for a degree.
5. Payment of all outstanding financial obligations to the University.

The relationship between the admission standards and the performance standards are essential to the program objectives. We are confident that those potential students that do not meet the admissions standards will not be able to successfully fulfill the five (5) categorical components of the program objectives. Moreover, those persons that cannot do the aforementioned will not successfully perform to the standards required by the WVSU BSE with a major in Civil Engineering.

c.2) Program Requirements (§133-11-6.2c.2)

The coursework will be divided into four distinct areas — University-required general education courses, college level mathematics and basic science courses, courses in engineering topics, and civil engineering emphasis courses. Each stream will begin with foundational courses and progress to more advanced courses, each meant to impart necessary content and skills that will make student success possible in later courses.

The WVSU BSE degree will consist of 127 credit hours of required courses. Transfer students may import credits to WVSU based upon the West Virginia Higher Education Policy Commission's Transfer Agreement, as well as the discretion of the engineering faculty.

In addition, the students will develop a Senior Design Project during their final year. Moreover, they will create a portfolio that presents their professional work. The intent is the portfolio to be a resource of the student's achievements that they can utilize in obtaining employment.

D) Program Outcomes (§133-11-6.2.d)

Based upon national accreditation (EAC of ABET) criteria, faculty committee review, the expected outcomes are:

a. an ability to apply knowledge of mathematics, science and engineering
b. an ability to design and conduct experiments, as well as to analyze and interpret data
c. an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability
d. an ability to function on multidisciplinary teams
e. an ability to identify, formulate and solve engineering problems
f. an understanding of professional and ethical responsibility
g. an ability to communicate effectively
h. the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental and societal context
i. a recognition of the need for, and an ability to engage in life-long learning
j. a knowledge of contemporary issues
k. an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

E) Program Content (§133-11-6.2.e)

The development of the WVSU Bachelor of Science in Engineering with a major in Civil Engineering is in keeping with the West Virginia State University mission to meet the higher education and economic development needs of the state and region through innovative teaching and applied research. (http://www.wvstateu.edu/About/WVSU-At-A-Glance.aspx)

e.1) Program Content (§133-11-6.2.e.1)

The B.S. in Engineering with a major in Civil Engineering program will follow the common practice of institutions and require eight semesters (four fall and four spring) provided in Table 2. Students will complete a total of 127 credit hours.

Course requirements for each categories are shown below (new courses are identified with asterisks):

MATHEMATICS AND BASIC SCIENCES

MATH 206	Calculus I	4
CHEM 105/107	General Chemistry I	5
MATH 207	Calculus II	4
PHYS 231/203	Physics for Science & Engineers I	5
MATH 208	Calculus III	4
MATH 415	Differential Equations for Scientists & Engineers	4
PHYS 232/204	Physics for Science & Engineers II	5
*MATH 215	Probability and Statistics (for Engineers)	3
BIOL 120	Fundamentals of Biology	4
TOTAL MATHEMATICS AND BASIC SCIENCES		38

ENGINEERING

ENGR 101	Intro to Problem Solving I	2
ENGR 102	Intro to Problem Solving II	3
ENGR 241	Statics	3
ENGR 243	Mechanics of Materials	3
ECON 202	Principles of Microeconomics	3
*ENGR 210	Engineering Graphics/CAD	2
*ENGR 321	Fluid Mechanics	3
*ENGR 322	Fluid Mechanics lab	1
*ENGR 242	Dynamics	3
*ENGR 320	Thermodynamics	3
*ENGR 479	Senior Design Projects	3
TOTAL ENGINEERING		29

CIVIL EMPHASIS

*CE	2xx	Surveying	3
*CE	3xx	Civil Engineering Materials	3
*CE	3xx	Structural Analysis I	4
*CE	3xx	Intro to Geotechnical Engineering	4
*CE	3xx	Intro to Environmental Engineering	4
*CE	3xx	Intro to Transportation Engineering	4
*CE	4xx	CE Design Elective	3
*CE	4xx	CE Design Elective	3
*CE	4xx	CE Open Elective	3
*CE	4xx	CE Open Elective	3
TOTAL CIVIL EMPHASIS			34

CE Design Electives:
CE 4xx – Pavement Design
CE 4xx – Environmental Engineering Design
CE 4xx – Foundation Engineering
CE 4xx – Reinforced Concrete Design

CE 4xx – Steel Design
Or approved by Department Coordinator/Chair

CE Open Electives:
CE Design Electives
CE 4xx – Construction Engineering
CE 4xx – Structural Analysis 2
CE 4xx – Independent Study
CE 4xx – Research
CE 4xx – Construction Methods
Or approved by Department Coordinator/Chair

The following chart (Table 2) provides the BSE with a major in Civil Engineering Curriculum Sheet.

Table 2: BSE with a major in Civil Engineering Curriculum Sheet

BSE with a major in Civil Engineering Curriculum Sheet
West Virginia State University

1st year Fall		cr. Hr.
MATH 206	Calculus I[1]	4
ENGR 101	Intro to Engineering I	2
G ED 101	Freshman Experience	3
CHEM 105/107	General Chemistry I[2]	5
Tier I: B	Written Communication I	3
		17

[1] Tier I: E (Mathematics)
[2] Tier I: F (Scientific Reasoning)
Tier I: B - ENGL 101, ENGL 101E, ENGL 101H

1st year Spring		cr. Hr.
MATH 207	Calculus II	4
ENGR 102	Intro to Engineering II	3
PHSY 231/203	Physics for scientists and engineers I[3]	5
*ENGR 2xx	Engineering graphics/CAD	2
Tier I: C	Written Communication II	3
		17

