

**AGENDA**  
**West Virginia State University**  
**BOARD OF GOVERNORS**  
**Erickson Alumni Center, Grand Hall**  
**September 14, 2017**  
**12:00 p.m.**

1. Call to Order and Roll Call – Chair L. Vincent Williams, Esq., presiding
2. Verification of Appropriate Notification of Public Meeting 2
3. Review and Approval of Agenda 1
4. Review and Approval of Minutes of Previous Meeting 3
5. Reports from Board Committees
  - a. Presidential Review
  - b. Institutional Advancement
  - c. Finance
  - d. Audit
  - e. Academic Policies
  - f. Recruitment and Retention
6. Report from the University President
  - a. University Reports Forwarded by Board Committees
    - i. Computer Science, M.S. Program Approval 13
    - ii. Engineering, B.S. Program Approval 34
    - iii. Revised Board Meeting Dates 69
7. Possible Executive Session under the Authority of West Virginia Code §6-9A-4 to Discuss Legal, Personnel and Property Matters
8. Other Matters
9. Next Meeting Date
10. Adjournment

West Virginia State University  
*Board of Governors*

Date!Time: 9/14/2017-- 12:00 PM

Location:

West Virginia State University  
Erickson Alumni Center  
Grand Hall  
Institute, WV

Purpose: To conduct the regular business of the Board.

Notes:

This is a compliant meeting.

Meeting was approved: 9/7/2017 8:24:21 AM

**West Virginia State University Board of Governors**  
**Grand Hall, Erickson Alumni Center**  
**June 15, 2017**  
**Minutes**

**1. Call to Order and Roll Call**

Dr. Smith called the meeting of the West Virginia State University (WVSU) Board of Governors (BOG) to order at 12:00 PM.

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

**2. Verification of Appropriate Notice of Public Meeting**

Dr. Smith announced the verification of appropriate notice of public meeting.

**3. Review and Approval of Meeting Agenda**

Mrs. Pitchford motioned for approval of the agenda, and Mr. Konstanty seconded the motion. The motion carried.

**4. Review and Approval of Minutes of Previous Meeting**

Dr. Thralls motioned for approval of the minutes of the April 27, 2017 meeting, and Mr. Kelley seconded the motion. The motion carried.

**5. Announcements from the Chair**

Dr. Smith stated there were several special presentations for members of the Board whose terms were ending. She expressed appreciation to the members for their service and proceeded with the presentations.

- a. Prior to the Board meeting, a resolution was drafted to recognize Dr. Thralls for his service on the Board of Governors. Dr. Smith read the resolution aloud and asked that a copy be attached to the meeting minutes for the record. A ceremonial copy of the resolution was presented to Dr. Thralls by Dr. Smith and President Jenkins. Dr. Thralls thanked the Board for the privilege of serving with them all these years, stating that it has been a capstone experience and he is humbled by the opportunity. He noted that he has worked with boards throughout his career and found this Board to be extraordinary in its commitment to the University and higher education community. He said he would continue to hold WVSU very close in both his mind and heart.

Prior to the Board meeting, a resolution was drafted to recognize Dr. Guetzloff for his service as the faculty representative on the Board of Governors. Dr. Smith read the resolution aloud and asked that a copy be attached to the meeting minutes for the record. A ceremonial copy of the resolution was presented to Dr. Guetzloff by Dr. Smith and President Jenkins. Dr. Guetzloff expressed his appreciation to faculty present for electing him to serve as their representative for four consecutive terms. He

thanked the Board for their support, hard work and commitment which helped move the University forward.

Prior to the Board meeting, a resolution was drafted to recognize Mrs. Squirts for her service as the classified staff representative on the Board of Governors. Dr. Smith read the resolution aloud and asked that a copy be attached to the meeting minutes for the record. A ceremonial copy of the resolution was presented to Mrs. Squirts by Dr. Smith and President Jenkins. Mrs. Squirts thanked everyone and said it has been a pleasure and honor serving on the Board. She stated that the experience has been both educational and inspiring.

Prior to the Board meeting, a resolution was drafted to recognize Ms. Shafer for her service as the student representative on the Board of Governors. Dr. Smith read the resolution aloud and asked that a copy be attached to the meeting minutes for the record. Dr. Smith and President Jenkins presented a ceremonial copy of the resolution to Interim Assistant Vice President Joe Oden in Ms. Shafer's absence. Dr. Smith read aloud a statement prepared by Ms. Shafer. In her note, Ms. Shafer said the experience taught her about the inner workings of the Board and showed how much time is put into the University. The Board taught her more than she ever imagined she would learn and helped her grow a deeper love for the University. Ms. Shafer thanked the Board for the memorable experience. The resolution will be provided to Ms. Shafer later.