[3] Tier II: E (Natural Science)
Tier I: C - ENGL 102, ENGL 102H, ENGL 112

2nd year Fall		cr. Hr.
MATH 208	Calculus III	4
PHYS 232/204	Physics for Scientists and Engineers II	5
ENGR 241	Statics	3
BIOL 120	Fundamentals of Biology	4
		16

2nd year Spring		cr. Hr.
MATH 415	Differential Equation for Scientists and Engineers	4
ENGR 243	Mechanics of Materials	3
*ENGR 3xx/3xx	Fluid Mechanics	4
*CE 2xx	Surveying	3
*CE 3xx	Civil Engineering Materials	3
	To	**17**

3rd year Fall		cr. Hr.
*CE 3xx	Structural Analysis I	4
*MATH 2xx	Probablility & Statistics for engineers	3
*ENGR 3xx	Thermodynamics	3
*CE 3xx	Intro to Geotechnical Engineering	4
*CE 3xx	Intro to Environmental Engineering	4
		18

3rd year Spring		cr. Hr.
*CE 3xx	Intro to Transportation Engineering	4
*CE 4xx	CE Design Elective	3
*ENGR 2xx	Dynamics	3
*CE 4xx	CE Design Elective	3
		13

4th year Fall		cr. Hr.
*CE 4xx	CE Open Elective	3
Tier II: G	Wellness	2
ECON 202	Principles of Microeconomics[4]	3
*CE 4xx	CE Open Elective	3
Tier I: D	Oral Communication	3
		14

Tier I: D - COMM 100, ENGL 201
Tier II: G - HHP 122, HHP 157, HHP 157H, HHP 242
[4] Tier II: F - Social Science
Tier II: A - ART 101, ART 101H, COMM 170, MUSIC 107
Tier II: D - HIST 201, HIST 201H, HIST 202, HIST 207, HIST 208
Tier II: B - ART 100, COMM 140, COMM 140H, ENGL 150, ENGL 150H, MUSC 104
Tier II: C - COMM
*new courses are identified with asterisks

4th year Spring		cr. Hr.
*ENGR 4xx	Senior Design Projects	3
Tier II: D	History	3
Tier II: A	Arts	3
Tier II: B	Humanities	3
Tier II: C	International Perspectives	3
		15

CE Design Electives:
CE 4xx – Pavement Design
CE 4xx – Environmental Engineering Design
CE 4xx – Foundation Engineering
CE 4xx – Reinforced Concrete Design
CE 4xx – Steel Design
Or approved by Department Coordinator/Chair

CE Open Electives:
CE Design Electives
CE 4xx – Construction Engineering
CE 4xx – Structural Analysis 2
CE 4xx – Independent Study
CE 4xx – Research
CE 4xx – Construction Methods

Total Credit hour for graduation = 127

e.2) *Program Content (**§133-11-6.2.e.2**) All proposed undergraduate degree programs shall include a coherent general education component that is consistent with the institution's mission and appropriate to its educational programs. The undergraduate general education component shall be documented.*

The BSE with a major in Civil Engineering curriculum contains a General Education component that is in keeping with the current West Virginia State University curriculum for all undergraduate degrees and is in accordance with the HEPC policy (**§133-11-6.2.e.2**). The full General Education requirements are provided below:

GENRAL EDUCATION CURRICULUM
Tier I: A. First Year Experience (3 cr.)
Tier I: B. Written Communication I (3 cr.)
One of the following: ENGL 101, ENGL 101E, ENGL 101H
Tier I: C. Written Communication II (3 cr.)
One of the following: ENGL 102, ENGL 102H, ENGL 112
Tier I: D. Oral Communication (3 cr.)
One of the following: COMM 100, ENGL 201
Tier I: E. Mathematics (3 cr.)
MATH 206 – Cal I (4 cr.)
Tier I: F. Scientific Reasoning (3-4 cr.)
One of the following: BIOL 101, BIOL 101H, BIOL 108, BIOL 110, BIOL 120, CHEM 100, CHEM 100H, PHYS 101, PHYS 102, PHYS 103, PHYS 106, PHYS 107, PHYS 110, PHYS 111, PHYS 120/121
OR, CHEM 105
Tier II: A. Arts (3 cr.)
One of the following: ART 101, ART 101H, COMM 170, MUSIC 107
Tier II: B. Humanities (3 cr.)
One of the following: ART 100, COMM 140, COMM 140H, ENGL 150, ENGL 150H, MUSC 104
Tier II: C. International Perspectives (3 cr.)
One of the following: COMM 446, INTS 210, INTS 250, ENGL 350, ENGL 351, ENGL 440, FREN 101, FREN 102, FREN 205, FREN 443, GERM 101, GERM 102, SPAN 101, SPAN 102, SPAN 205, POSC 210, POSC 415, PHIL 308, EDUC 319, EDUC 321

Tier II: D. History (3 cr.)
One of the following: HIST 201, HIST 201H, HIST 202, HIST 207, HIST 208
Tier II: E. Natural Science (3-4 cr.)
One of the following: BIOL 101, BIOL 101H, BIOL 108, BIOL 110, BIOL 120, CHEM 100, CHEM 100H, PHYS 101, PHYS 102, PHYS 103, PHYS 106, PHYS 107, PHYS 110, PHYS 111, PHYS 120/121
OR, PHYS 231
Tier II: F. Social Science (3 cr.)
One of the following: BA 210, BA 312, ECON 101, POSC 100, POSC 101, POSC 101H, PYSC 151, SOC 101, SOC 305, EDUC 201
OR, ECON 202
Tier II: G. Wellness (2 cr.)
One of the following: HHP 122, HHP 157, HHP 157H, HHP 242

e.3) Program Content (**§133-11-6.2.e.3**) *The minimum requirement for general education for all undergraduate programs delivered through the traditional distributed curricula is 24 for transfer associate's degrees, and 30 for bachelor's degrees. If the general education component is delivered through integrated, embedded, interdisciplinary, or other accepted models, institutions*

must demonstrate that the program meets minimum requirements equivalent to the distributed model.

The General Education curriculum for the BSE with a major in Civil Engineering program is in keeping with current practices at West Virginia State University.

6.3. Program Need and Justification

a) Relationship to Institutional Goals/Objectives (§133-11-6.3a)

The Mission of WVSU reads "West Virginia State University will meet the higher education and economic development needs of the state and region through innovative teaching and applied research." As civil engineering is one of the main engines of the economy, a civil engineering program at WVSU will produce graduates well prepared for the needs of the state and the region.

Special features of West Virginia State University that make it suitable for such a program are: First, WVSU is a historically black college, and, hence, has always had a mission to educate minorities and other underrepresented populations. Second, WVSU was established as a land-grant institution on March 17, 1891, under the Second Morrill Act of 1890. As a land-grant University, WVSU is charged with providing educational opportunities for students, citizens and the surrounding communities via its tripartite mission of research, teaching and outreach. Third, the University, "a living laboratory of human relations," is a community of students, staff and faculty committed to academic growth, service and preservation of the racial and cultural diversity of the institution. Fourth, WVSU offers flexible course schedules in traditional classrooms and online to facilitate financially challenged students to continue their study concurrently with their job.

b) Existing Programs (§133-11-6.3b)

Table 3 summarizes the baccalaureate program available in the state of West Virginia. Bluefield State College and Fairmont State University offer Civil Engineering Technology/Technician type programs as can be seen from the CIP code. Marshall University offers a B.S. in Engineering degree (CIP code 14.0101) with a Civil concentration. West Virginia University (and its branch campus WVU Institute of Technology) offers a B.S. in Civil Engineering program with the CIP code 14.0801. As a research university, WVU is able to be extremely selective in its enrollment, drawing from not only from the best and brightest of the state's applicants but also from national and international applicants. According to HEPC, only 49 percent of the students of WVU are in-state. As Tables 4 and 5 indicates, Kanawha Valley's students' eagerness to stay close to the Charleston area, a .B.S in Engineering program (CIP code 14.0101) with a major in Civil Engineering at West Virginia State University will serve the need of the students. In addition, the curriculum will be designed with an emphasis on practical/experimental/hands-on learning.

Table 3: Baccalaureate Programs in West Virginia

Institution	Institution Type	CIP Code(s)	Program Type
Bluefield State College	Public	15.0201	Civil Engineering Technology/Technician
Fairmont State University	Public	15.0201	Civil Engineering Technology/Technician
Marshall University	Public	14.0101	BS in Engineering (Civil Contentration)
WVU Institute of Technology	Public	15.0000	Engineering Technology/Technician
		14.0801	BS in Civil Engineering
West Virginia University	Public	14.0801	BS in Civil Engineering

c) Program Planning and Development (§133-11-6.3c)

Formal development of this proposal began in summer 2015. In a series of meetings, faculty from the 2+2 Engineering program, Computer Science program, Physics and Mathematics program first developed an Intent to Plan (approved by the WVSU Board of Governors on March 16, 2017) and submitted to Chancellor Paul Hill's office immediately. Chancellor Hill sent a letter dated April 20, 2017 indicating approval for the Bachelor of Science in Engineering with a major in Chemical Engineering program to begin constructing the Full Proposal Plan for BSE program. This letter can be found in the Appendix III. After BOG approval, WVSU submitted the full proposal to HEPC in June 2017. On Aug. 11, 2017, the Higher Education Policy Commission unanimously approved the Bachelor of Science in Engineering program. The approval letter can be found in Appendix III.

Planning activities for this proposal actually date back to the year 2013 with the development of a 2+2 Engineering program at WVSU.

Significant resources have already been invested in this program. Two engineering faculty were hired. Around $50,000 in equipment was purchased to set up two engineering lab. Engineering software was purchased to teach the current engineering course work and for future course work once the full program gets approved. And a significant amount of time has been invested in creation of this program.

d) Clientele and Need (§133-11-6.3d)

The expected clientele for this program will mainly come from the usual student body of WVSU, which includes;

- Minorities,
- Underrepresented populations,
- Non-traditional students,
- First generation college students (Students who are first in their families to attend college),

but will also include workers who want more advanced training in engineering.

The needs that will be met by this program may be broken down into *societal, occupational, educational* and *public service* needs.

The societal needs met would include:

- providing an educated citizenry;
- preparing students to enter the workforce;
- providing continuing education or retraining to current workers;
- increasing economic development in the service area of WVSU by attracting companies looking for a well-educated, technologically-skilled workforce.

Occupational Needs:

The Kanawha Valley is the economic hub of the state of West Virginia. Economic development and sustainability of any state directly connected to Civil Engineering. Civil engineers design, construct, supervise, operate and maintain large construction projects and systems, including roads, buildings, airports, tunnels, dams, bridges and systems for water supply and sewage treatment. An adequate supply of engineers is critical to the goal of fostering a statewide environment that nurtures high-tech industries. A review of U.S. Census records will reveal that the more engineers working in a state, the wealthier the state. Additionally, there is a strong and positive correlation between the number of engineers working in a state and the number of engineering schools located in the state. According to Bureau of Labor Statistics, U.S. Department of Labor[1], employment of civil engineers is projected to grow 8 percent from 2014 to 2024, much faster than the average for all occupations (Figure 1). As infrastructure continues to age, civil engineers will be needed to meet the needs of the state and the nation. The addition of a Civil Engineering option/concentration to the existing BSE program at WVSU will attract students of the state to serve the needs of its own.