Mr. Williams motioned for adoption of the four resolutions as presented, and Mrs. Pitchford seconded the motion. The motion carried. Mr. Williams commented that he has served with Dr. Thralls for a number of years, and his professionalism and demeanor are aspiring attributes. He further expressed appreciation to Dr. Thralls for his diligent work on the various academic programs brought before the Board. Mr. Williams also recognized Dr. Guetzloff, Mrs. Squirts and Ms. Shafer for their engaging representation of their respective constituent groups.

## **6. Reports from Board Committees**

### **Institutional Advancement:**

Dr. Smith chaired the Committee and presented the report.

- Total number of donors this year are 1,217 compared to 1,032 last year. Total giving is down compared to last year, which is largely due to the completion of the capital campaign. New gifts include but are not limited to \$150,000 from BrickStreet, which will be divided to support different initiatives of the University, and another gift of \$25,000.
- To date, the total cash flow for this year is \$1.6 million. The Committee discussed how much of cash is actually seen and it was noted that a good amount flows through scholarship.
- The Committee received a presentation on planned giving about including WVSU in wills, trusts, etc. A new user-friendly website was created about planned giving. Staff are working to make videos of individuals who have already made commitments to the University through planned giving.

- Copies of the Save the Date for F<sup>2</sup>Q were distributed to the Board. There was an inquiry about how the event and funds raised impact student success, and Vice President for Planning and Advancement Patricia Schumann said the inaugural event cleared \$14,000, which is going to endowed scholarships. Two students were awarded scholarships this year from those funds. Dr. Smith noted that Diane Strong played a key role in outreach to the community to engage new people and businesses.
- The Committee discussed the idea of holding the next Black and Gold Gala on campus.
- Director of Alumni Relations Belinda Fuller provided an update on alumni engagement. One highlight was the communication and postcard campaign started for prospective students, as well as graduates.
- The Committee received information on upcoming alumni events, as well as a copy of the Homecoming schedule and brochure.
- WVSU National Alumni Association President Dr. Lateef Saffore developed a quarterly newsletter to enhance communication with alumni, which can be accessed on the alumni website.

#### Audit:

Mr. Swingle was absent. As a result, Mr. Williams presided over the meeting and presented the report.

- The Committee received an update on audits.
- There are no current audits internally or externally.
- Auditors visited campus for the initial intake in preparation for next year's audit.
- The state hired a new audit firm for OPEB and expects audits to be conducted more timely.

#### Recruitment and Retention:

Mr. Konstanty chaired the Committee and presented the report.

- Director of Admissions Ashley Weir reported on metrics and various recruitment initiatives.
- Provost and Vice President for Academic Affairs Dr. Kumara Jayasuriya provided an update on retention efforts.
- The new advising center for freshmen has opened and is going well.

#### Academic Policies:

Mrs. Pitchford chaired the Committee and presented the report.

- The Committee reviewed two academic program proposals.
- The B.S. in Engineering program was approved with one caveat that if the faculty recommends that minimum admissions standards change it would come back before the Board for ratification. The M.S. in Sports Studies program was also approved. Through Committee discussion, it was agreed to add reference to Earl Lloyd on page 52 of the proposal in regard to individuals cherished as part of the history of the University. The Committee will recommend approval by the full Board for both programs later on the agenda.

### Finance:

Mr. Williams chaired the Committee and presented the report.

- The Committee received an update on the April budget, which indicated the University was on target as of April 30.
- The May budget could not be finalized due to a system glitch and will be distributed to the Board when available.
- Committee discussion was held on Athletics budget. Staff said adjustments would be made to tuition waivers for student-athletes to help address the deficit.
- The Committee discussed the Upward Bound program. State and local representatives are working to have the U.S. Secretary of Education to re-review the University's application. The loss of the program will result in staff being repositioned in other areas of the University, including the R&D Corporation.
- The Committee discussed the state budget, which is still being negotiated.
- Discussion was held on the housing budget and expenses related to maintenance.