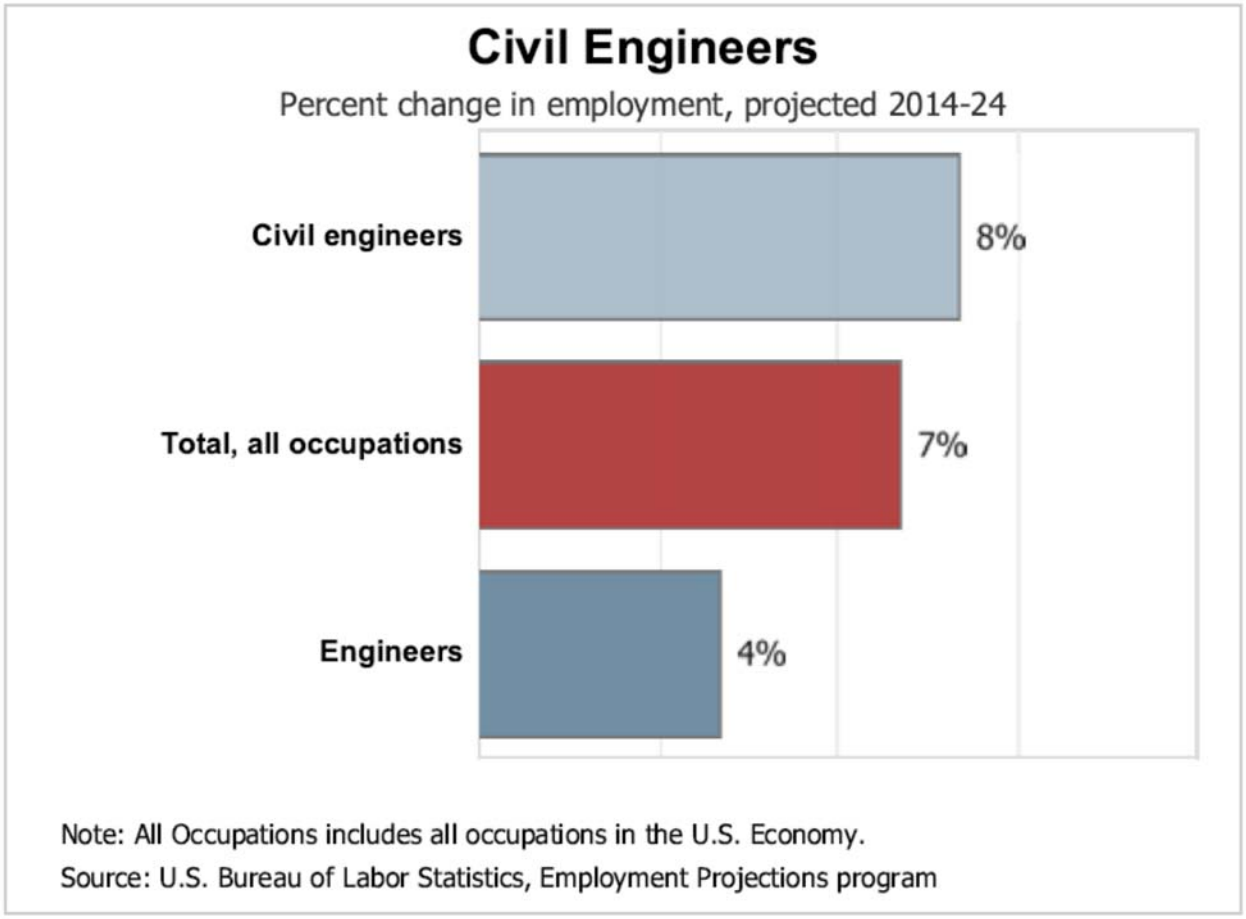

Figure 1: Projected growth of job according to US Department of Labor (2017)

[1]Bureau of Labor Statistics, U.S. Department of Labor, *Occupational Outlook Handbook, 2016-17 Edition*, Civil Engineers, on the Internet at https://www.bls.gov/ooh/architecture-and-engineering/civill-engineers.htm (visited *Aug 23, 2017*)

Finally, the two main public service needs met by this program would be

- Educating the citizens of West Virginia
- Serving as a source of technical expertise

Student demand for the program:
There is good evidence of student demand for an engineering program at WVSU. The student enrollment of the current engineering 2+2 (civil, mechanical and industrial) increased from just a few students to 22 students within just one year. A brief survey of these engineering students was conducted. Table 4 summarizes the survey. A significant result is that 79 percent of the engineering students want to complete their B.S. in Engineering at WVSU. A survey was conducted of freshmen in other disciplines (biology/pre-medical, computer science, chemistry, undecided etc.) as shown in Table 5. It was found that out of 67 non-engineering students, 15 students wanted to complete a B.S. in Engineering. Another 15 students indicated that they would have enrolled in engineering if a four-year B.S. in Engineering program had existed (at the time of their enrolment) at WVSU.

Table 4: Survey of Students currently in the 2+2 engineering program at WVSU

Number Surveyed	Willing to Complete 4-year BSE at WVSU	
	Yes	No
14	**11**	3

Table 5: Survey of students currently NOT in engineering program at WVSU

Major	**Number Surveyed**	**Willing to Complete 4-year BSE at WVSU**		**If 4-year Engineering existed one year ago, would you have enrolled in the Engineering Program?**	
		Yes	**No**	**Yes**	**No**
Biology	34	6	28	6	28
Undecided	3	1	2	1	2
Psychology/Clinical Psychology	2	1	1	1	1
Computer Science	12	2	10	2	10
Chemistry/Applied Chemistry	8	2	6	2	6
Pre-Dental	2	0	2	1	1
Pre-Pharm	1	0	1	0	1
Political Science/Pre-Law	1	1	0	1	0
Elementary Education	1	0	1	0	0
Biotechnology	1	0	1	0	1
Math/Computer Science	1	1	0	0	1
Business	1	1	0	1	0
Total:	**67**	**15**		**15**	

e) Employment Opportunities (§133-11-6.3e)

According to the Bureau of Labor Statistics, employment of civil engineers is projected to grow 8 percent from 2014 to 2024 – i.e. an additional 23,600 new civil engineering job position will be created. As infrastructure continues to age, civil engineers will be needed to manage projects to rebuild bridges, repair roads and upgrade levees and dams as well as airports and buildings. A growing population leading to increasing urbanization means that new water systems will be required while, at the same time, aging, existing water systems must be maintained to reduce or eliminate leaks. In addition, more waste treatment plants will be needed to help clean the nation's waterways. Civil engineers will continue to play a key part in all of this work.

f) Program Impact (§133-11-6.3f)

The B.S. in Engineering program, housed within the College of Natural Sciences and Mathematics maintains that the impact will be positive and welcomed by those connected to the program in particular, and the WVSU community in general. The BSE program will generate revenue for the University in the form of tuition and fees paid by incoming and retained students.

The 2+2 engineering program is currently running at the WVSU campus. Many of the students are interested in a B.S. in engineering degree (Table 4 and 5 provides the evidence). The number of inquiries about a four-year program also indicates students go to other institutions because of lack of a bachelor's degree program at WVSU. Even after the implementation of B.S. in Engineering program at WVSU, 2+2 engineering programs (civil, mechanical and industrial) will continue to operate.

g) Cooperative Arrangements (§133-11-6.3g)
WVSU has transfer arrangements with the following institutions:

- BridgeValley Community and Technical College
- Marshall University
- New River Community and Technical College
- Southern West Virginia Community and Technical College
- West Virginia Northern Community and Technical College
- West Virginia University System

As the BSE develops, we would explore opportunities for collaborative activities, such as:

- Encouraging students to participate in internships through WVSU's Cooperative Education Office.
- Creating 2+2 arrangements with other community and technical colleges

h) Alternatives to Program Development (§133-11-6.3h)
No alternatives were considered.

6.4. Program Implementation and Projected Resource Requirements

a) Program Administration (§133-11-6.4a)
Initially, the program will be administered by the Mathematics & Computer Science Department. Eventually, it may be desirable to create an Associate Chair of Engineering position in the department to focus on scheduling, program review and development, etc.

b) Program Projections (§133-11-6.4b)
See Appendix I, Form 1.

c) Faculty Instructional Requirements (§133-11-6.4c)
At the present time, WVSU has (because of its 2+2 engineering program with WVU) two full-time faculty members both with a terminal degree in civil engineering. Most of the classes in the first two years of Bachelor of Science in Engineering with a major in Civil Engineering program will be taught by the current faculty members. Faculty resources to teach mathmetics, science, and general education classes are already available at WVSU. It is estimated that one new faculty member will need to be hired but not untill the program is well-established.

d) Library Resources and Instructional Materials (§133-11-6.4d)
WVSU has the existing library resources to deliver the program. WVSU's library currently holds twenty two (22) journal subscription in the fields of mathematics, science and computer science area. As the program develops, it is likely that increased funding in this area will be necessary.

e) Support Service Requirements (§133-11-6.4e)
The existing classrooms and computer (including the ones dedicated to 2+2 Engineering Program) and science labs will be used to deliver the program. Additionally, WVSU has included engineering as a part of its current Title III comprehensive development plan (2012-2017) and is proposing that engineering be included in the plan for the next five-year cycle (2018-2022). Funds are and will be available for faculty salaries and fringe, equipment and supplies, renovations, and other necessary items for the implementation of this academic program in engineering.

f) Facilities Requirements (§133-11-6.4f)
Initially, no new facilities are needed, nor is the renovation of existing facilities needed. As the program develops into its third and forth years, we will utilize the fourth floor of Wallace Hall at WVSU to establish the civil engineering laboratory.

g) Operating Resource Requirements (§133-11-6.4g)

See Appendix II, Form 2.

h) Source of Operating Resources (§133-11-6.4h)

WVSU has included engineering as a part of it current Title III comprehensive development plan (2012-2017) and is proposing that engineering be included in the plan for the next five-year cycle (2018-2022). Funds are and will be available for faculty salaries and fringe, equipment and supplies, renovations and other necessary items for the implementation of academic program in engineering.

6.5. Program Evaluation

a) Evaluation Procedures (§133-11-6.5a)
In a technical program such as Bachelor of Science in Engineering, assessment occurs continuously, based on how students perform. However, for purposes of data collection, some specific assessment mechanism will be used:

1) Common Exam Component: Many of the courses (see Program Evaluation Table below in Table 6) will culminate in a required exam. At least a portion of the exam will consist of a set of questions selected from a pool of potential questions that are specific to that course. The pool of appropriate exam questions will be developed by the faculty who regularly teach the course and will cover the core knowledge in the courses necessary for mastery of the subject. It will allow us to determine what students have learned in the program and how well they have learned it. The data provided by these tests will allow us to improve those areas of the program where there is a pattern of student weakness. In addition to exams, project presentations, reports, homework, and lab work will be assessed for the Program Level Outcomes (PLO) listed in Table 6.