## **7. Report from the University President**

President Jenkins said the University would host a variety of summer camps such as the Governors School for Math and Science, Health Sciences and Technology Academy, North/South Football training camp, and the Coach Grant S. Gray and William "Weegee" Sawyers Summer Youth Program. He expressed his appreciation to the Board members whose terms are ending for their service and said he enjoyed working with them the past year. President Jenkins also acknowledged Vice President for University Relations and Operations Kimberly Osborne, who has accepting a position at UNC Greensboro. He said the University would not be where it is today in terms of marketing and branding without her. In addition, he introduced Executive Assistant Amanda Fellure and said she will be assisting staff with the Board moving forward. President Jenkins also thanked Vice President for Business and Finance Melvin Jones and Director of Physical Facilities Marvin Smith for their work to beautify the grounds and facilities. Lastly, President Jenkins acknowledged Dr. Micheal Fultz for leading flood relief efforts last year that resulted in the University receiving a Partners for Progress and Prosperity Regional Award (P3) from the American Chemical Society. Through this effort, WVSU students, staff and faculty, as well as the Kanawha Valley Section of the ACS, partnered with the Chemical Alliance Zone in June 2016 to provide relief to the affected schools by replacing lab and science equipment for Clendenin Elementary and Herbert Hoover High School.

### **a. University Reports Forwarded by Board Committees**

- Item 7.a.i: President Jenkins said, as recommended by the Academic Policies Committee, he brings before the Board for approval the B.S. in Engineering with a Major in Chemical Engineering program proposal. Dr. Thralls noted a provision with respect to possible admissions changes in the future being brought back before the Board for approval. Mr. Kelley motioned that the Board approve the program proposal as presented with the provision, and Mr. Konstanty seconded the motion. The motion carried.

- Item 7.a.ii: President Jenkins said, as recommended by the Academic Policies Committee, he brings before the Board for approval the M.S. in Sports Studies program proposal. Mrs. Pitchford commented that the Committee requested that Earl Lloyd be added on page 52 of the proposal concerning individuals who are cherished as part of the history of the University. Mr. Konstanty motioned that the Board approve the program proposal as amended, and Mr. Williams seconded the motion. The motion carried.
- Item 7.a.iii: President Jenkins asked Mr. Jones to present the BOG Budget Report. Mr. Jones provided an overview of the April report, which is on a modified cash basis. The income and expenditure rate target is 83.33 percent. Total income from beginning of the year to April 30 is at 92.21 percent, which is ahead of budget the rate. Total expenses are at 83.7 percent. The income for May and June are typically much lower because income payments are not being received those months; this will pick back up as beginning of the semester nears. Dr. Guetzloff inquired about the percentage of expenses in physical facilities. Mr. Jones explained it was for the entire campus and expenses have not all been transferred out to the appropriate areas. Dr. Guetzloff asked about Athletics, and President Jenkins said he began working mid-year to reduce the deficit in Athletics. He said the University must continue to reduce the amount of waivers awarded from different areas because there is no revenue attached to the waivers. Board discussion was held on housing and repair expenses.

**8. Possible Executive Session under the Authority of West Virginia Code §6-9A-4 to Discuss Legal, Personnel, and Property Matters**

Mr. Williams motioned for approval to go into executive session, under the authority of West Virginia Code §6-9A-4, to discuss legal, personnel, and property matters. Dr. Thralls seconded the motion, and the motion carried.

A motion to arise from executive session and reconvene into regular session was made by Mr. Kelley, and Mr. Konstanty seconded the motion. The motion carried. Dr. Smith asked for the record to reflect that the Board only discussed items related to the topics listed, that no decisions were made in executive session, and no motions or votes were taken.

**9. Announcements from the Chair Continued**

- a. Dr. Smith said the following dates have been proposed as outlined in the Board book for Fiscal Year 2018 meeting dates – September 14, 2017; December 7, 2017; January 24-25, 2018; March 15, 2018; April 19, 2018; and June 14, 2018. Board discussion was held on potentially changing the April meeting date to be closer to the Black and Gold Gala. President Jenkins said he would look at the possibility of having the Board meeting that Thursday, Foundation Board of Directors meeting on Friday, with the Black and Gold Gala being held on Saturday. Any recommended changes to Board meeting dates would be brought back to the Board for approval. There being no further discussion, Mr. Konstanty motioned that the Board approve the proposed Fiscal Year 2018 meeting dates as presented with the possible

amendment to the April meeting date. Mrs. Pitchford seconded the motion, and the motion carried.

- b. Dr. Smith stated three officers are to be elected during the Annual Meeting each year and become effective on July 1. Dr. Smith opened the floor for nominations. Mrs. Squirts proposed a slate of Mr. Williams as Chair, Mr. Lipscomb as Vice Chair, and Mrs. Pitchford as Secretary and moved that the Board elect these individuals. Dr. Guetzloff seconded the motion, and the motion carried. It was noted that Mr. Williams served in past as Vice Chair and Secretary.
- c. Dr. Smith said the Board of Governors Bylaws and Board of Governors Policy #61 specifies that the Presidential Review Committee shall be appointed each year. She proposed the following membership: Mrs. Pitchford, Mr. Kelley, Mr. Konstanty, Mr. Jones, and Dr. Smith. Dr. Smith asked for a motion to establish the Committee as proposed. Mrs. Pitchford so moved, and the motion was seconded by Dr. Guetzloff. The motion carried. As Chair-elect, Mr. Williams asked that the Committee hold an organizational meeting to elect a chair and begin its work.

**10. Other Matters**

At the request of Mrs. Squirts, President Jenkins spoke on House Bill 2542 regarding the elimination of classified staff and how the legislation would impact the University.

Dr. Smith asked that the minutes reflect that Mr. Kelley served as the student representative on the University's governing body in 1988.

**11. Next Meeting Date**

September 14, 2017

**12. Adjournment**

With there being no further business, the meeting adjourned at 2:57 p.m.

Respectfully submitted,

Gail Pitchford  
Secretary

Approved:

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Dr. Ann Brothers Smith  
Chair (Outgoing)

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L. Vincent Williams  
Chair-elect





WEST VIRGINIA STATE UNIVERSITY BOARD OF GOVERNORS  
RECOGNIZES AND APPRECIATES THE DEDICATED SERVICE OF

## DR. JOHN F. THRALLS

WHEREAS, Dr. John F. Thralls faithfully served as a member of the West Virginia State University Board of Governors beginning October 20, 2009 and ending June 30, 2016, and continuum service thereafter; and

WHEREAS, Dr. Thralls worked diligently for more than 30 years to impart an enduring love of learning and discovery in the hearts and minds of countless generations of students, while spearheading numerous advancements in higher education; and

WHEREAS, Dr. Thralls played a pivotal role and provided invaluable insight for two Presidential Searches and subsequent Presidential hiring of the 10th and 11th Presidents of the University; and

WHEREAS, Dr. Thralls demonstrated consummate professionalism by exhibiting integrity, respect and sincerity at all times while serving his board tenure; and

WHEREAS, Dr. Thralls served as a dedicated member of the Academic Policies, Presidential Review and Recruitment and Retention Committees; and

WHEREAS, Dr. Thralls in all that he does, exudes a limitless passion, calming presence and gentle spirit, which is evident through his love of his family, and life of public service; and

WHEREAS, Dr. Thralls, during his board tenure expressed a deep passion for the University's core values, mission and vision; and

WHEREAS, the West Virginia State University Board of Governors, on behalf of the students, faculty, staff, alumni and friends of the University, hereby gratefully acknowledges the distinguished service and immense contributions of Dr. Thralls.

NOW, THEREFORE, BE IT RESOLVED, that the West Virginia State University Board of Governors, meeting on this 15th day of June, 2017, hereby commends Dr. John F. Thralls for his dedication to excellence and public service at West Virginia State University, in the Kanawha Valley, and across the State of West Virginia; and

BE IT FURTHER RESOLVED, that this commendation is archived on the pages of the minutes of this meeting and a ceremonial copy presented to Dr. John F. Thralls as a token of the Board's everlasting appreciation and sincerest gratitude.

Dr. Ann Brothers Smith  
Chair, Board of Governors

Dr. Anthony L. Jenkins  
President, West Virginia State University



WEST VIRGINIA STATE UNIVERSITY BOARD OF GOVERNORS  
RECOGNIZES AND APPRECIATES THE DEDICATED SERVICE OF

## DR. THOMAS F. GUETZLOFF

WHEREAS, Dr. Thomas F. Guetzloff has served as a Professor of Analytical Chemistry at West Virginia State University for more than 17 years; and

WHEREAS, Dr. Guetzloff continues to be a leader on campus and has been instrumental in the launch of First Year Academic Advising Center for the class of 2021; and

WHEREAS, Dr. Guetzloff played a pivotal role and provided invaluable insight for two Presidential Searches and subsequent Presidential hiring of the 10th and 11th Presidents of the University; and

WHEREAS, Dr. Guetzloff has earned the admiration and respect of countless students and colleagues for his dedication, enthusiasm, professionalism and hard work to West Virginia State students, as well as the entire campus community; and

WHEREAS, Dr. Guetzloff served as a dedicated member of the Academic Policies, Institutional Advancement, and Recruitment and Retention Committees; and

WHEREAS, Dr. Guetzloff was elected by his peers to serve as the Faculty representative on the Board of Governors and faithfully provided excellent leadership and service to the Board of Governors beginning July 1, 2009, and ending on June 30, 2017; and

WHEREAS, Dr. Guetzloff, during his board tenure demonstrated a deep passion for the University's core values, mission and vision; and

WHEREAS, Dr. Guetzloff actively communicated with fellow members of the faculty and state and local leaders, as well as the entire University community, on issues of vital importance to the University throughout his tenure on the Board of Governors.