2) Student Feedback: Every student will be surveyed in all the engineering courses and through an exit interview before their graduation. These surveys will include questions on how well the program prepared them for employment and how well it prepared them for continued training, as well as seeking their ideas for improving the program. This will provide data of indirect assessment for the Program Level Outcomes (PLO) listed in Table 6.

3) This program will be part of the standard review process for programs at West Virginia State University. As part of this process, quantitative data on majors, graduates, courses taught, etc. will be generated and recorded.

Table 6: Program Objectives and Assessment

Course Number and Title	**PLO Assessed**	**PLO Measure**
ENGR 101: Engineering Problem Solving I	d,h,f,c,k,g,b	Exam, Report, Presentation
ENGR 102: Engineering Problem Solving II	k,e,a	Exam, Report
ENGR 241: Statics	a,e	Exam, HW
ENGR 243: Mechanics of Materials	a,e	Exam, HW
*ENGR 2xx: Engineering graphics/CAD	c,g,k	Report, Lab, Exam
*ENGR 3xx: Thermodynamics	a, e, k	Exam, Report, Lab
*ENGR 2xx: Dynamics	a,e	Exam, HW
*ENGR 4xx: Senior Design Projects	d,e,g,h,i,k	Report, Presentation
*ENGR 3xx: Fluid Mechanics	a,e,k,b	Exam, Report, Lab
*CE 2xx: Surveying	a,i,k,e	Report, Lab, Exam
*CE 3xx: Civil Engineering Materials	a,c,k,b,d	Exam, Report, Lab
*CE 3xx: Structural Analysis I	a,e,g,b	Exam, HW
*CE 3xx: Intro to Geotechnical Engineering	b,e,g	Exam, Lab, Report
*CE 3xx: Intro to Environmental Engineering	b,h,j	Exam, Report
*CE 3xx: Intro to Transportation Engineering	a,c,e,g	Exam, HW
*CE 4xx: Steel Design	a,c,e,g,i	Exam, HW
*CE 4xx: Reinforced Concrete Design	c,i	Exam, HW
*CE 4xx: Environmental Engineering Design	a,c,e,k,j	Exam, Report, HW
*CE 4xx: Pavement Design	j,a,e,c,k	Exam, HW
*CE 4xx: Construction Method	a,e,g,j,k	Exam, HW

*New courses are identified with asterisks

b) Accreditation Status (§133-11-6.5b)

Once the West Virginia Higher Education Policy Commission approves the BSE degree, the institution will seek approval from the Higher Learning Commission of the North Central Association. As the program develops, the University will seek ABET (Accreditation Board for Engineering and Technology) accreditation. The criteria ABET uses for evaluating Engineering programs (as detailed in the *2017-2018 Criteria for Accrediting Engineering Programs*) are given in Appendix V.

Appendices

Appendix I
Program Projection – FORM 1

Title 133, Form 1:

Five Year Projection of Program Size

	First Year (2018)	Second Year (2019)	Third Year (2020)	Fourth Year (2021)	Fifth Year (2022)
Number of Students Served through Course Offerings of the Program:					
Headcount	20	30	38	46	50
FTE	-	-	-	-	-
Number of student credit hours generated by courses within the program (entire academic year)	-	-	-	-	-
Number of Majors:					
Headcount	5	15	25	30	35
FTE majors	-	-	-	-	-
Number of student credit hours generated by majors in the program (entire academic year):	-	-	-	-	-
Number of degrees to be granted (annual total):	0	0	0	2	4

Appendix II
Operating Resource Requirements – FORM 2

Title 133, Form 2:

Five Year Projection of
Total Operating Resources Requirements

	First Year (2018)	Second Year (2019)	Third Year (2020)	Fourth Year (2021)	Fifth Year (2022)
A. **FTE Positions**					
1. Administrators	0	0	0	0.25	0.25
2. Full-time Faculty	2(100%)	2(100%)	2(100%)	2.75(73%)	2.75(73%)
3. Adjunct Faculty	0	0	4	2	2
4. Graduate Assistants	0	0	0	0	0
5. Other Personnel:					
a. Clerical Workers	0	0	0	0	0
b. Professionals	0	0	0	0	0
Note: Includes percentage of time of current personnel					
B. **Operating Costs** (Appropriated Funds Only)					
1. Personnel Services:					
a. Administrators	0	0	0	15,000	15,000
b. Full-time Faculty	130,000	130,000	130,000	185,000	185,000
c. Adjunct Faculty	0	0	10,000	5,000	5,000
d. Graduate Assistants	0	0	0	0	0
e. Non-Academic Personnel					
Clerical Workers	0	0	0	0	0
Professionals	0	0	0	0	0
Total Salaries	130,000	130,000	140,000	205,000	205,000
2. Current Expenses	0	0	0	500	500
3. Repairs and Alterations	500	500	500	500	500
4. Equipment:					
Educational Equipment	90,000	90,000	90,000	90,000	90,000
Library Books	2,000	2,000	2,000	2,000	2,000
5. Nonrecurring Expense (specify)	1,000	1,000	1,000	1,000	1,000
Total Costs	223,500	223,500	233,500	299,000	299,000

Five Year Projection of
Total Operating Resources Requirements

	First Year (2018)	Second Year (2019)	Third Year (2020)	Fourth Year (2021)	Fifth Year (2022)
C. **Sources**					
1. General Fund Appropriations (Appropriated Funds Only)	73,500	73,500	83,500	149,000	149,000
_X_ Reallocation _____ New funds					
2. Federal Government (Non-appropriated Funds Only)	150,000	150,000	150,000	150,000	150,000
3. Private and Other (specify)	0	0	0	0	0
Total All Sources	223,500	223,500	233,500	299,000	299,000

Appendix III
HEPC Intent to Plan Approval

Bruce L. Berry, M.D.
Chair

Paul L. Hill, Ph.D.
Chancellor

Leading the Way: Access. Success. Impact.