NOW, THEREFORE, BE IT RESOLVED, that the West Virginia State University Board of Governors, meeting on this 15th day of June, 2017, hereby commends Dr. Thomas F. Guetzloff for his dedication to excellence and public service at West Virginia State University, in the Kanawha Valley, and across the State of West Virginia; and

BE IT FURTHER RESOLVED, that this commendation is archived on the pages of the minutes of this meeting and a ceremonial copy presented to Dr. Thomas F. Guetzloff as a token of the Board's everlasting appreciation and sincerest gratitude.

Dr. Ann Brothers Smith  
Chair, Board of Governors

Dr. Anthony L. Jenkins  
President, West Virginia State University



WEST VIRGINIA STATE UNIVERSITY BOARD OF GOVERNORS  
RECOGNIZES AND APPRECIATES THE DEDICATED SERVICE OF

## MRS. DAISY SQUIRTS

WHEREAS, Mrs. Daisy Squirts has served as an Academic Assistance Counselor at West Virginia State University for more than 24 years; and

WHEREAS, Mrs. Squirts played a pivotal role and provided invaluable insight for two Presidential searches and subsequent Presidential hiring of the 11th President of the University; and

WHEREAS, Mrs. Squirts has earned the admiration and respect of countless students and colleagues for her dedication, collegiality, enthusiasm, professionalism and hard work to West Virginia State students, as well as the entire campus community; and

WHEREAS, Mrs. Squirts was elected by her peers to serve as the Classified Staff Council representative on the Board of Governors and faithfully provided excellent leadership and service to the Board of Governors beginning July 1, 2015, and ending June 30, 2017; and

WHEREAS, Mrs. Squirts served as a valued member of the Audit, Bylaws and Policy Review, Institutional Advancement, and Finance Committees; and

WHEREAS, Mrs. Squirts, during her tenure, demonstrated a deep passion for the University's core values, mission and vision; and

WHEREAS, Mrs. Squirts actively communicated with fellow members of the classified staff and state and local leaders, as well as the entire University community, on issues of vital importance to staff throughout her tenure on the Board of Governors.

NOW, THEREFORE, BE IT RESOLVED, that the West Virginia State University Board of Governors, meeting on this 15th day of June, 2017, hereby commends Mrs. Daisy Squirts for her dedication to excellence and public service at West Virginia State University, in the Kanawha Valley, and across the State of West Virginia; and

BE IT FURTHER RESOLVED, that this commendation is archived on the pages of the minutes of this meeting and a ceremonial copy presented to Mrs. Daisy Squirts as a token of the Board's everlasting appreciation and sincerest gratitude.

Dr. Ann Brothers Smith  
Chair, Board of Governors

Dr. Anthony L. Jenkins  
President, West Virginia State University



WEST VIRGINIA STATE UNIVERSITY BOARD OF GOVERNORS  
RECOGNIZES AND APPRECIATES THE DEDICATED SERVICE OF

## SHEALYN SHAFER

WHEREAS, Ms. Shealyn Shafer faithfully served as a member of the West Virginia State University Board of Governors beginning July 1, 2016, and ending June 30, 2017; and

WHEREAS, Ms. Shafer faithfully represented the student body in all Board deliberations and served as a strong student advocate in all situations; and

WHEREAS, Ms. Shafer demonstrated a deep passion for the University's core values and unique student experiences, while actively communicating with fellow members of the student body, as well as the entire University community, on issues of vital importance to all facets of the University and its operation; and

WHEREAS, Ms. Shafer participated as a dedicated member of the Academic Policies, Institutional Advancement, and Recruitment and Retention Committees; and

WHEREAS, Ms. Shafer proudly represented the University as a student-athlete and member of the women's basketball team for four years scoring over 1,000 points and pulling down over 800 rebounds; and

WHEREAS, Ms. Shafer is a talented and poised leader who has earned the respect of all members of the Board of Governors, and who truly will make a difference in the decades to come; and

WHEREAS, the West Virginia State University Board of Governors, on behalf of the students, faculty, staff, alumni and friends of the University, hereby gratefully acknowledges the distinguished service demonstrated by Ms. Shafer through her tenure on the Board of Governors.

NOW, THEREFORE, BE IT RESOLVED, that the West Virginia State University Board of Governors, meeting on this 15th day of June, 2017, hereby commends Ms. Shealyn Shafer for her dedication to excellence and public service at West Virginia State University, in the Kanawha Valley, and across the State of West Virginia; and

BE IT FURTHER RESOLVED, that this commendation is archived on the pages of the minutes of this meeting and a ceremonial copy presented to Ms. Shealyn Shafer as a token of the Board's everlasting appreciation and sincerest gratitude.

Dr. Ann Brothers Smith  
Chair, Board of Governors

Dr. Anthony L. Jenkins  
President, West Virginia State University

**Computer Science, M.S. Program Approval**



WEST VIRGINIA  
STATE  
UNIVERSITY

APPROVAL FOR A NEW PROGRAM  
MASTER OF SCIENCE IN  
COMPUTER SCIENCE

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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**

<b>Institution</b>	<b>Institution Type</b>	<b>CIP Code(s)</b>	<b>Description</b>
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**

<b>Major</b>	<b>Number Surveyed</b>	<b>Number Who Want a M.S. in Computer Science</b>	<b>Number Who Don't Want a M.S. in Computer Science</b>	<b>Number Who Prefer a Traditional Program</b>	<b>Number Who Prefer an online Program</b>
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
<b>Total:</b>	<b>112</b>	<b>58</b>	<b>14</b>	<b>40</b>	<b>18</b>

*§§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)
<b>Number of Students Served through Course Offerings of the Program:</b>					
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
<b>Number of Majors:</b>					
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.

**Five Year Projection of  
Total Operating Resources Requirements**

	<b>First Year (2018)</b>	<b>Second Year (2019)</b>	<b>Third Year (2020)</b>	<b>Fourth Year (2021)</b>	<b>Fifth Year (2022)</b>
<b>A. FTE Positions</b>					
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
<b>Note: Includes percentage of time of current personnel</b>					
<b>B. Operating Costs (Appropriated Funds Only)</b>					
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
<b>Total Salaries</b>	<b>80,000</b>	<b>80,000</b>	<b>165,000</b>	<b>170,000</b>	<b>170,000</b>
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
<b>Total Costs</b>	<b>84,500</b>	<b>84,500</b>	<b>169,500</b>	<b>175,000</b>	<b>175,000</b>

**Five Year Projection of  
Total Operating Resources Requirements**

	<b>First Year (2018)</b>	<b>Second Year (2019)</b>	<b>Third Year (2020)</b>	<b>Fourth Year (2021)</b>	<b>Fifth Year (2022)</b>
<b>C. Sources</b>					
1. General Fund Appropriations (Appropriated Funds Only)	81,500	81,500	81,500	81,500	81,500
<u>X</u> 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 Equipment:* 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/JavaScript, 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.

**Engineering, B.S. Program Approval**



WEST VIRGINIA  
STATE  
UNIVERSITY

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

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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 21<sup>st</sup> 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 21<sup>st</sup> 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**

<b>Course Number and Title</b>	<b>PLO Assessed</b>	<b>PLO Measure</b>
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 cumulative 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 cumulative 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 (§133-11-6.2.c.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

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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

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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

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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 <sup>1</sup>	4
ENGR 101	Intro to Engineering I	2
G ED 101	Freshman Experience	3
CHEM 105/107	General Chemistry I <sup>2</sup>	5
Tier I: B	Written Communication I	3

<sup>1</sup> Tier I: E (Mathematics) **17**  
<sup>2</sup> 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 <sup>3</sup>	5
*ENGR 2xx	Engineering graphics/CAD	2
Tier I: C	Written Communication II	3

<sup>3</sup> Tier II: E (Natural Science) **17**  
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	Probability & 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 <sup>4</sup>	3
*CE 4xx	CE Open Elective	3
Tier I: D	Oral Communication	3

**14**

**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

Tier I: D - COMM 100, ENGL 201  
Tier II: G - HHP 122, HHP 157, HHP 157H, HHP 242  
<sup>4</sup>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

**CE Design Electives: 15**  
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:

#### GENERAL 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**

<b>Institution</b>	<b>Institution Type</b>	<b>CIP Code(s)</b>	<b>Program Type</b>
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.