West Virginia Higher Education Policy Commission
1018 Kanawha Boulevard, East, Suite 700
Charleston, West Virginia 25301
www.wvhepc.edu

April 20, 2017

Dr. Anthony L. Jenkins
President
West Virginia State University
Post Office Box 1000
Campus Box 399
Institute, WV 25112

Dear President Jenkins:

I approve the request from West Virginia State University to initiate the development of the following programs:

- Bachelor of Science in Engineering with a major in Chemical Engineering
- Master of Science in Sports Studies
- Master of Science in Computer Science

The proposals for implementation should be prepared in accordance with the language and provisions of Series 11, *Submission of Proposals for New Academic Programs at Public Regional Institutions and the Monitoring and Discontinuance of Existing Programs.* While the proposals will need to address the appropriate elements of Series 11, I encourage you to closely examine the institutional commitment that will be required to position the necessary resources, both human and financial, to support and sustain the proposed programs.

Addressing these issues will facilitate the timely review of your program proposals, once submitted. If you have questions or need assistance, please contact the Academic Affairs Office.

Sincerely,

Paul L. Hill
Chancellor

cc: Dr. Kumara Jayasuriya, Provost, West Virginia State University
Mr. Tom Bennett, II, Chief of Staff, West Virginia State University
Dr. Corley Dennison, III, Vice Chancellor for Academic Affairs, Commission

Appendix IV
Bachelor of Science in Engineering (BSE)
Curriculum Summary Sheet

BSE with a major in Civil Engineering Curriculum Sheet

West Virginia State University

1st year Fall		cr. Hr.
MATH 206	Calculus I[1]	4
ENGR 101	Intro to Engineering I	2
G ED 101	Freshman Experience	3
CHEM 105/107	General Chemistry I[2]	5
Tier I: B	Written Communication I	3
		17

[1] Tier I: E (Mathematics)
[2] Tier I: F (Scientific Reasoning)
Tier I: B - ENGL 101, ENGL 101E, ENGL 101H

1st year Spring		cr. Hr.
MATH 207	Calculus II	4
ENGR 102	Intro to Engineering II	3
PHSY 231/203	Physics for scientists and engineers I[3]	5
*ENGR 2xx	Engineering graphics/CAD	2
Tier I: C	Written Communication II	3
		17

[3] Tier II: E (Natural Science)
Tier I: C - ENGL 102, ENGL 102H, ENGL 112

2nd year Fall		cr. Hr.
MATH 208	Calculus III	4
PHYS 232/204	Physics for Scientists and Engineers II	5
ENGR 241	Statics	3
BIOL 120	Fundamentals of Biology	4
		16

2nd year Spring		cr. Hr.
MATH 415	Differential Equation for Scientists and Engineers	4
ENGR 243	Mechanics of Materials	3
*ENGR 3xx/3xx	Fluid Mechanics	4
*CE 2xx	Surveying	3
*CE 3xx	Civil Engineering Materials	3
	To	**17**

3rd year Fall		cr. Hr.
*CE 3xx	Structural Analysis I	4
*MATH 2xx	Probablility & Statistics for engineers	3
*ENGR 3xx	Thermodynamics	3
*CE 3xx	Intro to Geotechnical Engineering	4
*CE 3xx	Intro to Environmental Engineering	4
		18

3rd year Spring		cr. Hr.
*CE 3xx	Intro to Transportation Engineering	4
*CE 4xx	CE Design Elective	3
*ENGR 2xx	Dynamics	3
*CE 4xx	CE Design Elective	3
		13

4th year Fall		cr. Hr.
*CE 4xx	CE Open Elective	3
Tier II: G	Wellness	2
ECON 202	Principles of Microeconomics[4]	3
*CE 4xx	CE Open Elective	3
Tier I: D	Oral Communication	3
		14

Tier I: D - COMM 100, ENGL 201
Tier II: G - HHP 122, HHP 157, HHP 157H, HHP 242
[4] Tier II: F - Social Science
Tier II: A - ART 101, ART 101H, COMM 170, MUSIC 107
Tier II: D - HIST 201, HIST 201H, HIST 202, HIST 207, HIST 208
Tier II: B - ART 100, COMM 140, COMM 140H, ENGL 150, ENGL 150H, MUSC 104
Tier II: C - COMM

4th year Spring		cr. Hr.
*ENGR 4xx	Senior Design Projects	3
Tier II: D	History	3
Tier II: A	Arts	3
Tier II: B	Humanities	3
Tier II: C	International Perspectives	3
		15

CE Design Electives:
CE 4xx – Pavement Design
CE 4xx – Environmental Engineering Design
CE 4xx – Foundation Engineering
CE 4xx – Reinforced Concrete Design
CE 4xx – Steel Design
Or approved by Department Coordinator/Chair

CE Open Electives:
CE Design Electives
CE 4xx – Construction Engineering
CE 4xx – Structural Analysis 2
CE 4xx – Independent Study
CE 4xx – Research
CE 4xx – Construction Methods

*new courses are identified with asterisks

Total Credit hour for graduation = 127

Appendix V
ABET Criteria for Accrediting Engineering Programs

I. GENERAL CRITERIA FOR BACCALAUREATE LEVEL PROGRAMS

All programs seeking accreditation from the Engnieering Accreditation Commission of ABET must demonstrate that they satisfy all the following General Criteria for Baccalaureate Level Programs.

Criterion 1. Students

Student performance must be evaluated. Student progress must be monitored to foster success in attaining student outcomes, thereby enabling graduates to attain program educationl objectives. Students must be advised regarding curriculum and career matters.