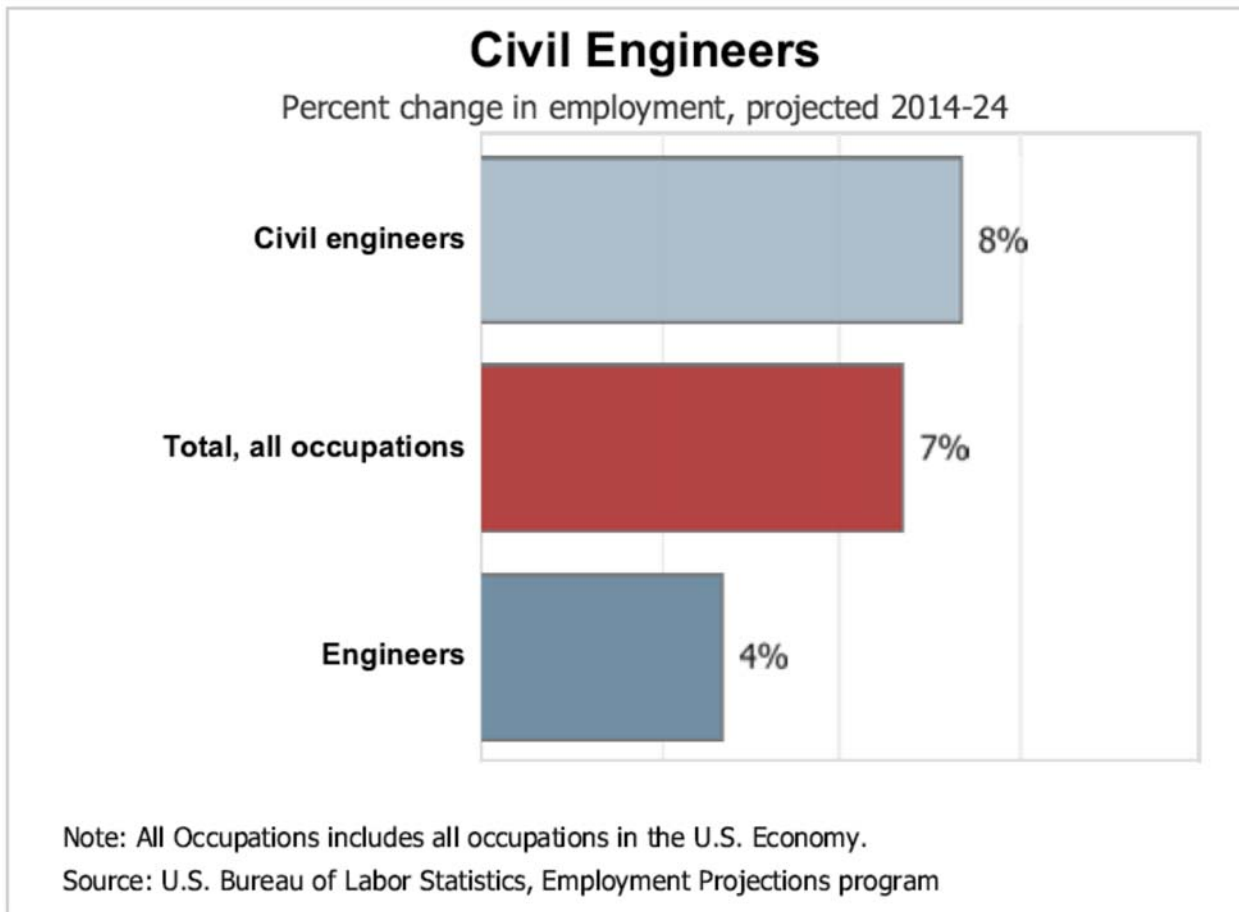
The societal needs met would include:

- 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<sup>1</sup>, 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)**

<sup>1</sup>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
<b>14</b>	<b>11</b>	<b>3</b>

**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
<b>Total:</b>	<b>67</b>	<b>15</b>		<b>15</b>	

**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 mathematics, 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 until 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 fourth 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 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 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**

<b>Course Number and Title</b>	<b>PLO Assessed</b>	<b>PLO Measure</b>
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**

	<b>First Year (2018)</b>	<b>Second Year (2019)</b>	<b>Third Year (2020)</b>	<b>Fourth Year (2021)</b>	<b>Fifth Year (2022)</b>
<b>Number of Students Served through Course Offerings of the Program:</b>					
Headcount	20	30	38	46	50
FTE	-	-	-	-	-
Number of student credit hours generated by courses within the program (entire academic year)	-	-	-	-	-
<b>Number of Majors:</b>					
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**

	<b>First Year (2018)</b>	<b>Second Year (2019)</b>	<b>Third Year (2020)</b>	<b>Fourth Year (2021)</b>	<b>Fifth Year (2022)</b>
<b>A. FTE Positions</b>					
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)