The program must have and enforce policies for accepting both new and transfer students, awarding appropriate academic credit for courses taken at other institutions, and awarding appropriate academic credit for work in lieu of courses taken at the institttion. The program must have and enforce procedures to ensure and document that students who graduate meet all graduation requirements.

Criterion 2. Program Educational Objectives

The program must have published program educational objectives that are consistent with the mision of the institution, the needs of the program's various constituencies, and these criteria. There must be a documented, systematically utilized, and effective process, involving program constituencies, for the periodic review of these program educational objectives that ensures they remain consistent with the institutional mission, the program's constituents' needs, and these criteria.

Criterion 3. Student Outcomes

The program must have documented student outcomes that prepare graduates to attain the program educational objectives.

Student outcomes are outcomes (a) through (k) plus any additional outcomes that may be articulated by the program.

a. an ability to apply knowledge of mathematics, science and engineering
b. an ability to design and conduct experiments, as well as to analyze and interpret data
c. an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability
d. an ability to function on multidisciplinary teams
e. an ability to identify, formulate and solve engineering problems
f. an understanding of professional and ethical responsibility
g. an ability to communicate effectively
h. the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental and societal context

i. a recognition of the need for, and an ability to engage in life-long learning
j. a knowledge of contemporary issues
k. an ability to use the techniques, skills and modern engineering tools necessary for engineering practice

Criterion 4. Continuous Improvement

The program must regularly use appropriate, documented processes for assessing and evaluating the extent to which the student outcomes are being attained. The results of these evaluations must be systematically utilized as input for the continuous improvement of the program. Other available information may also be used to assist in the continuous improvement of the program.

Criterion 5. Curriculum

The curriculum requirements specify subject areas appropriate to engineering but do not prescribe specific courses. The faculty must ensure that the program curriculum devotes adequate attention and time to each component, consistent with the outcomes and objectives of the program and institution. The professional component must include:

(a) One year of a combination of college level mathematics and basic sciences (some with experimental experience) appropriate to the discipline. Basic sciences are defined as biological, chemical and physical sciences.
(b) One and one-half years of engineering topics, consisting of engineering sciences and engineering design appropriate to the student's field of study. The engineering sciences have their roots in mathematics and basic sciences but carry knowledge further toward creative application. These studies provide a bridge between mathematics and basic sciences on the one hand and engineering practice on the other. Engineering design is the process of devising a system, component, or process to meet desired needs. It is a decision-making process (often iterative), in which the basic sciences, mathematics, and the engineering sciences are applied to convert resources optimally to meet these stated needs.
(c) A general education component that complements the technical content of the curriculum and is consistent with the program and institution objectives.

Students must be prepared for engineering practice through a curriculum culminating in a major design experience based on the knowledge and skills acquired in earlier course work and incorporating appropriate engineering standards and multiple realistic constraints.

One year is the lesser of 32 semester hours (or equivalent) or one-fourth of the total credits required for graduation.

Criterion 6. Faculty

The program must demonstrate that the faculty members are of sufficient number and they have the competencies to cover all of the curricular areas of the program. There must be sufficient faculty to accommodate adequate levels of student-faculty interaction, student advising and counseling, university service activities, professional development and interactions with industrial and professional practitioners, as well as employers of students.

The program faculty must have appropriate qualifications and must have and demonstrate sufficient authority to ensure the proper guidance of the program and to develop and implement processes for the evaluation, assessment, and continuing improvement of the program. The overall competence of the faculty may be judged by such factors as education, diversity of backgrounds, engineering experience, teaching effectiveness and experience, ability to communicate, enthusiasm for developing more effective programs, level of scholarship, participation in professional societies, and licensure as professional engineers.

Criterion 7. Facilities

Classrooms, officies, laboratories and associated equipment must be adequate to support attainment of the student outcomes and to provide an atmosphere conducive to learning. Modern tools, equipment, computing resources and laboratories appropriate to the program must be available, accessible, and systematically maintained and upgraded to enable students to attain the student outcomes and to support program needs. Students must be provided appropriate guidance regarding the use of the tools, equipment, computing resources and laboratories available to the program.

The library services and the computing and information infrastructure must be adequate to support the scholarly and professional activities of the students and faculty.

Criterion 8. Institutional Support

Institutional support and leadership must be adequate to ensure the quality and continuity of the program.

Resources including institutional services, financial support, and staff (both administrative and technical) provided to the program must be adequate to meet program needs. The resources available to the program must be sufficient to attract, retain, and provide for the continued professional development of a qualified faculty. The resources available to the program must be sufficient to acquire, maintain, and operate infrastructures, facilities, and equipment appropriate for the program, and to provide an environment in which student outcomes can be attained.

PROGRAM CRITERIA FOR CIVIL AND SIMILARLY NAMED ENGINEERING PROGRAMS

These program criteria apply to engineering programs that include “civil,” or similar modifiers in their titles.

1. Curriculum

The curriculum must prepare graduates to apply knowledge of mathematics through differential equations, calculus-based physics, chemistry and at least one additional area of basic science; apply probability and statistics to address uncertainty; analyze and solve problems in at least four technical areas appropriate to civil engineering; conduct experiments in at least two technical areas of civil engineering and analyze and interpret the resulting data; design a system, component, or process in at least two civil engineering contexts; include principles of sustainability in design;

explain basic concepts in project management, business, public policy, and leadership; analyze issues in professional ethics; and explain the importance of professional licensure.

2. Faculty

The program must demonstrate that faculty teaching courses that are primarily design in content are qualified to teach the subject matter by virtue of professional licensure, or by education and design experience. The program must demonstrate that it is not critically dependent on one individual.