<b>1. Personnel Services:</b>					
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
<b>Total Salaries</b>	<b>130,000</b>	<b>130,000</b>	<b>140,000</b>	<b>205,000</b>	<b>205,000</b>
<b>2. Current Expenses</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>500</b>	<b>500</b>
<b>3. Repairs and Alterations</b>	<b>500</b>	<b>500</b>	<b>500</b>	<b>500</b>	<b>500</b>
<b>4. Equipment:</b>					
Educational Equipment	90,000	90,000	90,000	90,000	90,000
Library Books	2,000	2,000	2,000	2,000	2,000
<b>5. Nonrecurring Expense (specify)</b>	<b>1,000</b>	<b>1,000</b>	<b>1,000</b>	<b>1,000</b>	<b>1,000</b>
<b>Total Costs</b>	<b>223,500</b>	<b>223,500</b>	<b>233,500</b>	<b>299,000</b>	<b>299,000</b>

**Five Year Projection of  
Total Operating Resources Requirements**

	<b>First Year (2018)</b>	<b>Second Year (2019)</b>	<b>Third Year (2020)</b>	<b>Fourth Year (2021)</b>	<b>Fifth Year (2022)</b>
<b>C. Sources</b>					
1. General Fund Appropriations (Appropriated Funds Only)	73,500	73,500	83,500	149,000	149,000
<input checked="" type="checkbox"/> Reallocation					
<input type="checkbox"/> 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,

A handwritten signature in black ink, appearing to read "Paul L. Hill".

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

CHANCELLOR'S OFFICE  
(304) 558-0699 phone • (304) 558-1011 fax

**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 <sup>1</sup>	4
ENGR 101	Intro to Engineering I	2
G ED 101	Freshman Experience	3
CHEM 105/107	General Chemistry I <sup>2</sup>	5
Tier I: B	Written Communication I	3

<sup>1</sup> Tier I: E (Mathematics) **17**

<sup>2</sup> Tier I: F (Scientific Reasoning)

Tier I: B - ENGL 101, ENGL 101E, ENGL 101H

**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**

**3rd year Fall** cr. Hr.

*CE 3xx	Structural Analysis I	4
*MATH 2xx	Probability & Statistics for engineers	3
*ENGR 3xx	Thermodynamics	3
*CE 3xx	Intro to Geotechnical Engineering	4
*CE 3xx	Intro to Environmental Engineering	4

**18**

**4th year Fall** cr. Hr.

*CE 4xx	CE Open Elective	3
Tier II: G	Wellness	2
ECON 202	Principles of Microeconomics <sup>4</sup>	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

<sup>4</sup>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

**1st year Spring** cr. Hr.

MATH 207	Calculus II	4
ENGR 102	Intro to Engineering II	3
PHYS 231/203	Physics for scientists and engineers I <sup>3</sup>	5
*ENGR 2xx	Engineering graphics/CAD	2
Tier I: C	Written Communication II	3

<sup>3</sup> Tier II: E (Natural Science) **17**

Tier I: C - ENGL 102, ENGL 102H, ENGL 112

**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 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 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

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: **15**

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**

**Appendix V**  
**ABET Criteria for Accrediting Engineering Programs**



## I. GENERAL CRITERIA FOR BACCALAUREATE LEVEL PROGRAMS

All programs seeking accreditation from the Engineering 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 educational 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 institution. 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 mission 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, offices, 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.

**Proposed Amended Fiscal Year 2018 Meeting Dates**

As required by West Virginia Code, the Board of Governors must hold a total of six meetings a year with an annual meeting during the month of June for the purpose of electing officers. As outlined in the Board of Governors Bylaws, specifically Article II (Meetings), Section A (Meetings), Items 1 through 7, the following are required:

*A. Meetings*

- 1. The Board of Governors shall hold a minimum of six (6) meetings during each fiscal year, to include an annual meeting each June.*
- 2. Notice of meetings shall be in accordance with the Open Governmental Meetings Act.*
- 3. Of the twelve (12) voting members of the Board of Governors, seven (7) shall constitute a quorum.*
- 4. Special meetings may be convened by the Chair or upon petition of a majority of the members.*
- 5. Meeting procedures shall be in accordance with Robert's Rules of Order subject to the suspension of any rule by a two-thirds vote of the Board.*
- 6. An annual meeting shall be convened each June for the purpose of selecting a Chairperson and other officers.*
- 7. The Board of Governors shall provide an opportunity for administrators, faculty, students and classified staff to discuss various issues no less than one (1) time per year. The viewpoints of the various constituencies should be presented by a person or persons selected by those constituencies. That person shall be someone other than the constituency's board representative.*

For Fiscal Year 2018, the below amended meeting dates are proposed for the Board's consideration and review:

September 14, 2017

December 8, 2017

January 24-25, 2018

April 6, 2018

May 11, 2018

June 14, 2018